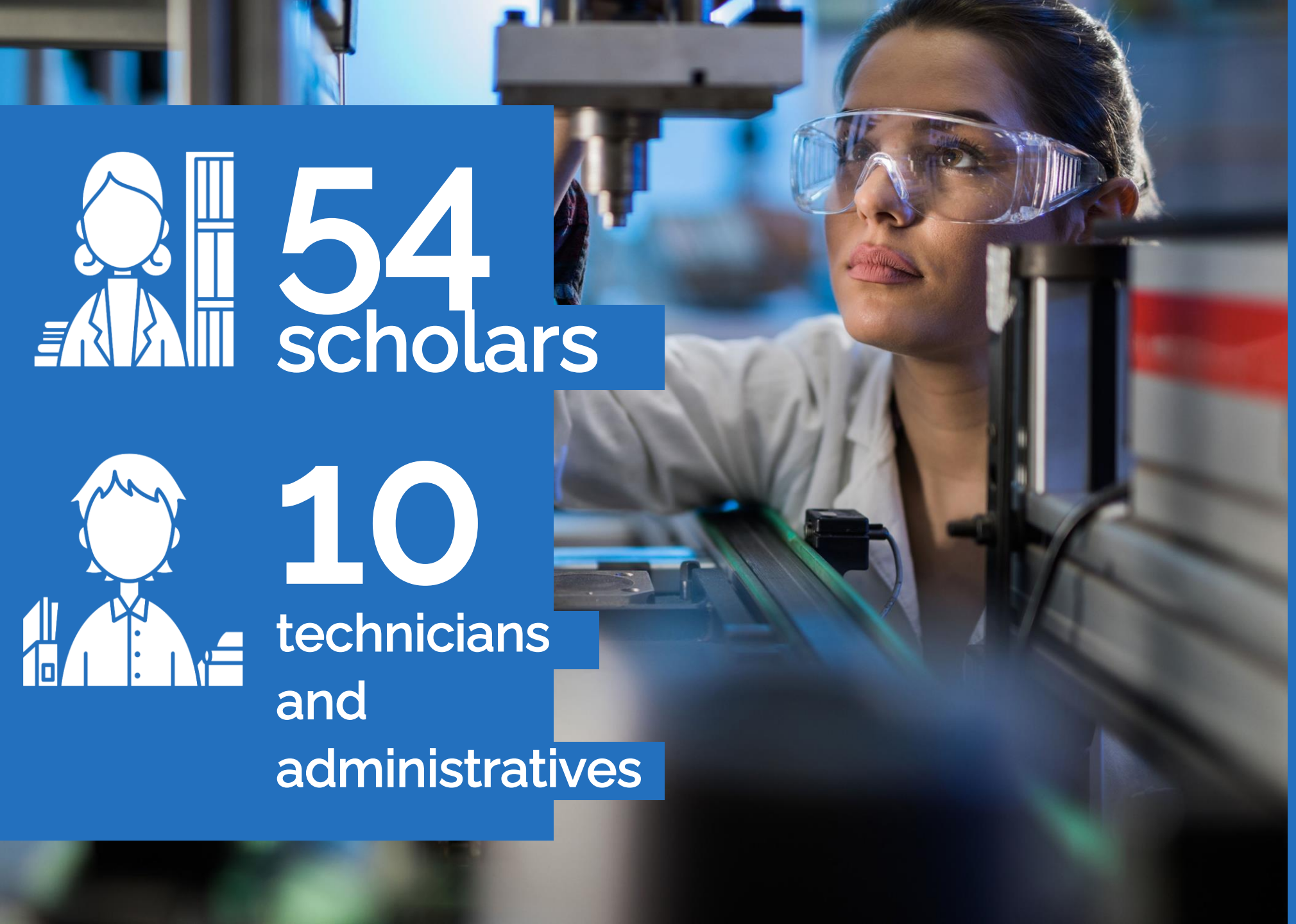
DIEI

Department of Electrical and Information Engineering

University of Cassino and Southern Lazio



54
scholars

10
technicians and administratives

- Electric and electronic measurements
- Electrical engineering
- Electrical power systems
- Electronics
- Electromagnetic fields
- Information processing systems
- Mathematical analysis
- Mathematical physics
- Numerical analysis
- Power electronic converters, electrical machines and drives
- Systems and control engineering
- Telecommunications

