DIPARTIMENTO
INGEGNERIA
CIVILE EDILE
ARCHITETTURA
18|22 23|27 ECCELLENZA

UNIVERSITÀ
POLITECNICA
DELLE MARCHE

DICEA UNIVPM

Department of Construction and Civil Engineering and Architecture

www.dicea.univpm.it

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THE NUMBERS OF EXCELLENCE: DICEA during the last 5 years

Ranking

DICEA ranked first among departments of excellence in both 2018 and 2022

Quality in scientific research

DICEA improved its excellent results from 2011-14 in the 2015-19 VQR. The trend demonstrates a progressive enhancement in the quality of research; the results of the ongoing VQR 2020-24 are pending

High-level researcher involvement

Several researchers of recognized international prestige belong to the DICEA, as evidenced by their visibility on international databases and their ranking compared to their Italian colleagues in the same SSD (Scopus H-index)

Ability to attract funding

DICEA has attracted resources totalling more than 25 million, including funding from the two Department of Excellence projects 2018-22 and 2023-27. The ability to attract research projects of both international relevance (2 HE, 2 HE MSCA-DN, 1 HE MSCA-PF, 1 DEP, 1 ISF, 2 LIFE+, 2 Interreg, 3 Erasmus+, 1 funded by the US DoD), and high-level national (11 PRIN 2022, 1 PRIN PNRR 2022, 6 PNRR, 2 INAIL), and regional/local (at least 5 projects)

Financed scientific research

The capacity to attract third-party research activities funded by institutions and companies has increased, both in terms of number and total amount, peaking at around € 1,1 million per year

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THE NUMBERS OF EXCELLENCE: DICEA into numbers by 2024

DICEA

Department of Excellence
for the 2nd consecutive five-year period, consolidating its leading position in university scientific research!

2018-22 | excellence
2023-27 | excellence

The Head of the Department
Professor Enrico Quagliarini


231 publications


53 research staff

24 technical and administrative staff


>3,2 M€ research income


75 PhD, post-doc, research fellows


8 research labs


1 digital educational lab

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THE NUMBERS OF EXCELLENCE: DICEA into numbers by 2024

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The Head of the Department
Professor Enrico Quagliarini

16 Scientific Field of Research

CEAR-01/A CEAR-01/B CEAR-03/A CEAR-03/B CEAR-04/A CEAR-06/A CEAR-07/A CEAR-08/A CEAR-08/B CEAR-09/A CEAR-10/A CEAR-11/A CEAR-11/B CEAR-12/B MATH-03/A GIUR-04/A

Teaching Programs for

FIRST CYCLE DEGREE
Building Engineering, Civil and Environmental Engineering

PROFESSIONAL DEGREE COURSE
Technics for Territorial Design and Management

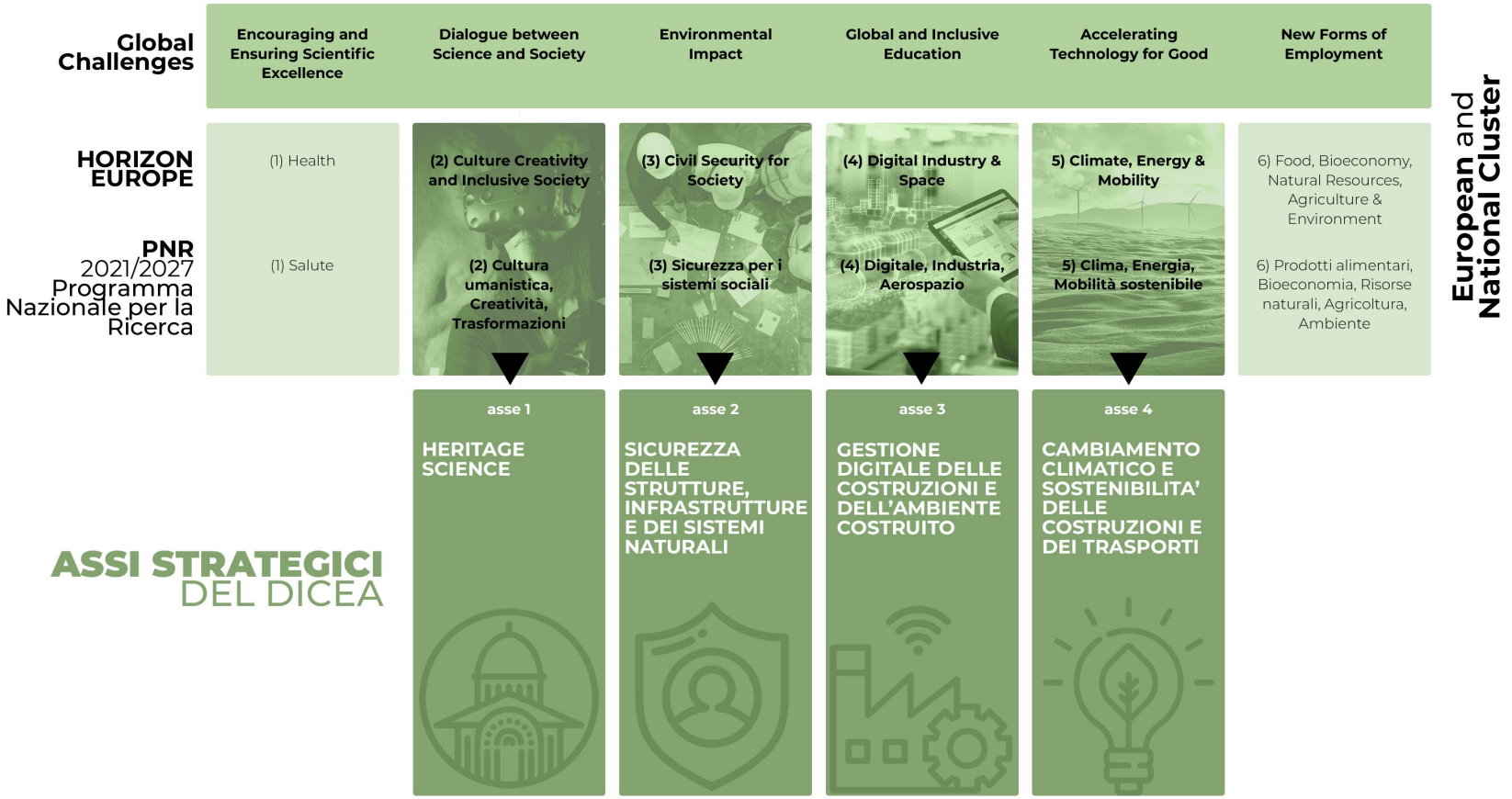
MASTER DEGREES
Civil Engineering, Building Engineering, Environmental Engineering

