

DICEM

DEPARTMENT OF CIVIL
AND MECHANICAL
ENGINEERING

HEAD:
PROF. DOMENICO FALCONE



MISSION

The Department of Civil and Mechanical Engineering pursues its vision through:

- ✓ The education of highly qualified civil and mechanical engineers capable of meeting the challenges of a constantly evolving world.
- ✓ The development of cutting-edge scientific and technological research, focusing on issues of strategic importance to society and the environment.
- ✓ The promotion of technology transfer and third-mission activities, contributing to the economic and social growth of the local area.
- ✓ The creation of a stimulating and inclusive working environment that values diversity and fosters the professional growth of faculty members, researchers, technical and administrative staff, and students.

The DICEM provides a comprehensive and rigorous education that integrates theoretical knowledge with practical experience. This promotes a deep understanding of the fundamental principles, concepts and methodologies of civil and mechanical engineering. Its graduates are prepared to design, build and maintain sustainable and resilient infrastructure, as well as to develop innovative mechanical systems that improve quality of life and technological progress.

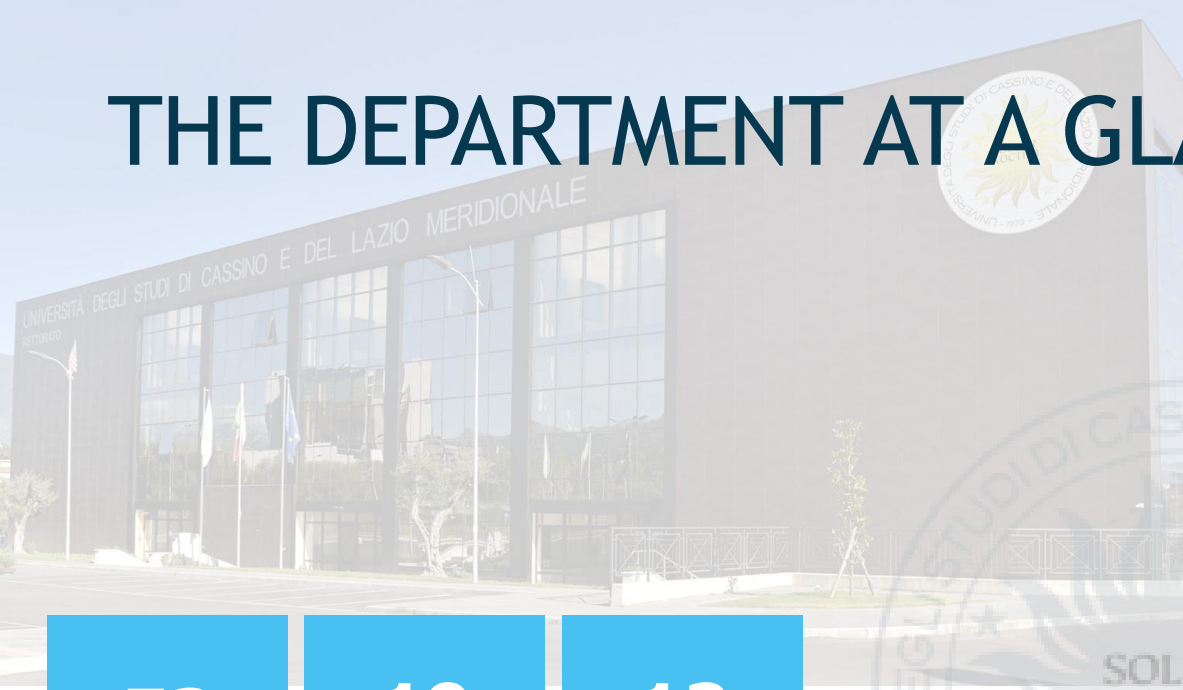
LET US DESIGN AND BUILD YOUR FUTURE TOGETHER

OVERVIEW

The Department of Civil and Mechanical Engineering aims to become a centre of excellence in education and research, recognised nationally and internationally for the quality and innovation of its activities and for its strong impact on the technological, economic and social development of the local area. Its goal is to educate and prepare future engineers with the abilities, expertise and ethical values needed to address the complex challenges of infrastructure, construction and mechanical-system development.

To achieve its objectives, DICEM promotes a culture of continuous learning and professional development among faculty, staff and students, constantly encouraging exploration and innovation while fostering curiosity and critical thinking. It seeks to create an inclusive and collaborative environment that supports interdisciplinary research, creativity, and excellence in teaching and learning.

THE DEPARTMENT AT A GLANCE



53

DOCENTI,
RICERCATORI
E RICERCATRICI

19

DIRIGENTI,
PERSONALE TECNICO
AMMINISTRATIVO

12

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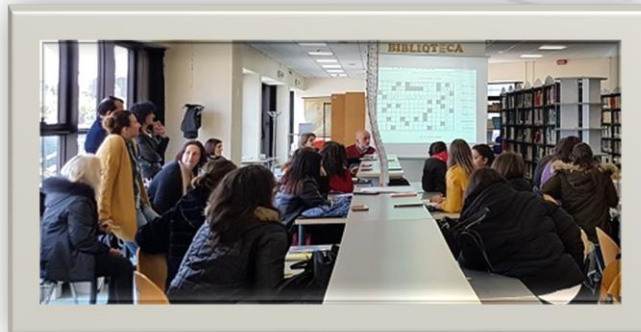
STUDENTI DI CUI

337

STRANIERI

28

DOTTORANDI



The Department of Civil and Mechanical Engineering (DICEM) comprises 53 permanent faculty members and researchers and 12 fixed-term researchers, distributed across 26 academic disciplines. It also includes 19 managers and technical, administrative and library staff. DICEM operates 13 laboratories supporting both research and laboratory-based teaching.

Its principal scientific fields include mechanical, management, civil and environmental engineering, together with basic sciences such as physics and chemistry.

A total of 1,201 students are enrolled in the 10 Bachelor's and Master's degree programmes administered by DICEM, including a substantial international community of 337 students from numerous countries.