Teaching

Bachelor

- Ingegneria Informatica e delle Telecomunicazioni
- Industrial Engineering Technology
- Ingegneria Industriale

Master of Science

- Ingegneria Informatica
- Ingegneria Biomedica
- Telecommunications Engineering
- Ingegneria Elettrica

PhD

- Metodi, Modelli e Tecnologie per l'ingegneria

Research activities

DIEI has been designated as a **Department of excellence** for the years 2018-2022 based on a competitive selection process carried out by the Italian Ministry of Education, University and Research for the activity 2011-2014

Successful Competitive calls (2020-2022)

9

European

11

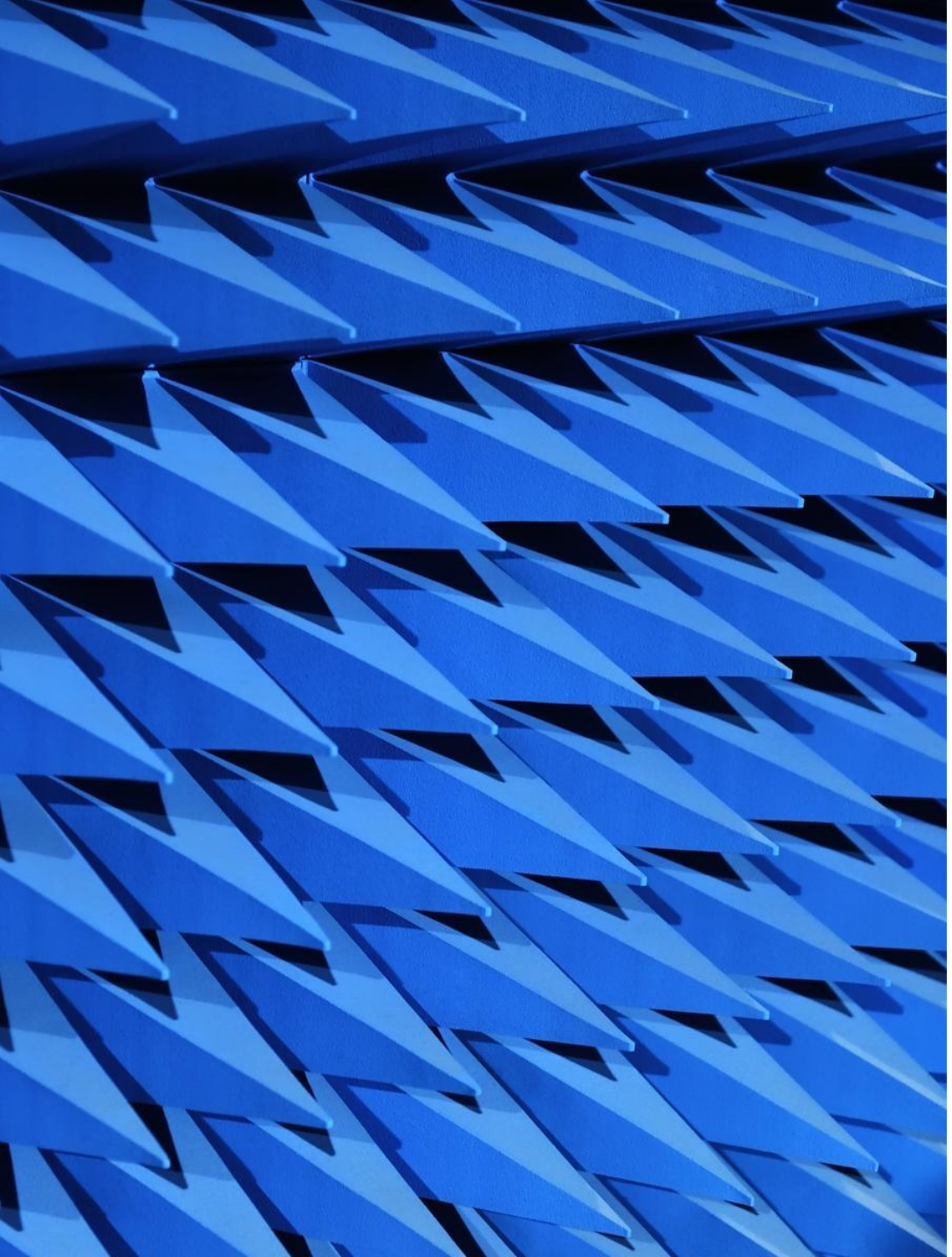
National

5

Regional

Total Budget DIEI

3.800 kEuro



Laboratories

- AIDA – Artificial Intelligence and Data Analysis
- CORE – Communication, Radar, and Networking Laboratory
- EMCLAB – Electromagnetic Compatibility
- LAI – Industrial Automation and Robotics
- LAMI - Industrial Measurement Laboratory
- LaSE - Power System Laboratory
- LEI - Industrial Electronics
- LEMNDE - Computational Electromagnetism and Nondestructive Evaluation
- LM - Microwave Laboratory

AIDA

Artificial Intelligence Laboratory

Activities

- Biomedical imaging