SINGLE CYCLE DEGREE
Building Engineering-Architecture

DEPARTMENT OF EXCELLENCE 2023-27

4 strategic axes of research

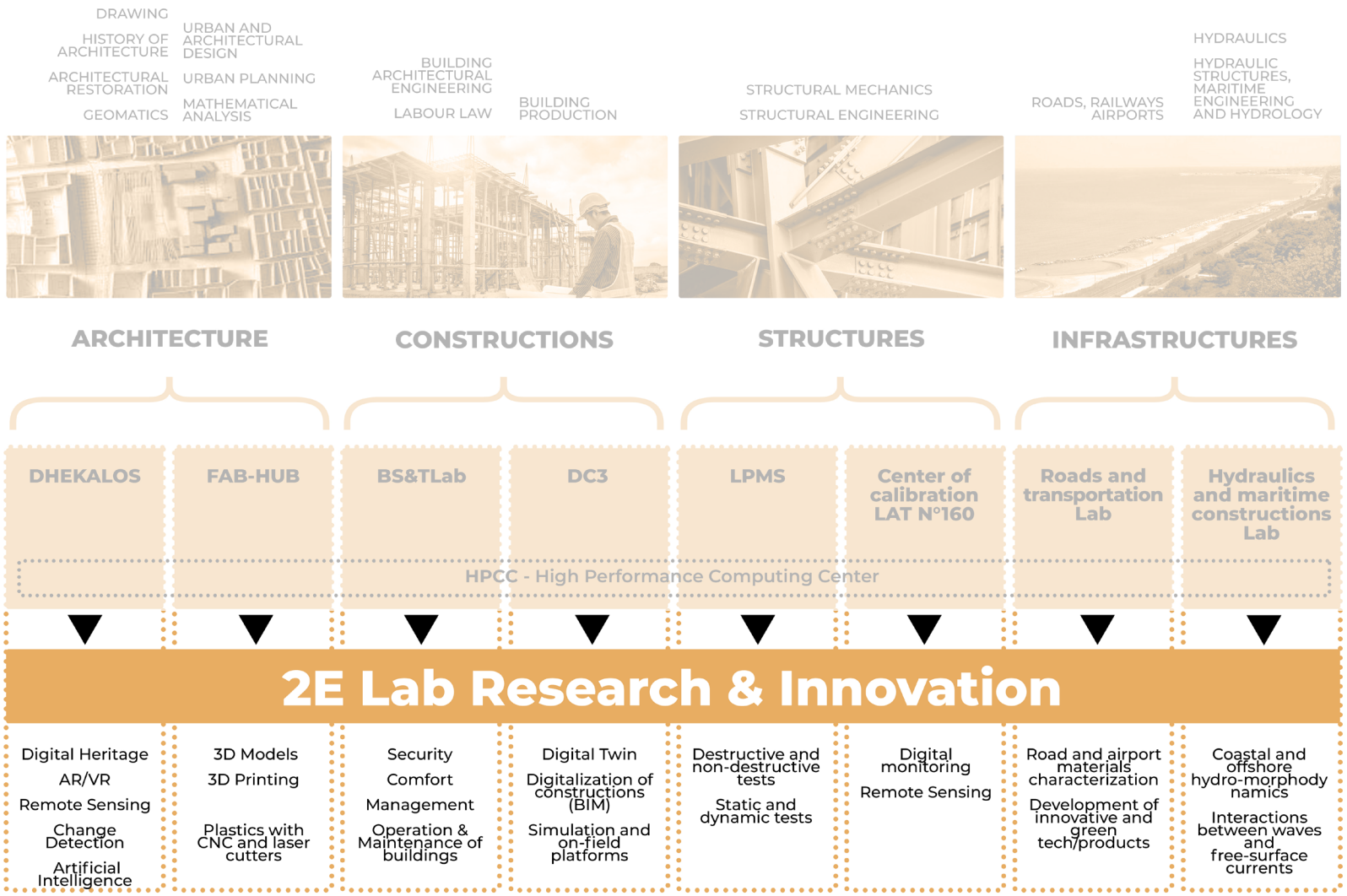
1 | Heritage Science
2 | Safety of Structures, Infrastructure and Natural Systems
3 | Digital Management of Construction and the Built Environment
4 | Climate Change and Sustainability of Construction and Transportation