DEPARTMENT MEMBERS

Full Professors

Fausto Arpino
Nicola Bonora
Giorgio Buonanno
Michela Cigola
Mauro D'Apuzzo
Gianfranco Dell'Agli
Marco Dell'Isola
Giovanni De Marinis
Vittorio Di Cocco
Domenico Falcone
Giorgio Figliolini
Gustavo Fontana
Michele Grimaldi
Francesco Iacoviello
Maura Imbimbo
Giuseppe Modoni
Michele Pansini
Wilma Polini
Andrew Ruggeri
Michele Saroli
Luca Sorrentino

Associate Professors

Costanzo Bellini
Andrea Caporale
Gino Cortellessa
Gianpaolo Di Bona
Giorgio Ficco
Enzo Galloni
Arturo Gallozzi
Rudy Gargano
Francesco Granata
Ernesto Grande
Marco Greco
Gianluca Iannitti
Angelo Leopardi
Antonello Marocco
Erika Ottaviano
Alessandra Perna
Marco Race
Erminio Salvatore
Alessandro Silvestri
Giuseppe Spazzafumo
Luca Stabile
Gabriel Testa
Carla Tricarico
Sandro Turchetta
Jeffery Wyss
Marcello Zordan

Researchers

Massimo Cavacece
Gaspere Giovinco
Gillo Giuliano
Carmine Elvezio Pagliarone
Alessandro Rasulo
Domenico Speranza

Fixed-term Researcher

Francesco Bianco
Laura Canale
Elisa Caracci
Fabio Di Nunno
Matteo Fiorucci
Giorgio Grossi
Davide Lanni
Benito Mignacca
Alberto Porzio
Sara Ricci
Luciano Tomassi
Valentina Tomei

Laboratory Technicians

Alberto Colantuono
Raffaele D'Alessio
Mario Fionda
Lino Fuoco
Chiara Lanni

DEGREE PROGRAMMES

3

CORSI DI LAUREA

1

BACHELOR'S DEGREE

4

CORSI DI LAUREA
MAGISTRALE

2

MASTER'S DEGREES



DICEM offers the following Bachelor's and Master's degree programmes:

Bachelor's Degree in Civil and Environmental Engineering (L-7)

Bachelor's Degree in Industrial Engineering (L-9)

Bachelor's Degree in Management Engineering (L-9, Frosinone campus)

Bachelor's Degree in Industrial Engineering Technology (L-9)

Master's Degree in Civil and Environmental Engineering (LM-23)

Master's Degree in Management Engineering (LM-31, Frosinone campus)

Master's Degree in Mechanical Engineering (LM-33)

Master's Degree in Civil Engineering for the Environment and Territory (LM-35)

Master's Degree in Civil and Environmental Engineering (LM-23, taught in English)

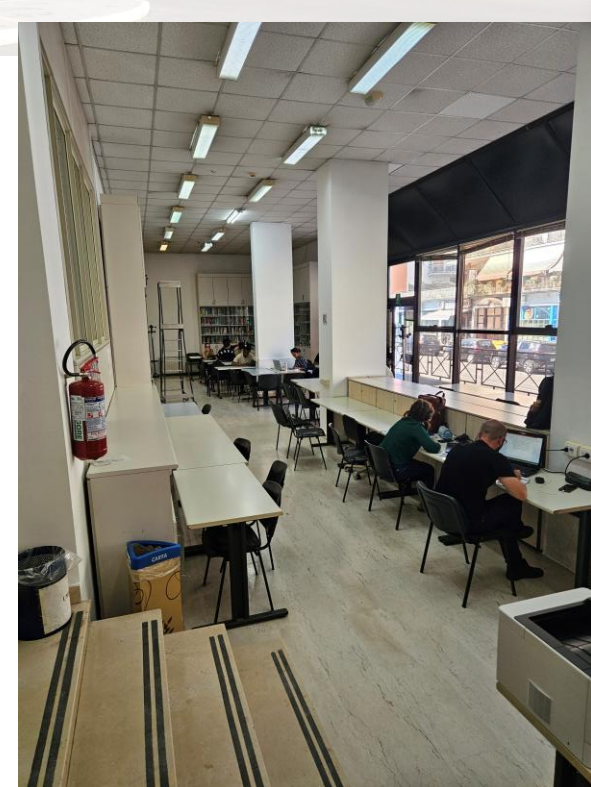
Master's Degree in Mechanical Engineering (LM-33, taught in English)

LIBRARIES AND FACILITIES

The Engineering Library Services Centre manages the acquisition, cataloguing and use of the book and documentary collections of the Department of Electrical and Information Engineering, the Department of Civil and Mechanical Engineering, and the Frosinone campus.

The library collection includes almost 8,000 printed monographs and more than 4,000 annual volumes of printed journals.

The IEL, Scopus and Web of Science databases are available.



RESEARCH GROUPS



DICEM has extensive experience in scientific research and technological development in Mechanical, Management, Civil and Environmental Engineering.

DICEM's scientific activities are organised into 14 research groups:



Structural Analysis and Design
coordinated by Maura Imbimbo

Documentation, Analysis, Surveying and
Architectural and Territorial Technology
coordinated by Michela Cigola

Applied Physics and Building Physics
coordinated by Marco Dell'Isola, Giorgio
Buonanno and Fausto Arpino

Geology and Environmental and Sanitary
Engineering
coordinated by Michele Saroli

Geotechnical Engineering
coordinated by Giuseppe Modoni

Industrial Plant Management and Safety
coordinated by Domenico Falcone

Water Engineering
coordinated by Giovanni De Marinis

Energy Conversion Systems and Machinery
coordinated by Gustavo Fontana

Materials
coordinated by Gianfranco Dell'Agli

Mechanics of Machines
coordinated by Giorgio Figliolini

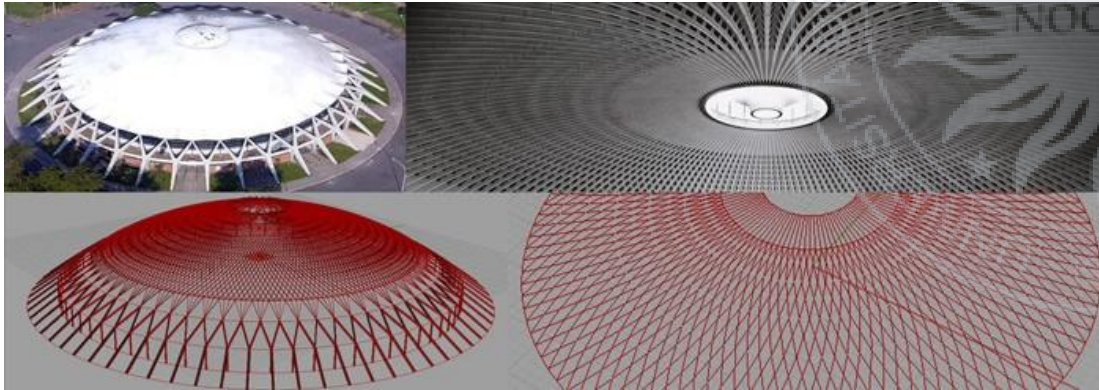
Metallurgy
coordinated by Francesco Iacoviello