  (mammography, eye fundus)
- Healthcare applications
  (Alzheimer, ECG, Gait analysis)
- IoT and smart sensors
  (pollutant detection, batteries, smart energies)
- AI in Cultural Heritage
  (bible, papyri, gamification)
- Cybersecurity
  (intrusion detection, traffic analysis)
- Satellite image processing
  (identification of micro-landfills and asbestos roofs)

Referent
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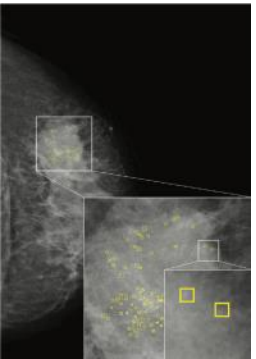
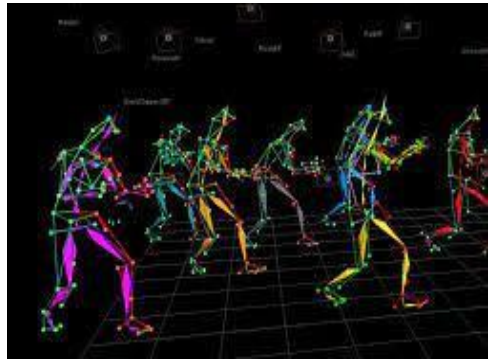
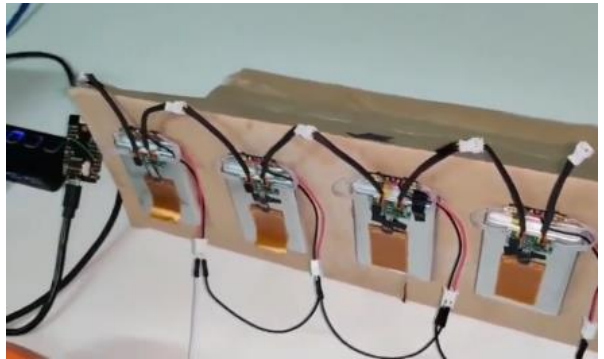
https://aida.unicas.it



AIDA

Data Analysis Laboratory

Activities

- Homogenization of PDEs
  (superconducting multifilamentary composites, metamaterials)
- Inverse problems
  (non-destructive electromagnetic diagnosis, ERT)
- Optimal control
  (optimal control of ODEs, optimization under uncertainties)
- Nonlinear dynamical systems and applications
  (socio-epidemiological models, biomathematics, electrochemistry)
- Pattern formation and bifurcation theory
  (wave propagation, self-organization phenomena, spatio-temporal chaos)

Referent
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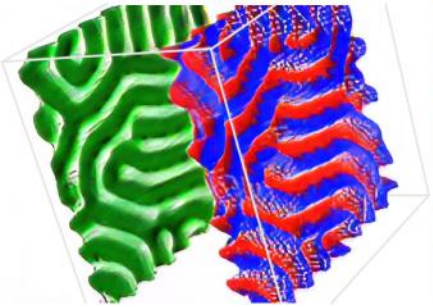

