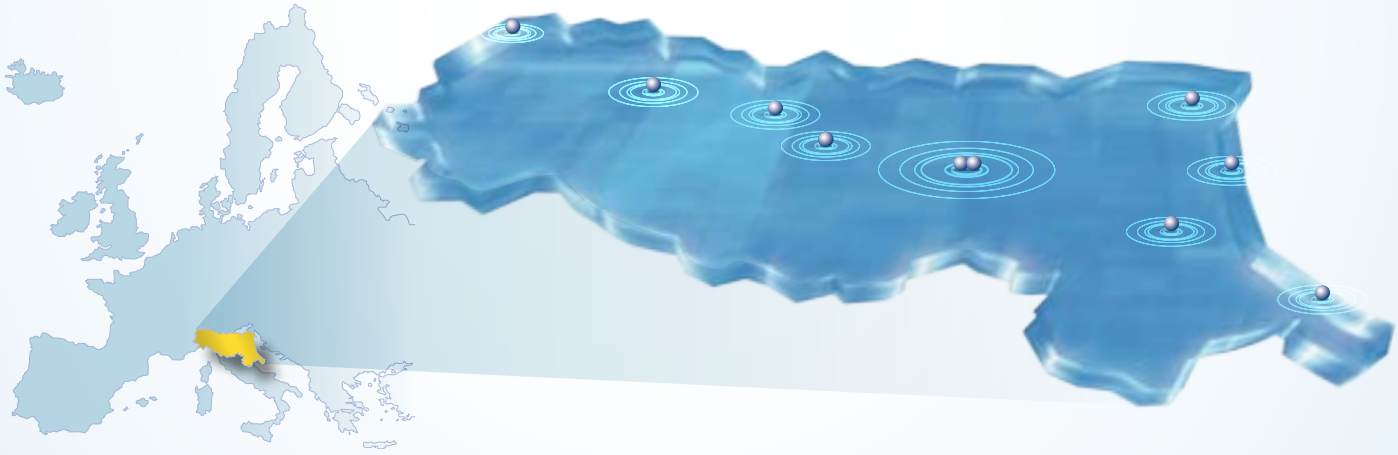
ASTER

RETE ALTA TECNOLOGIA
EMILIA-ROMAGNA
HIGH TECHNOLOGY NETWORK

ASTER EMILIA-ROMAGNA HIGH TECHNOLOGY NETWORK:

TECHNOPOLES



BOLOGNA MANIFATTURA / BOLOGNA CNR / MODENA / REGGIO EMILIA / PARMA / PIACENZA / FERRARA / RAVENNA-FAENZA / FORLÌ-CESENA / RIMINI

BUILDING OUR FUTURE TOGETHER

Regione Emilia-Romagna

Bologna, February 2011
1st Edition - English

The present publication is drawn up by ASTER S. Cons. p. A together with the Regional Department for Productive Activities, energy and sustainable development plan, green economy, construction, Emilia-Romagna Region single integrated authorization.
All information contained in this publication were gathered by ASTER directly or with reference to previously published materials, and with the contribution of Technopoles and Emilia-Romagna High Technology Lab managers, consistently with the Framework Programme Agreement between the Emilia-Romagna Region, the Universities of Bologna, Ferrara, Modena and Reggio Emilia, Parma, the CNR (Italian National Research Council), the ENEA (Italian National Agency for New Technologies, Energy and Sustainable Economic Development), the Polytechnic and Università Cattolica del Sacro Cuore of Milan for the offices in Piacenza, aiming at setting up a Regional High Technology Network as part of the implementation of Priority I Activity 1.1 of the ERDF 2007 – 2013 ROP (Regional Operational Programme) and of the Consortium Agreement for the activities of ASTER S. Cons. p. A.
The Technopoles have been set up within the framework of Priority I Activity 1.1 of the ERDF 2007 – 2013 Emilia-Romagna ROP.

The Emilia-Romagna Region has invested, for quite a long time, in research and innovation to consolidate its outstanding position in Europe and worldwide.
Innovation, research and business are keywords for the Regional action, and guidance for the future that has already started.
It is vital, in this era of deep and rapid change, to make services and technology transfer activities available to all enterprises, so as to increase learning opportunities for our business system and our territorial competitiveness.
And it is even more so for a land like Emilia-Romagna, very rich in small and very small enterprises that can ensure high quality productions but are very unlikely to develop in-house research centres.
The Regional High Technology Network - thanks to its strong integration with the University – represents an important strategic choice to develop research, innovation and high quality work. Our ten Technopoles and over fourty Laboratories belonging to the Network, clearly demonstrate the value and priority the Region has given to this commitment.
We are convinced that advanced training and research are the necessary levers that make individuals and enterprises fully entitled to enter the knowledge society.
It is a path that institutions, companies, universities and citizens walk together, to ensure Emilia-Romagna can be at the very heart of this process pointing to the future.
The networking approach, known as "Technopoles" in Emilia-Romagna, harmoniously fits in the leading European research network, keeping its leading role in the study and implementation of new technologies, already collecting indications and guidance for the next Framework Programme.