DEPARTMENT OF EXCELLENCE 2023-27

2E lab
digital education lab

> a hub for students and professionals education
> it cross-links DICEA's labs
> it is intended as an enabling tool for the virtual design and construction of environments, buildings and infrastructure



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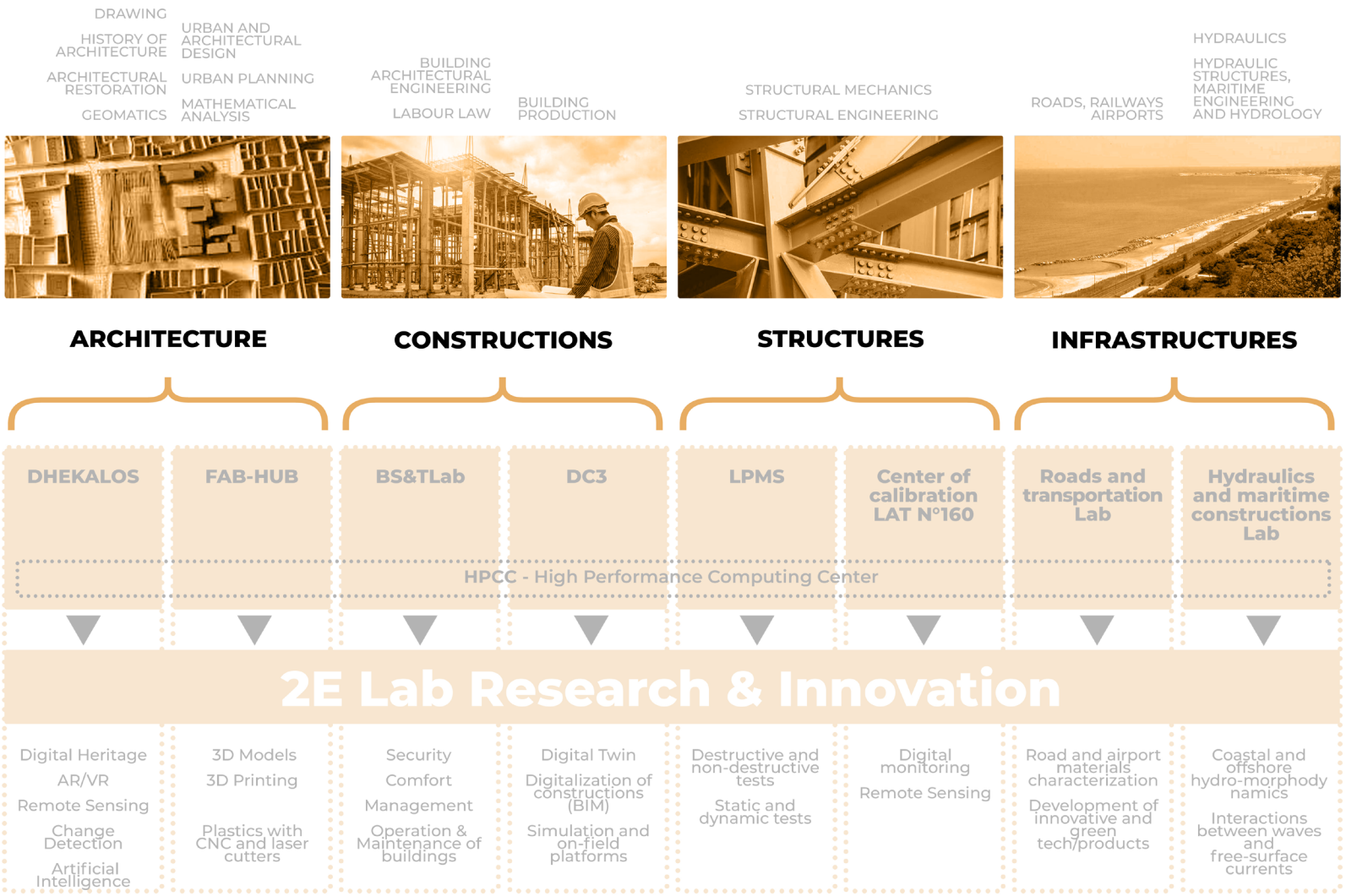
THE STRUCTURE OF THE DEPARTMENT