Mechanical Design
coordinated by Gianluca Iannitti

Roads, Railways and Airports
coordinated by Mauro D'Apuzzo

Manufacturing Technologies and Systems
coordinated by Luca Sorrentino

STRUCTURAL ANALYSIS AND DESIGN LABORATORY (LAPS)



The research group investigates solid, material and structural mechanics, addressing fundamental construction problems involving structural response to loads, reliability, safety and optimisation. Its work covers statics, dynamics, instability, fracture and collapse, as well as behavioural models used to describe these phenomena.

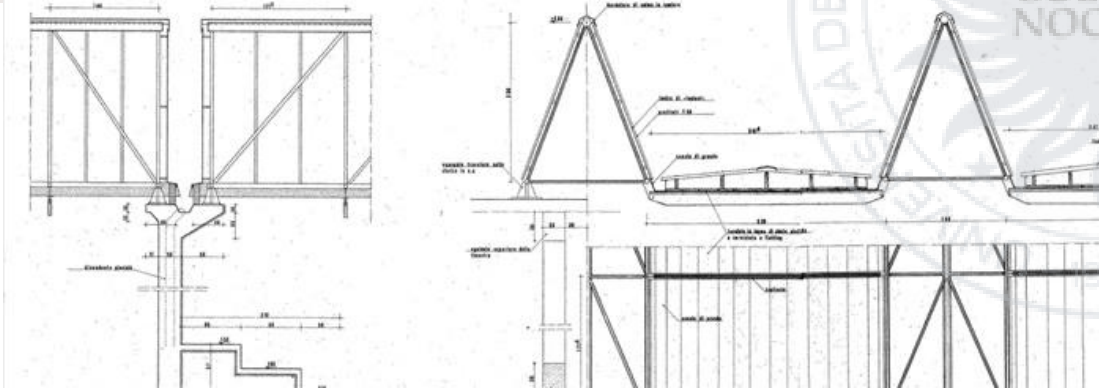
The group combines physical and mathematical modelling, computational mechanics, experimental analysis and structural identification. Its research extends to interactions between structures and the physical environment, non-conventional materials and structures, the historical development of structural models, and the structural interpretation of historic buildings and monuments.

The group also develops theories and techniques for the structural conception and design of new buildings and for the assessment and rehabilitation of existing structures.

Activities therefore include loads on structures and the resulting behaviour as a function of typology, morphology, materials, technologies, soil and environmental interaction, and strategies for use and control.

They also cover vulnerability, reliability, comfort, safety and durability assessment; methods and tools for structural design and construction; experimental testing, acceptance testing and structural monitoring; historical studies of construction; and safety assessments and structural intervention solutions for historic buildings and monuments.

DOCUMENTATION, ANALYSIS, SURVEYING AND ARCHITECTURAL AND TERRITORIAL TECHNOLOGY LABORATORY (DART)

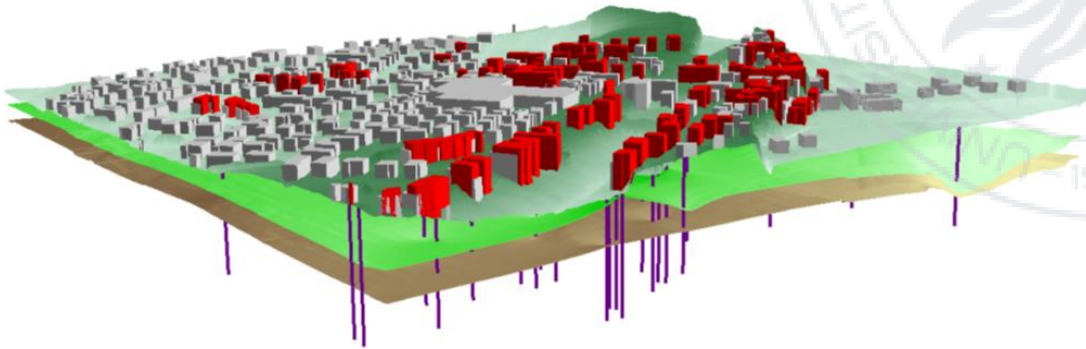


Within the research group, members of the ICAR/17 academic field carry out scientific and educational activities concerning the representation of architecture, cities and the environment. Representation is understood broadly as a means of understanding the laws governing formal structure, a tool for analysing existing values, and an expressive and visual communication medium for design ideas at different scales.

The group studies the scientific foundations of drawing, computer modelling, virtual representation and reverse modelling, together with their theories and methods, both innovative and historical. Surveying is investigated as a means of understanding architectural, urban and environmental reality, from direct and instrumental methods to the most advanced digital procedures for metric, morphological and thematic restitution. Drawing is examined as a graphic, infographics and multimedia language applied throughout the design process, from the initial idea to its detailed implementation.

The scientific content associated with ICAR/10 concerns analysis of buildings in their constructive, functional, typological and formal aspects and in the hierarchy of their systems. The aim is to assess design feasibility and ensure that works optimally meet essential requirements. The activities include critical evaluation of traditional and innovative building techniques and their translation into assisted-design and production processes, addressing both new construction at different scales and the conservation, recovery and renovation of existing buildings.

GEOTECHNICAL AND TRANSPORT INFRASTRUCTURE LABORATORY (LabGIT)



The Geotechnical and Transport Infrastructure Laboratory conducts research on key Civil and Environmental Engineering topics related to sustainable land management and territorial development.