Vasco Errani
President of the Emilia-Romagna Region

The Emilia-Romagna Region is committed to ensuring socio-economic dynamism, innovation capacity and quality of development to foster the creation of new business, the growth of the existing ones and to create therefore new employment opportunities.
In Emilia-Romagna innovation at all levels is the result of the initiative and creativity of our entrepreneurs and skilled manpower, in a very heterogeneous business system which is all the more robust (from very small to medium-small and large enterprises, from manufacturing and agricultural to co-operative enterprises). It is a continuous process, embedded in the widespread culture of the Emilia-Romagna society, and supported by politics and institutions. It will certainly not be out of place to speak of "teamwork" to foster innovation, research, internationalization. For this reason, the support to companies networking, the development of competitive benefits at district level and the shift "from productive districts to technological districts" (which by the way is the title of a recent regional call for proposal), the creation of structured co-operations with the research system, the promotion of new innovative enterprises represent fundamental goals of our industrial policies in Emilia-Romagna. To be competitive in an ever-changing world, with new economic giants such as China, India, Russia, Brazil and other rapidly emerging countries, we want to trigger a continuous improvement of processes and products, the granting of new patents, to ensure sustainability growth and qualified employment.
Many elements in the innovative regional system have the necessary qualities to play their role in this challenge: district leading companies, champions in term of innovation and global market positioning; small and medium enterprises which are more dynamic; new high tech businesses; universities and research centres that must become active partners for the production system in every aspect of their activity.
Emilia-Romagna has the capacity to organize cooperation in an innovative world, creating excellent quality products and labels. This system will undoubtedly gain momentum from the regional policies which considers knowledge as the fundamental element in competitiveness, as it results in the on-going development of the Regional High Technology Network. This is where the most modern and innovative ideas are developed and turned into patents and new opportunities.
This commitment will continue in the next years and become even stronger, given the fact that our ultimate priority is employment, so as to avoid that the current slight economic recovery is combined to a further unemployment growth.

Gian Carlo Muzzarelli
Minister of Productive Activities, energy, sustainable development
and green economy Emilia-Romagna Region.

INDEX

PREFACE

With the approval of the Technopoles Programme the Emilia-Romagna Region has drawn up a major strategic plan for the regional society and has completed the phase which started with Law No. 7/2002 "Promotion of the regional system for industrial research, innovation and technology transfer activities", leading to the creation of a great regional infrastructure for industrial research and technology transfer: the Emilia-Romagna High Technology Network. This resulted in a strengthened network that combines research structures and centres of excellence aimed at promoting the shift of production systems, districts and chains towards a greater technological dynamism and a stronger commitment in R&D.
From productive districts to technological districts", this is the strategic view under the Region interventions.
The Technopoles Programme confirms the commitment of Universities and Research Research Centres based on the regional territory in promoting innovation and knowledge economy, and the evolution of the production systems into high technology.
The Technopoles Programme, implementing Priority 1 of the ERDF 2007-2013 Regional Operational Plan (ROP), is based on a Framework Agreement between the Region, Universities and Research Centres which defines the commitments and the new governance scheme carried out through ASTER, and based on networking and on the development of tools for sharing and promoting competences and scientific equipment, as well as on the involvement of companies.
10 Technopoles will be created on the regional territory, where industrial research laboratories, innovation centres, new technology businesses incubators, structures for technology transfer, and research laboratories for companies will be installed.
This network, therefore, will have a significant strategic role:
First and foremost for the scientific institutions being involved, i.e. the Universities of Bologna, Modena and Reggio Emilia, Ferrara, Parma, the Polytechnic and Cattolica of Milan with its offices in Piacenza, CNR, ENEA, Istituto Ortopedico Rizzoli and other research institutes; but also for local Authorities, namely Provinces and Municipalities that will accommodate the network laboratories and infrastructures. The Region itself is a direct leading actor in the implementation of the Technopole of Bologna which will be based in the premises of ex Manifattura Tabacchi.
Globally, the area made available, also thanks to the contribution of local Authorities, will cover 160 thousand square meters, involving some important urban requalification interventions as well.
Secondly, for those researchers permanently involved in the programme: 1600 researchers, 560 of whom are represented by new contracts