4 research sections

1 | Architecture
2 | Construction
3 | Structures
4 | Infrastructures

each section combines **2 research areas**



UNIVERSITÀ POLITECNICA DELLE MARCHE

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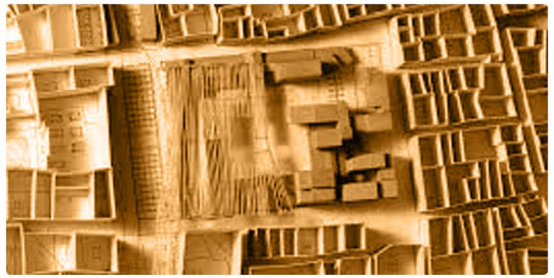
THE STRUCTURE OF THE DEPARTMENT



ARCHITECTURE

- Digital &Heritage
- Hub 4 Heritage &Habitat
- Mathematics

CONSTRUCTIONS

- Building Architectural Engineering
- Digital & Built environment

STRUCTURES

- Structural Mechanics
- Structural Engineering

INFRASTRUCTURES

- Hydraulics
- Transportation Infrastructures

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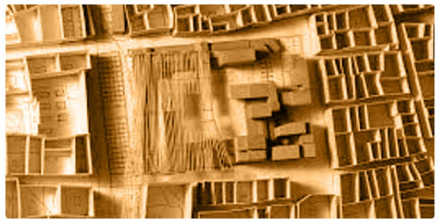
THE STRUCTURE OF THE DEPARTMENT



ARCHITECTURE

SSD
CEAR-04/A
CEAR-10/A
CEAR-11/A
CEAR-11/B

Digital & Heritage

mission

is committed to study historical, architectural, territorial, and environmental heritage through a dynamic and continuous process that enriches knowledge of history, culture, and diversity in the fields of architecture and landscape/territory. This aims to provide a clearer understanding of historical dynamics, cultural influences, as well as changes that have occurred on the territory over time.

lab: DHEKALOS

is an interdisciplinary lab on Digital Cultural Heritage at DICEA UNIVPM. The laboratory drives a scientific process that spans from knowledge to the conservation and enhancement of cultural heritage, both tangible and intangible. Two closely integrated research groups cover the spectrum of competences of the laboratory: Digital Cultural Heritage (DISTORI), which deals with the digitalization of cultural heritage (photogrammetry, TLS, 3D modeling, HBIM, ICTs, Virtual, Augmented, and Mixed Reality, VR movies and digital transformation of CH as a whole), and Geomatics Applications & Processing (GAP), which focuses on the processing of certified geo-spatial data for environmental monitoring, landscape control, and spatio-temporal dynamics (remote sensing, digital cartography and photogrammetry, GNSS, Lidar, SLAM into data collection for the transition from GIS to CityGML).

people

Professors
Paolo Clini
Eva Savina Malinverni
Antonello Alici
Romina Nespeca
Roberto Pierdicca
Ramona Quattrini
Chiara Mariotti

Technical Staff
Anna Paola Pugnaloni
Luigi Sagone

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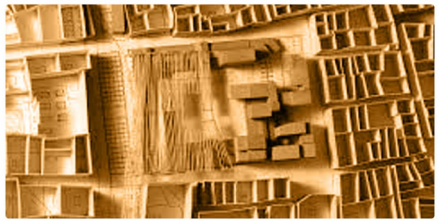
THE STRUCTURE OF THE DEPARTMENT



ARCHITECTURE

SSD
CEAR-09/A
CEAR-12/B

Hub for Heritage and Habitat

mission

the research focuses on the following areas:
_architectural design, urban planning and reuse, transformation and enhancement of built heritage in historical contexts;
_strategic visions and scenarios for the regeneration of architectures, cities, territories, and landscapes;
_territorial branding and smart cities to deal with climate change and societal challenges;
_recycle and circular economy strategies applied to architecture, city and territory.