The Geotechnical Engineering group performs experimental and theoretical research on fundamental and applied topics organised into four main areas:

- laboratory techniques for studying the mechanical and hydraulic properties of soils and rocks;
- numerical analysis of the static and seismic behaviour of major geotechnical works, including foundations, retaining structures, dams and tunnels;
- ground-improvement techniques and the development of sustainable solutions;
- geotechnical risk analysis over large areas, including liquefaction and subsidence.

The Roads, Railways and Airports research group studies the design, construction, operation, maintenance and control of transport infrastructure. Its main topics include the functional and mechanical characterisation of asphalt mixtures, road safety and vulnerable road users, assessment of environmental impacts at road-section and network levels, road information systems for management, and construction-site quality and safety.

INDUSTRIAL PLANT MANAGEMENT AND SAFETY LABORATORY (LAGESII)



The research group studies the methods and general criteria governing the planning, design, construction and management of industrial plants and production systems. Its main research areas include:

- analysis and design of industrial plants, including feasibility studies, site selection and economic evaluation;
- analysis and design of plant utilities and services, including techno-economic optimisation methods;
- analysis and design of production processes and technologies;
- ergonomic analysis and design, and the safety of production systems;
- management of production systems, including quality and maintenance management;
- industrial logistics, including materials management and handling;
- automation of production systems, including economic assessment of integrated and flexible systems and industrial instrumentation for automatic process control.

The group integrates design, economic, organisational and management expertise in engineering. Two broad research themes can be identified. The first integrates economic and management knowledge into design, highlighting the economic implications of projects, relationships between design choices and corporate performance, links between innovation design and implementation, project financing methods, and interactions with the business environment. The second explores the professional domains of management engineering, combining economic, organisational and technological skills with an engineering approach based on design orientation, systems and control theory, modelling and quantitative methods, and integration between theoretical models and empirical validation.

WATER ENGINEERING LABORATORY (LIA)



The laboratory carries out research, supports teaching, and provides testing and consultancy services for external organisations. Activities include experiments on scaled physical models, materials testing, the design and implementation of in-situ measurement campaigns, monitoring of existing works and works under construction, and studies in numerical modelling.

The LIA's principal fields of interest are aquifer protection, water regulation, soil conservation and territorial safeguarding, and the design and management of hydraulic infrastructure, including aqueduct systems, urban drainage networks, and urban, irrigation and industrial distribution systems.

The laboratory collaborates with international research groups. Its members include representatives of the IAHR Fluvial Hydraulics Committee, the Executive Board of the Italian Hydraulics Group (GII), the Water Supply Systems Study Centre (CSSI), and numerous technical committees of public bodies, including the Ministry of Infrastructure and Transport and regional authorities.

In addition to its original premises in Via Di Biasio, Cassino, the LIA also operates at the Folcara university campus, where large-scale physical models are developed.

ENERGY MACHINERY AND SYSTEMS LABORATORY (LAMIEN)



The research group studies, develops and optimises energy-conversion technologies. Its theoretical, numerical and experimental activities aim to improve energy efficiency, reduce pollutant emissions and promote sustainable solutions.

The laboratory investigates fluid machinery used in electrical and thermal power generation, land, marine and aeronautical propulsion, and industrial and civil processes, analysing and optimising both individual components and complete systems.

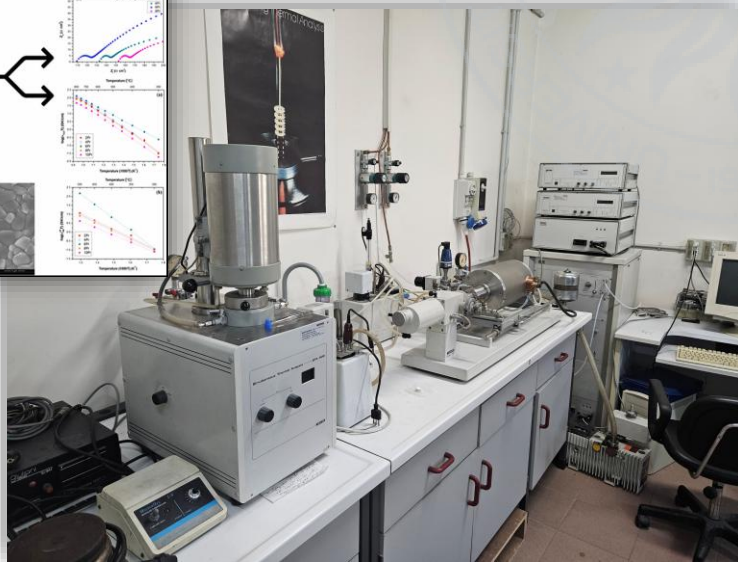
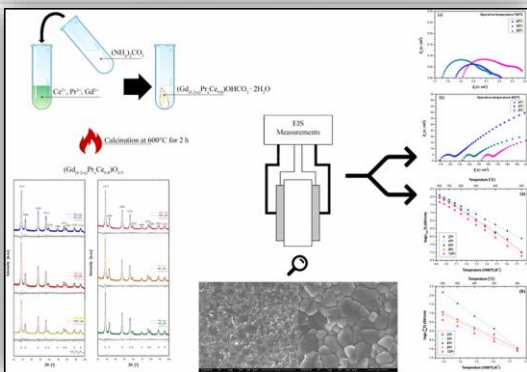
The group's expertise covers component design, experimentation and testing, as well as operation, diagnostics, control and environmental-impact analysis.

A major research area concerns systems for hydrogen production, storage and use. Activities include numerical and experimental analysis of different fuel-cell technologies, such as LT-PEMFC, HT-PEMFC and SOFC, their integration into complex energy systems, and performance optimisation through cell-level and system-level simulation models. Another important topic is the internal-combustion engine, with particular emphasis on combustion and pollutant formation and on innovative, sustainable fuels. Advanced numerical models based on CFD and dynamic simulation are used to predict system behaviour and optimise configuration.

The laboratory has an experimental infrastructure for testing device performance, validating simulation models and studying innovative solutions under controlled conditions.