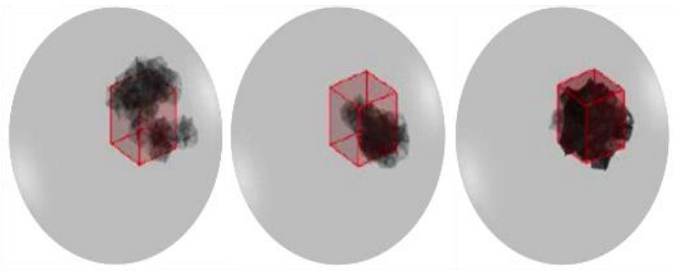
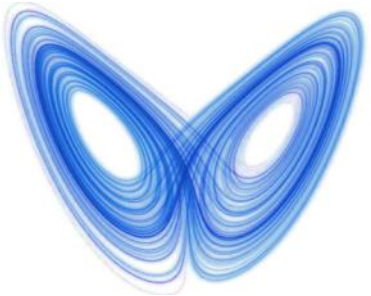
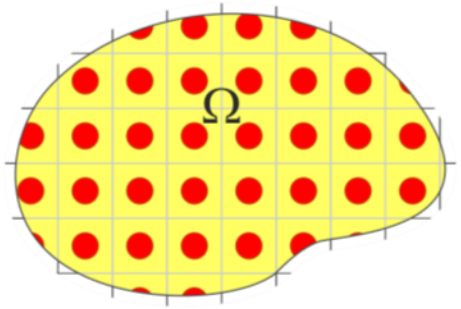

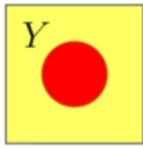

EMCLAB

Electromagnetic Compatibility Laboratory

Activities

- Compact shielded and semi-anechoic chamber for EMC full compliance
  (3 meters-distance measurements up to 18 GHz)
- Full-compliance electromagnetic compatibility - Directive 2014/30/EU
  (testing and analysis for civil, industrial and automotive applications)
- Pre-compliance testing for railway, biomedical devices and E-health
- Support for homologations of measurement instruments under the MID - Directive 2014/32/EU
- Narrowband and broadband measurements for human exposure evaluation to electromagnetic fields
- Measurements of QoS in wired and mobile networks (up to 5G)

Referent
Domenico Capriglione

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https://www.unicas.it/siti/laboratori/emclab-laboratorio-di-compatibilita-elettromagnetica.aspx







CORE

Communication, Radar, and Networking Laboratory

Activities

- Wireless Networks technologies for 5G and beyond 5G
  (networks, metasurfaces, reconfigurable intelligent surfaces, massive MIMO, cell-free MIMO, dense networks, multi-user detection)
- Radar system and joint communication and sensing networks
  (single and multi-target scenarios, space-time coding for MIMO radars)
- Data Mining by big data algorithms
  (sensing applications, video and audio processing, secure and robust cloud architectures for BigData and IoT)

Referent
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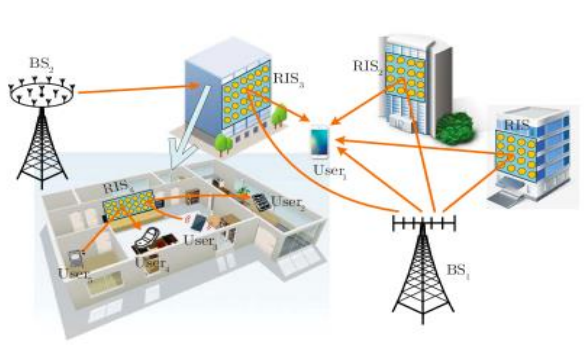
https://www.unicas.it/siti/laboratori/corelab-laboratorio-di-comunicazioni-radar-e-networking.aspx



LAI

Industrial Automation Laboratory

Activities

- Electric vehicles
  (Battery pack, BMS and TMS, traction control, hybrid systems, high performances powertrain, traction inverters, testing and validation, charging infrastructures)
- Industrial electrical drives
  (industrial inverters, control of electric motors, revamping, PLC architectures, optimization)