lab: FAB-HUB

is a new manufacturing and 3D printing laboratory for the creation of architectural and urban models and small structures in wood, metal and other materials. It supports the research and training activity of DICEA, offering itself as a point of excellence for the creation of innovation and the advancement of development in multiple design scales and fields: from architectural, technological, structural and industrial design to urban design. Innovative projects for a realistic reproduction of buildings, monuments scanned with laser, city skylines, objects and architectural, structural and technological details. Students can benefit from the lab equipment, creating their scale building models with different materials such as polymers, clay, wood, silicone, metal. The available technologies expand the possibilities of investigation and advancement in this research field.

people

Professors
Gianluigi Mondaini
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Maddalena Ferretti
Francesco Rotondo

Technical Staff
Floriano Capponi
Gianni Plescia

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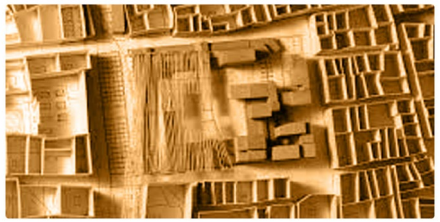
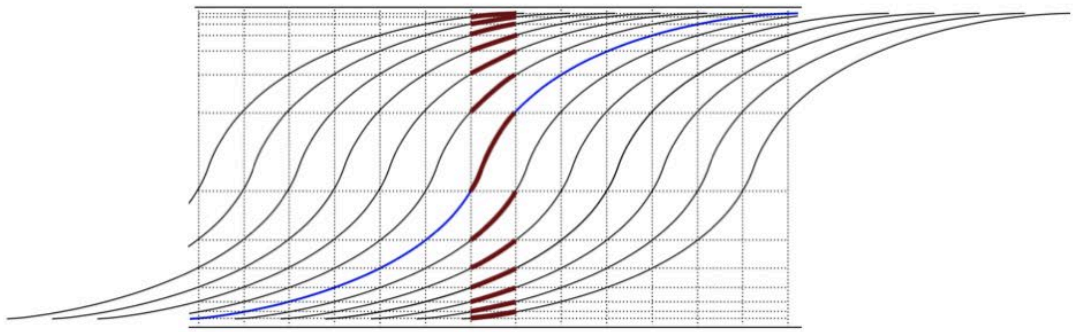
THE STRUCTURE OF THE DEPARTMENT

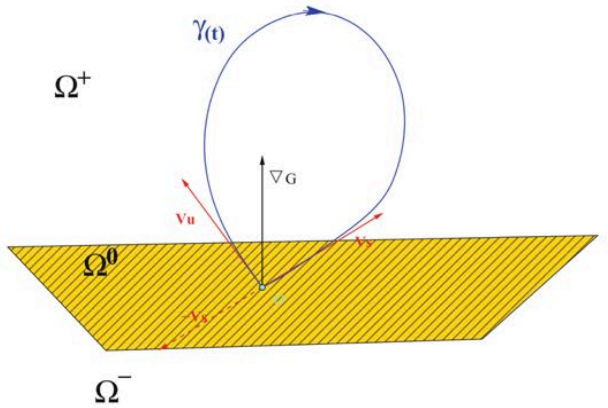


ARCHITECTURE

Mathematics

SSD
MATH-03/A





mission

the research activity of the group deals with various fields of Mathematical Analysis, focusing on the study of the existence and multiplicity of solutions of ordinary and partial differential equations by variational and topological methods, degree theory, and dynamical systems techniques.

research activities

the main research strands of the group are as follows:

1 | Variational methods for semilinear elliptic equations

2 | Boundary value problems for ordinary and functional differential equations

3 | Topological degree, fixed point index and applications in nonlinear analysis

people

Professors
Alessandro Calamai
Piero Montecchiari

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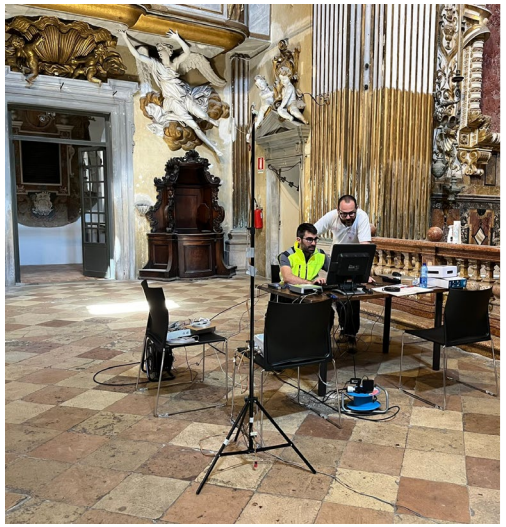
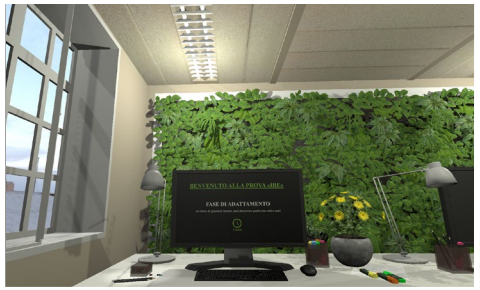
THE STRUCTURE OF THE DEPARTMENT