The integrated use of numerical simulation and experimentation is a distinctive feature of the laboratory and supports the development of increasingly efficient, reliable and sustainable energy-conversion technologies.

MATERIALS LABORATORY (LABMAT)

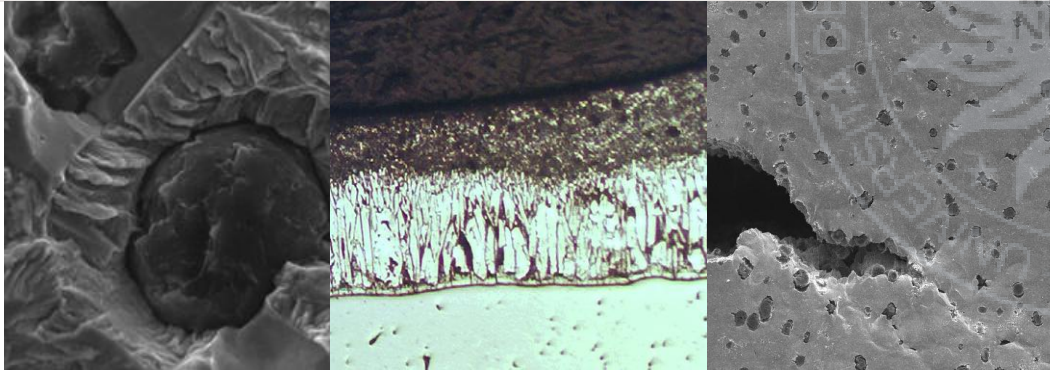


The Materials Laboratory (LABMAT) research group comprises faculty members and researchers in Materials Science and Technology and the Chemical Foundations of Technology. The group studies the chemical and physicochemical foundations of materials-related technologies, their properties and their interactions with the environment, providing a unified view of principles common to different phenomena and classes of substances. It also addresses the full range of scientific and professional aspects of materials science and technology.

Within this broad field, the group focuses primarily on advanced ceramic materials, from their synthesis—including both new compositions and innovative manufacturing processes—to the development of products for applications such as energy production and storage, catalysis and photocatalysis, biological separation, environmental remediation, restoration of architectural structures and soil consolidation. Materials are comprehensively characterised in terms of structural and microstructural properties and their influence on chemical and physical behaviour, including electrochemical, catalytic, electrical, thermal and magnetic properties.

The group has developed strong expertise allowing comprehensive investigation of chemical properties by atomic absorption, Raman and infrared spectroscopy; structural and microstructural properties by X-ray diffraction, scanning and transmission electron microscopy, porosimetry and surface-area analysis; thermal properties by differential thermal analysis and dilatometry; and electrical and electrochemical properties by electrochemical impedance spectroscopy and voltammetry.

METALLURGY AND PHYSICS LABORATORY (LaMeFi)



The research group studies the distinctive properties of metallic materials and the phenomena occurring during manufacturing and service. Activities focus on several classes of metals:

- Aluminium alloys: effects of chemical composition and microstructure on crack-propagation mechanisms.
- Rolled duplex and superduplex stainless steels: effects of microstructure and service environment on hydrogen embrittlement, fatigue and localised corrosion resistance.
- Al-Si metal-matrix composites containing SiC particles: effects of SiC particles on mechanical behaviour and damage.
- Titanium alloys: fatigue resistance as a function of microstructure and loading conditions.
- Ferritic-pearlitic ductile cast irons: damage mechanisms under static and fatigue loading and corrosion resistance.
- Austenitic and ferritic stainless steels: influence of microstructure on localised corrosion resistance.
- Sintered stainless steels: influence of microstructure on fatigue and corrosion resistance.
- Unalloyed steels: local damage mechanisms.
- Hot-dip galvanising: kinetics of intermetallic-phase formation and damage mechanisms.
- NiTi shape-memory alloys: mechanical behaviour under static and cyclic loading.
- Additive manufacturing of metal alloys: microstructural and mechanical characterisation.

INDUSTRIAL MEASUREMENTS LABORATORY (LAMI)

The research group carries out scientific and educational activities in industrial measurements for energy and the environment. It studies fundamental and applied aspects of engineering thermodynamics, thermofluid dynamics, heat transfer, energy systems, environmental physics, lighting engineering and applied acoustics, with reference to technological problems in engineering, architecture, industrial design, territorial planning and agriculture.

Scientific and technical expertise includes the thermodynamics of energy conversion, final energy use, energy saving, cogeneration and renewable energy in industrial and civil applications, heating and cooling technologies, refrigeration, thermophysical properties of materials, thermofluid dynamics of confined spaces, environmental conditioning for human comfort and conservation of artefacts, passive technologies and building-services systems for environmental control, and energy and environmental planning at territorial, urban and building scales.

The group analyses and develops techniques for measuring and controlling the thermofluid-dynamic quantities that characterise thermodynamic transformations, thermal processes and environments. Experimental and applied research includes mechanical and thermofluid-dynamic measurements in industrial and laboratory settings, including contact and remote pressure and temperature measurements, flow measurements for liquids and gases in closed conduits, metering of energy and energy-carrier flows, and legal or regulatory metrology and related instrumentation.



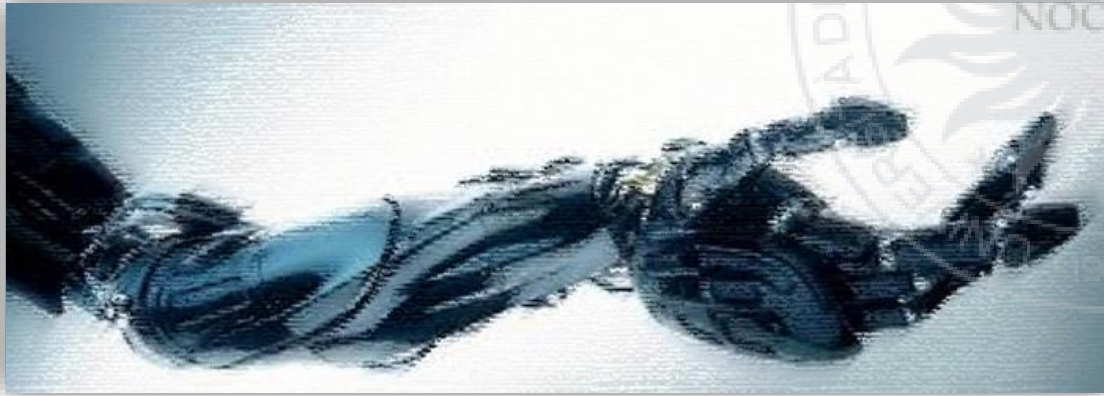
INDUSTRIAL DESIGN LABORATORY (LAPI)