Referent
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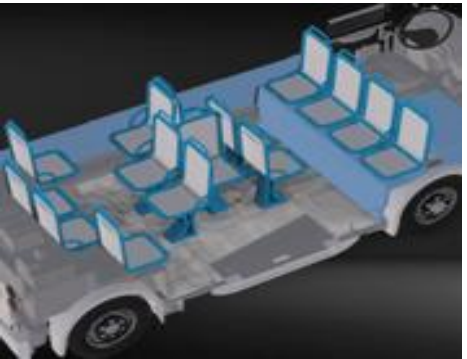
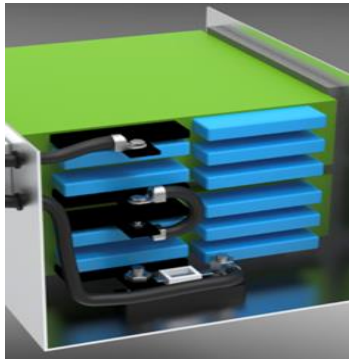



LAI
Robotics Laboratory

Activities

- Industrial & Service Robotics
- Marine Robotics
- Assistive Robotics
- Cooperative Manipulation
- Human-Robot-Interaction
- Multiple-robot systems

Referent
Alessandro Marino

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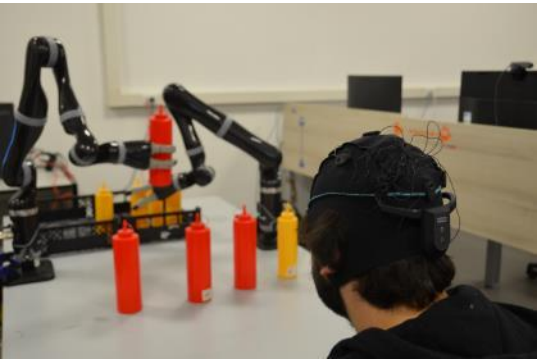

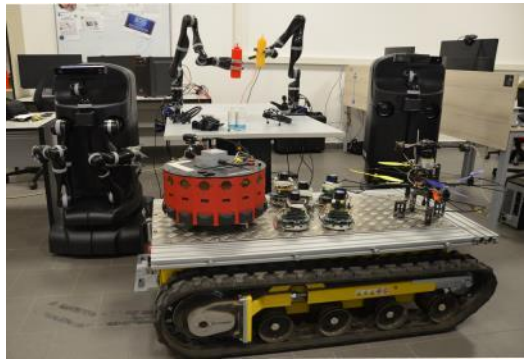


LAMI

Industrial Measurement Laboratory

Accredited Calibration Laboratory (LAT 105)
according to ISO/IEC 17025:2017

UNIVERSITÀ DEGLI STUDI DI CASSINO E DEL LAZIO MERIDIONALE
lami laboratorio misure industriali

Activities

- Non-destructive testing and evaluation
- Smart and cognitive measurement systems
- Measurement for medical, biomedical, sport, and healthcare applications
- Synchronization and localization in sensor networks
- Instrumentation and measurement for networking and cybersecurity analysis
- Sensor and measurement systems for environmental monitoring and agrifood
- Sensors and sensor networks for IoT and industrial applications
- Calibration services
- Measurement for smart energy and power quality

Referent
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LASE

Power System Laboratory

Activities

- Renewable energy resources modeling
  (production estimation and optimization)
- Analysis and control of smart grids
- Strategies for participation in electricity markets
- Power Quality and energy efficiency in electrical systems
- Energy saving and efficiency improvement of road infrastructure lighting systems
- Design, development and testing of smart electric devices
- Automation of industrial electrical systems
  (SCADA/DCS)
- Verification of electrical safety

Referent
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http://www.unicas.it/siti/laboratori/lase-laboratorio-di-sistemi-elettrici.aspx