CONSTRUCTIONS

SSD
CEAR-08/A
GIUR-04/A






Building Architectural Engineering

mission

the research activity concerns the development of technological solutions, tools and services for the improvement of the built environment from the points of view of safety, comfort, management, use. The Group carries out several European, national and local research projects. It actively collaborates with national and international subjects in the research and production sectors and with numerous Local Bodies. The group is engaged in constant actions of technology transfer and enhancement of knowledge deriving from research.

lab: BS&T

it supports research activities related to the development of innovative building technologies and smart buildings that can adapt and respond to user needs for comfort and safety, considering economic and environmental aspects in the life cycle.

It is divided into 4 macro-areas of activity:
1 | **Materials and building components testing**
2 | **Human interaction analysis**
3 | **Full-scale experimental buildings for long-term in situ measurements**
4 | **Computing center**

people

Professors
Marco D'Orazio
Enrico Quagliarini
Giovanni Zampini
Elisa Di Giuseppe
Gabriele Bernardini
Francesco Monni
Arianna Latini

Technical Staff
Andrea Gianangeli

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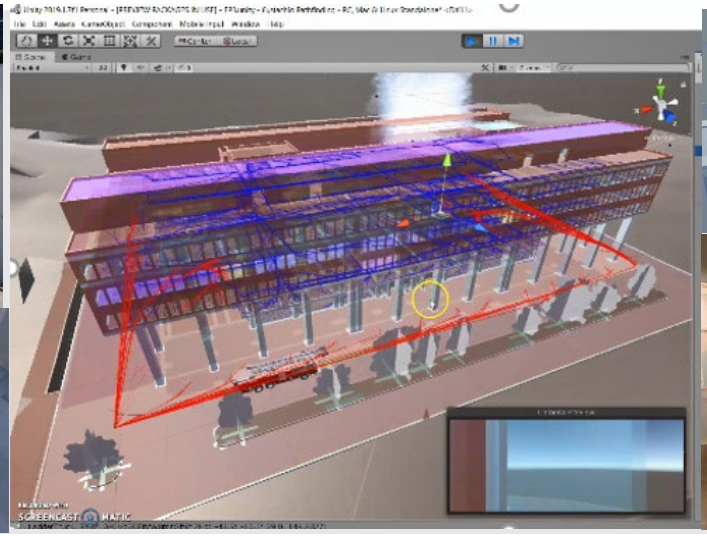
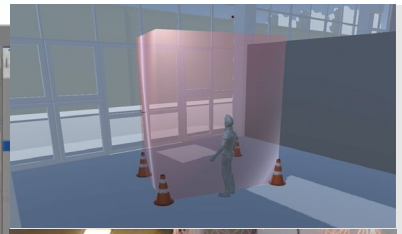
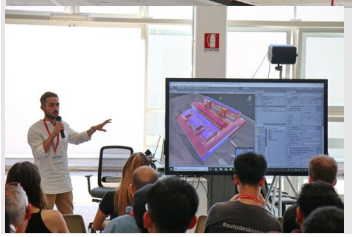
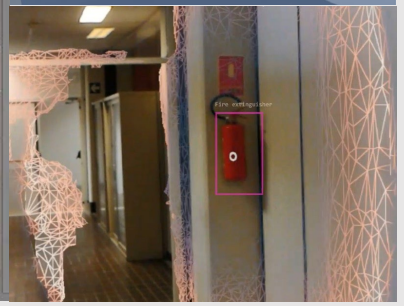
THE STRUCTURE OF THE DEPARTMENT

CONSTRUCTIONS

SSD
CEAR-08/B



Digital & Built Environment

mission

This research team carries out teaching, research activities and consulting to develop, customize and implement digital technologies and innovative methodologies to control construction processes in **complex domains**. This includes the management of complexity and real-time simulation tools. Preferred applications are the production phase and the management of the built environment, mainly concerning **BIM modelling**, **Digital Twins** and related techniques and challenges, such as information modelling, knowledge management, immersive simulation tools.

lab: DC3 Digital Construction Capability Centre

is a full-scale laboratory and demonstration center ("capability center") of the advanced digital technologies and innovative processes required to attain the topics of the mission of the research team. They include augmented and mixed reality (**AR/MR**), HW and SW architectures to develop and demonstrate **digital twins** in full-scale applications, real-time **tracking and monitoring systems**, **AI-based reasoners** to manage complex scenarios (e.g. **health and safety** in construction sites, **project control**, construction **project management**), **decision-making** tools, platforms for the implementation of **BIM-based** processes. The DC3 hosts **demonstrators** of typical construction process scenarios, to **showcase** at what extent digital technologies and advanced management methods can help **manage the built environment**. Such situations can be reproduced for any of the macro-phases of the construction process.