The research group brings together expertise in the design, construction and experimental testing of machines, structures and mechanical systems. Its main areas of expertise include:

- Structural integrity and fracture mechanics. Code-based design using internationally recognised standards such as R6, DNV-OS-F101, BS 7910, API 1104, ASME Section VIII and EN 13445. Finite-element design using commercial software such as MSC.MARC and LS-DYNA. Prediction of ductile fracture through the development and application of damage-mechanics models.
- Analysis of the mechanical behaviour of non-conventional materials. Characterisation and design of composite materials. Development and use of damage-tolerance design and product-qualification procedures. Study of polymeric and metallic materials produced by additive manufacturing.
- Modelling and characterisation of materials operating under extreme conditions. Study, simulation and experimental validation of impulsive phenomena. Constitutive modelling and characterisation of materials subjected to large strains, high strain rates, high temperatures and high pressures.
- Analysis of materials and mechanical components subjected to high temperatures. Modelling of creep, creep-fatigue and thermo-mechanical fatigue. In this field, the group has developed a proprietary computational model for creep-life prediction based on short-duration tests and incorporating both damage and microstructural evolution.

ROBOTICS AND MECHATRONICS LABORATORY (LARM)



The Robotics and Mechatronics Laboratory (LARM) carries out research and development in the analysis and functional mechanical design of machines, robotic systems and mechatronic systems. The mechanical systems considered are broad in scope and include prime movers and driven machines, mechanical devices, mechanisms, transmissions and drives, automatic machines and robots, vehicles, transport and lifting systems, energy-conversion systems, biomechanical systems and micro-components.

The research group develops theoretical and experimental methods for studying kinematics, statics and linear and nonlinear dynamics, and for modelling and simulating mechanical systems and devices. Topics include mechanisms and articulated systems, vibration and mechanical-system control, mechatronics and prognostics, fluid automation and fluidics, fixed and mobile robotics, environmentally sustainable systems and renewable energy, and pneumatic, hydraulic, electrical and non-conventional actuation technologies. Related activities extend to industrial design and engineering, machine design and construction, fluid dynamics, bioengineering, movement science and orthopaedics, including prostheses and exoskeletons.

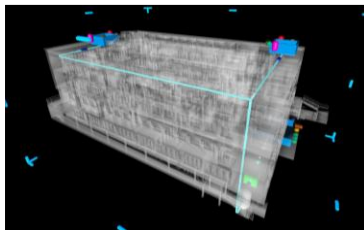
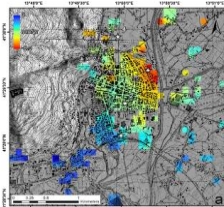
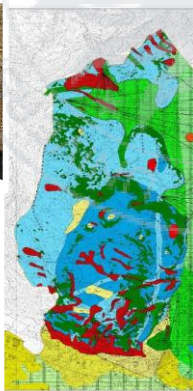
MANUFACTURING TECHNOLOGIES AND SYSTEMS LABORATORY (LaTeSLa)



The group conducts research, education and technology-transfer activities in manufacturing technologies and systems for metallic materials and polymer-matrix composites, tolerancing and mechanical measurements. It develops methods to improve product performance, anticipate assembly-related problems, reduce the time and cost of bringing new products to market, and increase quality and sustainability. Specific areas include:

- Metal-forming technologies: plastic deformation of metals, sheet-metal formability and process optimisation through finite-element simulation.
- Manufacturing technologies for polymer composites: analysis of geometric and dimensional deviations; development of robotic manufacturing technologies, including filament winding and tape placement; manufacturing of green composites; adhesive joining and laser texturing.
- Additive manufacturing technologies: analysis of geometric and dimensional deviations and mechanical performance of manufactured parts, with particular interest in lattice structures; development of methods for producing hybrid metal-composite structures for aeronautical applications.
- Machining: development of multi-sensor systems and intelligent systems for process monitoring; tool-wear monitoring.
- Part assemblability: development of methods for assigning geometric tolerances to assembly components, verifying tolerance chains for assemblability, and inspecting designed geometric tolerances using coordinate-measuring machines.

TERRITORY, ENVIRONMENT, RESOURCES AND RISKS LABORATORY (LaTARR)



LaTARR—the Territory, Environment, Resources and Risks Laboratory—is a basic and applied research laboratory of the Department of Civil and Mechanical Engineering at the University of Cassino and Southern Lazio. Its activities focus on analysing and managing territory, the environment and natural resources, with particular attention to geological, environmental and anthropogenic risks, including earthquakes, floods, landslides, subsidence, volcanic eruptions, health risks and hazards arising from human activities. The laboratory studies strategies and tools for sustainable territorial management, taking fragility into account, and for defining and mitigating the risks to which areas are exposed. It also investigates the protection and conservation of natural resources such as water and soil, and develops actions and interventions to reduce environmental risks both preventively and in emergencies. It assesses the impact of pollution on the environment and human health and develops remediation and prevention strategies. It also investigates renewable energy, including bioenergy derived from organic waste. The laboratory provides professional training and public outreach to increase awareness of environmental risks and promote responsible behaviour.

The laboratory was created by combining two academic fields—Applied Geology (GEOS-03/B) and Environmental and Sanitary Engineering (CEAR-02/A)—with the aim of integrating complementary expertise and promoting research, innovation and experimentation through a multidisciplinary and collaborative environmental approach. Applied Geology research includes soil and slope protection; landslides and deep-seated gravitational slope deformation; earthquake geology; erosion and subsidence; aquifer management and protection; remote sensing; characterisation of soils and rocks; engineering geological surveying and rock-mass characterisation; geological and geophysical subsurface exploration; thematic mapping; urban geology; monitoring, prevention and mitigation of geological risks; rehabilitation of contaminated sites; and conservation of environmental assets.

