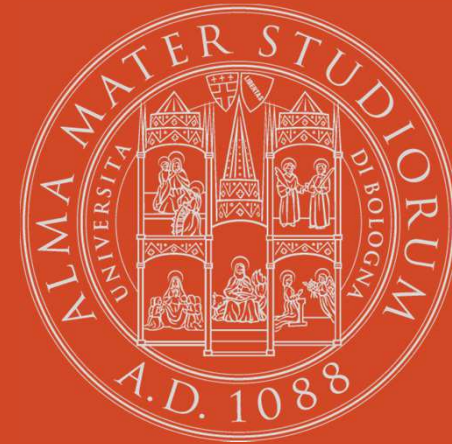


Local facilitators and regional tutors training

Eco-NautiNET Project

WORKSHOP MATERIALS AND PRESENTATIONS



TECNOPOLO
DI RAVENNA

Technopole of Ravenna

CIRI - Advanced Applications in Mechanical
Engineering & Materials Technology

CIRI – MAM

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CIRI

ADVANCED APPLICATIONS IN MECHANICAL
ENGINEERING AND MATERIALS TECHNOLOGY

Contacts

CIRI - Advanced Applications in Mechanical Engineering & Materials Technology

Is the Interdepartmental Center for Industrial Research of the University of Bologna, which works in the field of advanced applications in mechanical engineering and materials technology (CIRI MAM). The CIRI MAM covers several research topics, ranging from automation to mechanics of machines, from production technologies to materials, from navigation to toxicology.



About us

The Interdepartmental Center for Industrial Research on Advanced Applications in Mechanical Engineering and Materials Technology.

Organization

Director, Assistant Director, Operating Units, Management Committee.

Academic Personnel

Contacts of the Academic Personnel of the Center.

Committed Personnel

Contacts of the Committed Personnel of the Center.

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Research

Research fields of CIRI MAM grouped into Operative Units.



- [Automation, robotics and mechatronics](#)
- [Advanced materials and nautical applications](#)
- [Advanced materials, design and photonic applications](#)
- [Structured and/or composite materials for advanced applications](#)
- [Virtual prototyping and experimental modelling of mechanical systems](#)
- [Innovative technologies for fashion](#)

Automation, robotics and mechatronics

Scientific Coordinator Prof. Claudio Melchiorri

Special-purpose processors and embedded multi-core systems, with real-time operating systems, for industrial automation. Design of automatic machines control software, approaches “model-driven engineering” based, patterns “machine-independent & platform-independent”. System diagnostic and supervision methods. Control architectures, electric components and electrochemical accumulation systems for electric vehicles. Energy conversion systems and coordinated motion control systems. Robotic and mechatronics systems with advances features for safe interaction with users, autonomous mobile robots modelling.

Development of:

- propulsion systems for low environmental impact vehicles;
- energy accumulation and conversion systems and their integration;

- low capacity wind power generation systems;
- photovoltaic systems;
- variable speed hydroelectric generation systems;
- energy saving systems;

energy-efficient systems for electric and hybrid propulsion.

Advanced materials and nautical applications

Scientific Coordinator Prof. Alfredo Liverani

The aim of the unit is the study of advanced solutions in the fields of composite materials, computational fluid-dynamics, advanced design methods and sensor technologies, in order to obtain more performance and eco-friendly boats of lighter and cheaper construction.

In particular we develop:

- advanced design systems, capable of multi-parameter optimization of complex dynamic systems and use of automated simulation (Simulation Driven Design);
- structural calculation systems extending Finite Element Methods (FEM) to the specifics of composite materials and complex structures, like marine ones;
- methods of Computational Fluid-Dynamics (CFD) applied to advanced problems of two-phase flows and Fluid Structure Interaction, either with traditional formulations (RANS, potential) or with innovative ones (SPH, Vortex Methods);
- innovative and eco-friendly composite materials, and related production and recycling processes;
- instrumental systems of nautical sensor technology and computer vision, as well as quality control system for composite structures;
- virtual prototyping and photorealistic visualization;

The industrial field targeted for applications are:

- Marine industry, automotive e aeronautics
- Composite materials
- Environmental and energy saving industrial field

Advanced materials, design and photonic applications

Scientific Coordinator Prof. Vittorio Colombo

- Advanced design of product and process oriented to innovative materials, new technologies and innovative assembly techniques;
- Mechanical, micro-structural, chemical-physical characterization, for non conventional materials;
- Photonic applications and laser processing technologies;

innovative processes for the development of advanced material.

Structured and/or composite materials for advanced applications

Scientific Coordinator Prof. Angelo Casagrande

The aims of the Operating Unit are:

- Design, innovative synthesis and characterization of nanomaterials for industrial application in diagnostic, medical science, energy and environment, functionalized polymeric materials, etc.
- Study of advanced composite materials with matrices and reinforcements of different chemical nature for automotive and nautical field.
- Production of raw materials and syngas from recycled materials.

The fields of interest are:

- Chemistry of process
- Auto motive and nautical sector
- Packaging
- Diagnostics and biomedical field
- Industrial catalyst
- Photolithography and protective coating
- Plastics, ceramics and composite materials
- Food industry
- Metallurgy and advanced mechanics
- Electronic, energetic and environment sectors

Virtual prototyping and experimental modelling of mechanical systems

Scientific Coordinator Prof. Giuseppe Catania

- Characterisation of the vibro-acoustic behaviour of machine, mechanisms and devices;
- Experimental analysis of vibrations and experimental modal analysis;
- Monitoring and diagnostic of mechanical components;
- Characterisation of the mechanical properties of materials.

Innovative technologies for fashion

Scientific Coordinator Prof. Vincenzo Tumiatti

studies on chemical and toxicological migration and characterization;

- Toxicological studies: definition of the toxicological profile of substances released by fabrics;
- Morphological and ultra-structural study of fabrics and materials and analysis of cloth biocompatibility.

Contacts

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[Send an e-mail](#)

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