LEI

Industrial Electronic Laboratory

Activities

- Electrical Machines
  (design and testing)
- Power Electronics and converters

Referent
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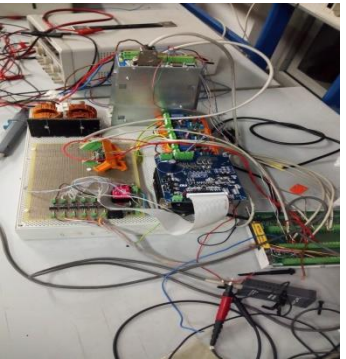
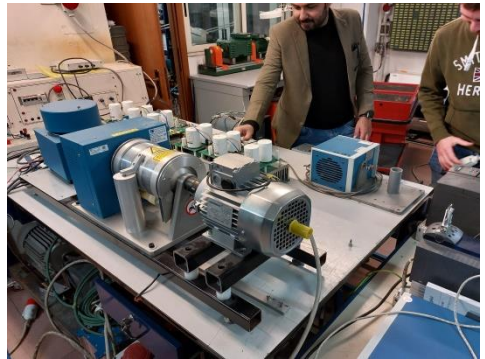
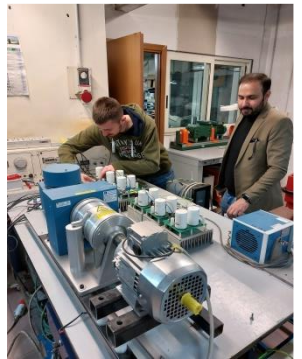
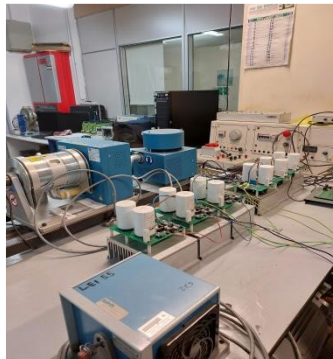
https://www.unicas.it/siti/laboratori/lei-laboratorio-di-elettronica-industriale-gianni-d-angelo.aspx





LEMNDE

Computational Electromagnetism and Nondestructive Evaluation Laboratory

Activities

- Electromagnetic imaging
- Computational electromagnetism
- Circuits analysis and design

Referent
Antonello Tamburrino

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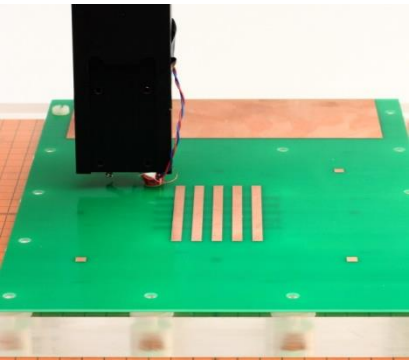
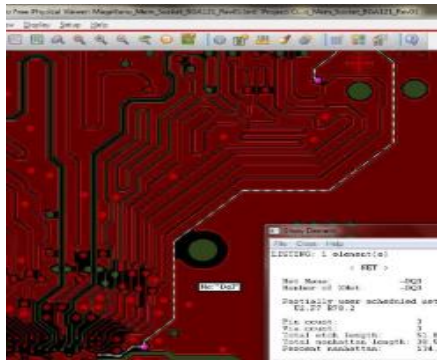
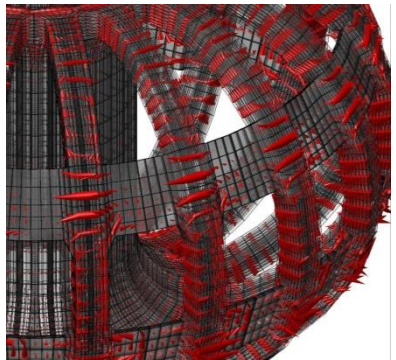
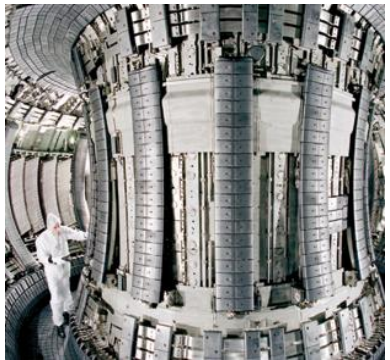
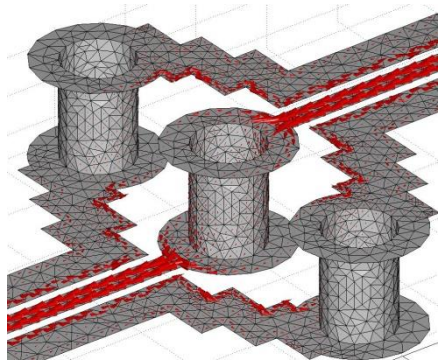
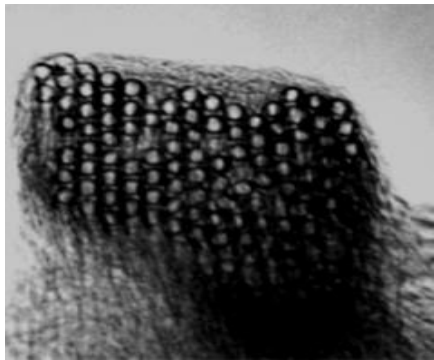
Website
https://www.unicas.it/siti/dipartimenti/diei/ricerca/laboratori/lemnde-laboratorio-di-calcolo-elettromagnetico-e-diagnostica-elettromagnetica-non-distruttiva.aspx