Environmental and Sanitary Engineering activities address the environmental impact of human interventions, with emphasis on sustainable development and the circular economy. They include the design and management of treatment and recovery processes and plants for water, wastewater and sludge; atmospheric emissions and health risks; integrated waste management; life-cycle assessment; protection and remediation of soils and sediments; and the production and valorisation of biogas and other biofuels.

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DICEM RESEARCH ACTIVITIES IN FIGURES

10

EUROPEAN
EXTRA-
EUROPEAN

31

NATIONAL

8

REGIONAL

49

ACTIVE PROJECTS
(2024-25)

0

START UP

13

LABORATORIES

5

SPIN OFF

520

SCIENTIFIC PAPERS
IN THE PERIOD
2022-24



COMPETITIVE PROJECTS

Anno inizio finanziamento	Acronimo	Titolo	Programma
2021	IRIS	Inspection and security by Robots interacting with Infrastructure digital twinS	NATO MYP SPS
2021	JRP-i27 SAFEST	Sustainable advanced flow meter calibration for the transport sector	H2020 EMPIR
2021	PRIME	PiattafoRma Integrata per la Manutenzione e gestione Energetica nella fabbrica intelligente	PON 2014-2020
2021	PROMET H20	Metrology for trace water in ultra-pure process gases	H2020 EMPIR
2022	ECOSENS	Economic and Social Considerations for the Future of Nuclear Energy in Society	Euratom Research and Training Programme
2022	ENEA PTR 2022-2024	LA4.3: "Analisi ed ottimizzazione dei sistemi di monitoraggio, controllo e feedback dei consumi di energia e di acqua calda sanitaria, del comfort e della qualità dell'aria negli edifici" LA 4.4: "Analisi, sperimentazione e validazione della metodologia di calcolo dello Smart Readiness Indicator nel contesto edilizio italiano"	MASE-ENEA
2022	ENEA PTR 2022-2024 Idrogeno	Studio della compatibilità delle utenze per l'uso di diverse miscele di idrogeno-metano allacciate alla rete gas	MASE 2022-2024
2022	FC341	Modellazione matematica e numerica di celle a combustibile ad alta temperatura di tipo SOFC	PNRR
2022	FM251	Modellazione matematica e numerica di misuratori per miscele di gas naturale ed idrogeno	PNRR
2022	POS-T2-STROKE	Diagnosi e trattamento precoci dell'ictus mediante Unità Mobile Dedicata con Risonanza Magnetica	PNR 2015-20
2022	SUPERH2	SUstainable Proton-conducting solid oxide Electrolytic cells for Renewable H2 production at intermediate temperatures	PRIN 2022
2023	APRIORI	Advanced technologies for Physical Resllience Of cRitical Infrastructures	Science for Peace and Security Programme

COMPETITIVE PROJECTS

Anno inizio finanziamento	Acronimo	Titolo	Programma
2023	CELLOPHAN	Caratterizzazione delle Emissioni in Luoghi di Lavoro di microPlastiche Aerodisperse e Nanoplastiche	BRIC 2022 INAIL
2023	GreenMOB	Sviluppo di Innovative Strutture Multifunzionali in Metallo/Composito GREEN per una MOBilità Sostenibile	POR-FESR 2021-2027
2023	HEMALIB	High-Entropy Materials for advanced Li-Ions Batteries	PRIN 2022 PNRR
2023	Hero-Belt	Herringbone Enhanced Run-flat Operational BELT	PNRR
2023	ISACOB	Interazione Sicura e Autoadattativa tra uomo e robot CollaBorativo	BRIC 2022 INAIL
2023	LEM	LowEnergyManufacturing: Sviluppo di una tecnologia di formatura a ridotto consumo di energia per la produzione di parti aeronautiche	POR FESR 2021-2027
2023	MISCE	Mechatronics for Improving and Standardizing Competences in Engineering	Erasmus Plus
2023	NanoCo	Nonlocal modelling of nano-coatings	PRIN 2022 PNRR
2023	NextGenerationEU1	Orientamento attivo nella transizione scuole-università	PNRR
2023	NoMISN	Nonlocal Mechanics of Innovative Soft Nanostructures (NoMISN)	PRIN 2022
2023	CoolGas	CoolGal: a liquid metal-cooled Beryllium target for a proton-induced Neutron Production	PRIN 2022
2023	I-ADMA	I-ADMA Mechanical behaviour prediction of ADditively MANufactured component by an artificial Intelligence approach	PRIN 2022
2023	PRISMA	Physical internet Regenerative Sustainable Materials	PRIN 202

COMPETITIVE PROJECTS

Anno inizio finanziamento	Acronimo	Titolo	Programma
2023	BIOCORE	BIOlogical COmpact and prefabricated REactors for complete wastewater treatment	PRIN 2022
2023	LYRICA	Liquid hydrogen carriers as sustainable fuels for innovative energy systems configurations in the maritime sector	PRIN 2022
2023	MOMENTA	Modelling complex biOlogical systeMs for biofuEl productioN and sTorAge: mathematics meets green industry (MOMENTA)	PRIN 2022
2023	HybridJoint	Hybrid joints between dissimilar metal materials for lightweight structures of environmentally-friendly vehicles: experimental characterization, theoretical modeling and CAE-based simulation chain from joint manufacturing to fatigue design by local approaches	PRIN 2022
2023	SMART RENEW	SMART REhabilitation of NEtworks with high Water losses	PRIN 2022
2023	Re Grid	Reuse-based optimization approach for environmentally efficient steel Grid structures	PRIN 2022 PNRR
2023	SIREL-MCA	Sviluppo di strumentazione innovativa volta a ridurre il rischio di esposizione dei lavoratori addetti alle attività di messa in sicurezza e bonifica di reti e strutture con presenza di Materiali Contenenti Amianto	BRIC 2022 INAIL
2023	SIR CEC	Progettazione e realizzazione di sistemi innovativi integrati con IA, reti neurali e robotica per la riduzione del rischio in cantieri a elevata contaminazione	BRIN 2022 INAIL
2023	SPEA	Sviluppo Prodotti Ecosostenibili in Alluminio per il settore alimentare	POR FESR 2021-2027
2023	SPS G6001	Multi Cable-Driven Robot for Detecting /Detonating Unexploded Mine and Ordnance	Science for Peace and Security Programme
2023	tunES	Tuning EPC and SRI instruments to deliver full potential	LIFE
2024	3D-ECOCORE	3D-ECOCORE	PNRR