people

Professors
Berardo Naticchia
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Alberto Giretti
Alessandro Carbonari
Alessandra Corneli
Leonardo Messi
Francesco Spegni

Technical Staff
Massimo Vaccarini

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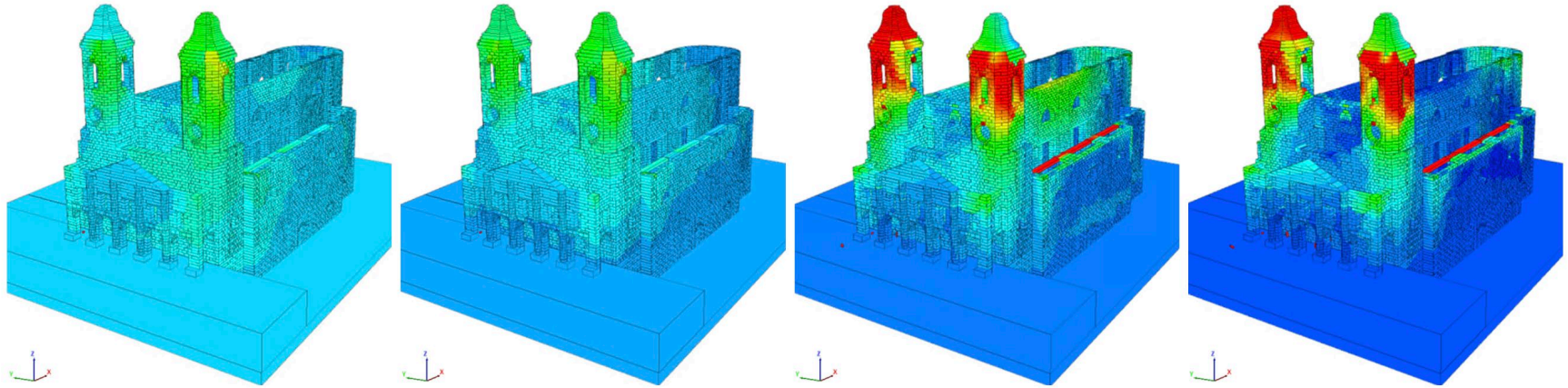
THE STRUCTURE OF THE DEPARTMENT

STRUCTURES

SSD
CEAR-06/A



Structural Mechanics

mission

the research group develops and disseminates knowledge, tools and innovative techniques for understanding and solving problems in the realm of applied science and engineering. It investigates the static and dynamic behavior of structures. It aims at designing buildings and mechanical parts, and any other component for the benefit of mechanical engineering and architectural design. The group also tackles issues in bio and nano engineering paying attention to advanced materials.

lab: LPMS

the Official Materials and Structures Testing Laboratory "Prof. Giovanni Menditto" (LPMS) is specialized in performing tests for the mechanical characterization of materials, using presses and small electrohydraulic actuators; quasi-static, cyclic and pseudo-dynamic tests on structural components and prototype scale structures, with both vertical and horizontal forcings thanks to major frames and a steel contrast wall, large electrohydraulic actuators and a vibrodyn. The Lab has instruments for conventional in situ investigations and dynamic identification, both for defining the mechanical characteristics of existing buildings (including historic and architecturally valuable buildings) and for operations related to the testing and monitoring of new and existing structures. The Lab operates in both teaching (experimental research theses) and research through collaboration with companies and individuals.

people

Professors
Francesco Clementi
Fabrizio Davì
Stefano Lenci
Pierpaolo Belardinelli
Giovanni Lancioni
Michele Serpilli
Valeria Settimi

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THE STRUCTURE OF THE DEPARTMENT

STRUCTURES

SSD
CEAR-07/A

Structural Engineering

mission

to explore topics of primary interest in Structural Engineering. The group is among the international leaders in the field of steel-concrete composite bridges, with significant contributions in analytical modelling, long-term effects, and construction techniques. It is also recognized in important research fields of earthquake engineering and structural dynamics, such as soil-foundation-structure interaction, base isolation systems, structural identification and monitoring, and innovative materials for structural reinforcement.

lab: LPMS

the Official Materials and Structures Testing Laboratory "Prof. Giovanni Menditto" (LPMS) is specialized in performing: tests for the mechanical characterization of materials, using presses and small electrohydraulic actuators; quasi-static, cyclic and pseudo-dynamic tests on structural components and prototype scale structures, with both vertical and horizontal forcings thanks to major frames and a steel contrast wall, large electrohydraulic actuators and a vibrodyn. The Lab has instruments for conventional in situ investigations and dynamic identification, both for defining the mechanical characteristics of existing buildings (including historic and architecturally valuable buildings) and for operations related to the testing and monitoring of new and existing structures. The Lab operates in both teaching (experimental research theses) and research through collaboration with companies and individuals.