µLAB
Microwave Laboratory

Activities

- Realization and test of microwave devices
- Antennas and arrays (design, measurement, analysis, diagnosis)
- Biological interactions and microwave heating
- Experimental dosimetry
- RF propagation and EMF measurements
- Numerical and analytical methods for propagation and scattering
- Permittivity measurements

Referent
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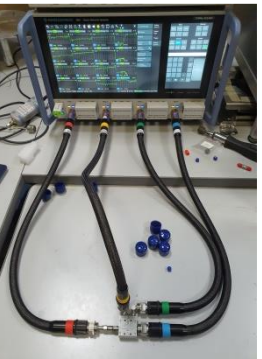
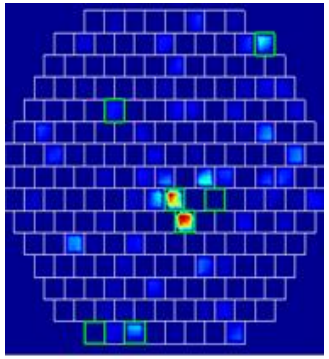
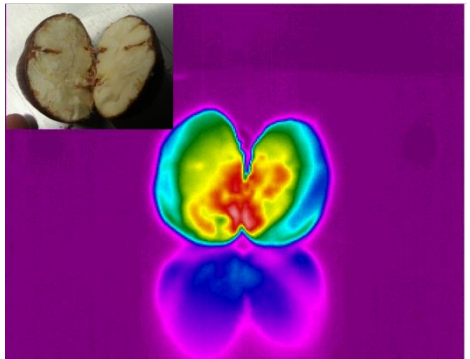
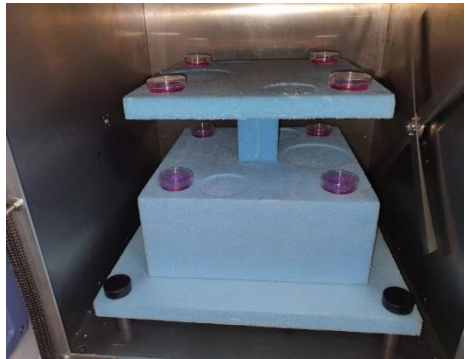
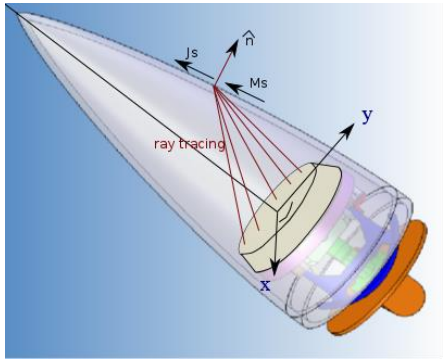
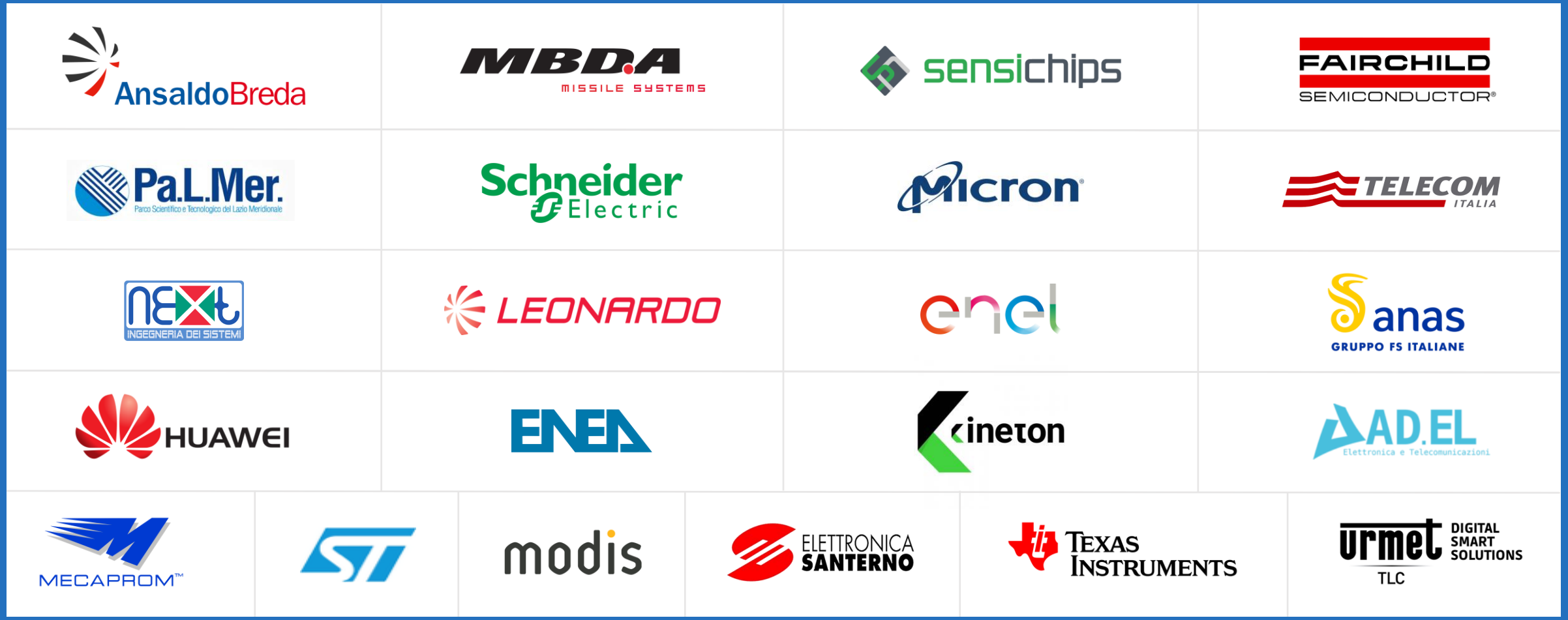