COMPETITIVE PROJECTS

Anno inizio finanziamento	Acronimo	Titolo	Programma
2024	Clepsydra	Groundwater monitoring and Decision Support System development to optimise decision-making in sensitive and water-scarce agricultural environments in the Mediterranean context	Interreg Euro-MED
2024	I3waterS	Intelligent, innovative, integrative Water Systems	HORIZON-EUROPE
2024	SAFER RE BUILT	Sustainable Approaches For Earthquake Resistant_REhabilitation solutions for the BUILT environment	PNRR
2025	Benessere nel guscio	Programma di Filiera	Quinto bando contratto di filiera
2025	BUFALA BENESSERE E AMBIENTE	Programma di Filiera “BUFALA AMBIENTE E BENESSERE”	Quinto bando contratto di filiera
2025	Vino Benessere e Ambiente	Programma di Filiera	Quinto bando contratto di filiera
2023	EcoCrate	Sviluppo di una cassetta innovativa ecocompatibile per il settore ittico con sensore di controllo della catena del freddo	POR FESR 2021-2027
2023	FlexiComp	Sviluppo di nuovi tessuti gommati funzionalizzati per la realizzazione di serbatoi flessibili per il settore aeronautico	POR FESR 2021-2027
2023	H2Bio	Idrogeno da biomasse vegetali	POR FESR 2021-2027
2023	FRaPS	Frictionless Rail Push System	POR FESR 2021-2027
2023	VitalSpace	Vital Space	POR FESR 2021-2027
2024	TESTOR	Compact Versatile Testing Rig for Elastomers	MOST

PATENTS/SPIN-OFF COMPANIES

Five patents have been filed over the last three years:

- ❑ “SISTEMA PER ISPEZIONE E/O TRATTAMENTO DI GRANDI SUPERFICI”. Domanda italiana numero 102022000000458 del 13 gennaio 2022 di Vincenzo Gattulli, Andrea Arena, Erika Ottaviano, Antonio González Rodríguez, Francisco Moya Fernández, Sergio Juárez Pérez, David Rodríguez Rosa, Jean Dumoulin, Thibaud Toulhier. Concesso in data 13 gennaio 2024
- ❑ “TESTATA A CARICA SAGOMATA ED UN METODO DI PRODUZIONE DELLA TESTATA”. Domanda italiana numero 1020220000008426 del 28 aprile 2022 di Nicola Bonora, Andrew Ruggiero, Gianluca Iannitti, Gabriel Testa. Concesso in data 9 aprile 2024.
- ❑ “PURIFICATORE PERSONALE D’ARIA”. Domanda italiana numero: PCT/IB2023/055069 del 17 maggio 2023 dei proff. Fausto Arpino e Giorgio Buonanno.
- ❑ “SYSTEM FOR VERIFICATION AND CALIBRATION OF LINEAR AND ANGULAR DISPLACEMENT AND SPEED SENSOR SYSTEM FOR VERIFICATION AND CALIBRATION OF LINEAR AND ANGULAR DISPLACEMENT AND SPEED SENSORS”. Domanda europea numero EP23174144.8 del 18 maggio 2023 di Gianfranco Miele, Marco Laracca, Gianluca Iannitti.
- ❑ “STRUTTURA DI ARMATURA CERAMICA CON MIGLIORATA RESISTENZA AGLI IMPATTI”. Domanda italiana numero 102024000014836 del 27 giugno 2024 di Nicola Bonora, Andrew Ruggiero, Gianluca Iannitti, Gabriel Testa, Sara Ricci, Alberto Pagano, Andrea Ceccacci.

Active spin-off companies:

- ❑ "Techdyn Engineering" Afferenti coinvolti: Proff. Nicola Bonora, Andrew Ruggiero, Gianluca Iannitti
- ❑ "La A.G.S. s.r.l. (Advanced Geotechnical Solutions)" Afferenti coinvolti: Proff. Paolo Croce, Giuseppe Modoni, Erminio Salvatore
- ❑ "EnTrat srl" Afferenti coinvolti: Prof. Giuseppe Spazzafumo, Ing. Daniele Candelaresi
- ❑ "E-ThenA" Afferenti coinvolti: Prof. Marco Greco
- ❑ "EASYDAV srl" Afferenti coinvolti: Nicoletta D’Angelo, Rosa Avitabile, Gisella Vizzaccaro, Prof. Nicola Bonora



PhD PROGRAMME

28 PhD students in
total

23 Italian students

5 Italian students



Corso di dottorato in Metodi, Modelli e Tecnologie per l'Ingegneria

The PhD Programme in Methods, Models and Technologies for Engineering provides high-level scientific education through a pathway combining research, technology and innovation.

The programme prepares highly qualified technical and scientific professionals in fundamental and applied engineering research.

Through a balanced combination of educational activities—including courses and seminars delivered locally and at other schools, research using advanced methods, participation in joint activities with researchers from other institutions, and interaction with faculty members—the programme trains researchers capable of independently planning and managing technological innovation processes that are not confined to narrowly defined disciplines.

The programme provides advanced knowledge in fields offering strong career prospects in Italy and abroad. It is a key qualification for joining leading companies and attaining senior positions in international organisations focused on research and development, innovation and design.

The three-year curriculum includes courses common to all students and others specific to the selected area and concludes with a doctoral thesis on an innovative research topic developed by the candidate.

The programme is divided into the following curricula, each bringing together specific expertise represented on the Academic Board:

- C1: Civil and Environmental Engineering
- C2: Information Engineering
- C3: Electrical Engineering
- C4: Mechanical and Management Engineering
- C5: Environments and Technologies for Physical Activity and Health

Additional information is available at the following link:
<http://www.unicas.it/ricerca/dottorato-di-ricerca/corso-di-dottorato-in-metodi,-modelli-e-tecnologie-per-l%E2%80>

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