people

Professors
Fabrizio Gara
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Erica Magagnini
Vanni Nicoletti

Technical Staff
Elisa Bettucci
Stefano Bufarini
Carlo Perticarini

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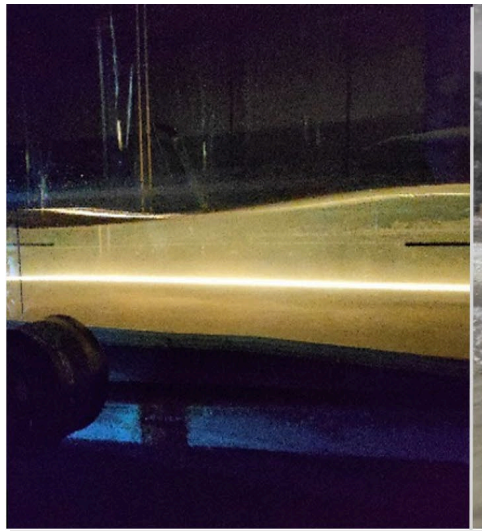
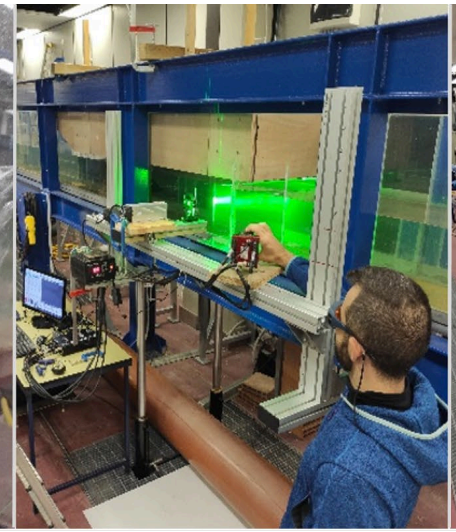
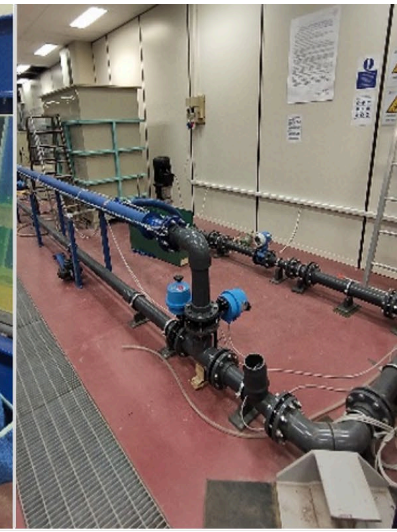
THE STRUCTURE OF THE DEPARTMENT

INFRASTRUCTURES

Hydraulics

SSD
CEAR-01/A
CEAR-01/B



mission

teaching, researching and supporting activities and/or collaboration with external organisations and companies operating or with interests in the hydraulics sector. The research group in the Hydraulics area works mainly in Fluid Mechanics, Biofluid Dynamics, Environmental Hydraulics, Hydrology, Hydraulic and Fluvial Constructions, and Maritime, Coastal and Offshore Hydraulics and Engineering.

lab: Hydraulics and Maritime Construction

the Hydraulics group has the Hydraulics and Maritime Construction Laboratory, which houses equipment and instruments useful for studies and simulations of: marine and river dynamics, pressure flows, biological flows.

people

Professors
Maurizio Brocchini
Sara Corvaro
Giovanna Darvini
Carlo Lorenzoni
Matteo Postacchini
Luciano Soldini
Gianluca Zitti

Technical Staff
Livio Luccarini
Giacomo Trozzi

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THE STRUCTURE OF THE DEPARTMENT

INFRASTRUCTURES

SSD
CEAR-03/A

Transportation Infrastructures

mission

teaching and research activities focus on design, maintenance, management and material characterisation for road and airport infrastructures. In recent years, the research group is mainly addressed to pursuit innovative solutions for sustainable mobility, circular economy and transition to smart infrastructures.

lab: Roads and Transportation

the research and training activities are developed using a fully equipped laboratory that is set in a facility of about 800 m^2 with some of the most advanced equipment for the mechanical characterization of innovative and sustainable road and airport materials.

The main fields of interest are:
1 | **Laboratory of Rheology of Binders**
2 | **Laboratory of Dynamic Testing of Mixtures**
3 | **MOST (National Center for Sustainable Mobility) Laboratory**
4 | **Laboratory of Transportation Geotechnics**

people

Professors
Francesco Canestrari
Andrea Graziani
Amedeo Virgili
Fabrizio Cardone
Gilda Ferrotti
Lorenzo Paolo Ingrassia
Arianna Stimilli

Technical Staff
Andrea Grilli
Pierluigi Priori