Technology transfer: contracts



Technology transfer: spinoff

Greenergy

LEDA

LEDA, Advanced Electro Dynamics Laboratory Srl

POD

Power On Demand Srl,

EveryBotics

EnerTronica

Technology transfer: 23 patents

- Method and device to detect islanding operation of a part of an electric distribution system
- Sistema e metodo per generare un segnale di uscita che fornisce un risultato finale ottenuto da un soggetto in risposta a compiti di scrittura a mano predefiniti eseguiti dal soggetto
- Process of handwriting recognition and related apparatus
- Purifying apparatus and method based on photocatalysis through modulation of light emission
- Apparato depuratore basato su fotocatalisi mediante modulazione dell'emissione luminosa
- High Voltage Fiber Optic Sensor for the Measurement of an Alternating Electric Field
- Resource allocation in mimo multi-cellular networks via submodular optimization
- High voltage fiber optic sensor for the measurement of an alternating electric field
- Coordinated linear beamforming in downlink multi-cell wireless networks
- Azionamento elettrico senza spazzole con due rotori indipendenti per propulsione elettrica ibrida
- Coordinated linear beamforming in downlink multi-cell wireless networks
- Procedimento e apparato di riconoscimento di scrittura a mano
- Coordinated linear beamforming in downlink multi-cell wireless networks
- Distributed inter-cell interference mitigation in OFDMA multi-carrier wireless data networks
- Colonnina di ricarica intelligente per auto, scooter e bici elettriche
- Method and device for controlling the power supply of an electromagnetic actuator
- Metodo e dispositivo per controllare l'alimentazione elettrica di un attuatore elettromagnetico
- Sistema di Alimentazione "Biberonaggio Elettrico" per Imbarcazioni Fluviali e Lagunari.
- Electromagnetic Actuator for a Proportional Solenoid Valve
- Attuatore Elettromagnetico per una Elettrovalvola Proporzionale
- sistema di alimentazione ad alta efficienza per ascensori
- Dispositivo di misurazione della caratteristica coppia-velocità di motori elettrici.
- Misuratore di livello a fibre ottiche

Thank you!