or research fellowships and the other are researchers and lecturers already working in Universities and Research Institutes who will join a growing strategic network for the industry, together with other important research bodies operating at international level. Indeed, there will be 45 research structures and innovation centres giving rise to operating units within the Emilia-Romagna High Technology Network, all of which will be granted an autonomous status from a legal, organisational and scientific point of view. These units will be linked together through the coordination work undertaken by ASTER with the Thematic Platforms focusing on: agri-food, construction, energy and environment, ICT and design, life sciences, mechanics and new materials.
Finally, for the regional companies and main production chains that, in these last years, have already developed primary industrial research projects with Universities and Research Institutes, thanks to the activities of the Regional Programme for Industrial Research, Innovation and Technology Transfer (PRRIITT). With the new programme companies will benefit from the availability of a huge technical and scientific skill base, as well as qualified structures and equipments.
This programme meets the priority goal set by the European Union to create an economy based on innovation and knowledge and on a growing involvement in R&D, representing key factors for competition and for boosting economic growth.
Globally, there are 137 millions in public funding both from European Funds and regional resources, to co-finance Universities, Research Centres and Local Authorities that are committed to supporting, in their local areas, the Technopoles programme, totalling 241 millions of investments.
Technopoles, beside housing a significant number of research laboratories proposed by the University of Bologna, ENEA and Istituto Ortopedico Rizzoli, will include many activities proposed by important economic organizations and provide service functions for the whole regional Network.
ASTER will play its network hub function at the Bologna Manifattura Technopole premises, which will become the point of reference and liaison of the whole Network, providing co-ordination, promotion and marketing services, as well as networking opportunities at regional, national and international, thus promoting relationships and collaborations and making the activities performed by Technopole members visible and available to all.

EMILIA-ROMAGNA HIGH TECHNOLOGY NETWORK: TECHNOPOLES

The Emilia-Romagna Region has undertaken the goal to identify, design and develop a regional system for industrial research and technology transfer.
The new Technopoles Network complements the process developed through different Regional Plans aimed at enhancing research, innovation and technology transfer.
With the Regional Law No. 7 of 2002, subsequently developed through PRRIITT – Regional Programme for Industrial Research, Innovation and Technology Transfer – the Region has initially launched a first experience in cooperation with Universities and Research Centres working on the territory, by setting up 27 industrial research and technology transfer Labs (net-lab) and 24 Innovation Centres, focusing on the different regional industrial sectors of specialization.
The same Law has reconfigured the mission of the regional technology agency named ASTER, that was turned into a consortium with the participation of the Region and all the Universities located in Emilia-Romagna, as well as those national Research Centres based in the region (CNR and ENEA), Unioncamere (Italian Union of Chambers of Commerce) and entrepreneural Associations.

This first Plan (2004-2007) involved the participation of a number of University and Research Centres (departments, laboratories, centres), the subscription of 650 new contracts for young researchers and the involvement of over 800 contract researchers (professors, researchers and technicians operating in the universities and Research Centres involved). Their activity focused on industrial research and technology transfer of interest to companies and produced 666 research results, namely 148 studies, 128 methods, 115 prototypes, 20 patents and 10 spin-offs of new firms.

Starting from 2007, a second Plan promoted a further regional intervention phase (2008-2009) aimed at optimizing the reinforcement and merging of the previous laboratories (from 27 to 14) and Centres (from 24 to 8) and a first coordination of such structures at regional level according to thematic areas consistent with the production specializations in Emilia-Romagna: agri-food, construction, energy and environment, ICT and design, mechanics and materials, life science.
Beside promoting the setting up of laboratories, the two regional Plans 2004 and 2007 directly supported the implementation of innovation projects for businesses (529 projects) by financing cooperation agreements with Universities and Research Centres (547) and promoting the recruitment of new young researchers within companies (811 contracts signed, in 46% of cases these young researchers were subsequently granted a permanent contract).

Finally, since 2008, the Region, always working in partnership with the Universities and Research Centres based on the territory, has started the current implementation phase for Technopoles coordinated within the regional High Technology Network, with the aim of: shifting the experimental nature of the Laboratories that were created; extending the commitment to industrial research in Universities and Research Centres; involving human resources (new young researchers and contract staff); developing scientific and technical equipment.

The Region has then set the “Creation of Technopoles for industrial research and technology transfer” Programme with an important financial commitment thanks to the European Programme ERDF 2007 – 2013 ROP and regional funding. Within this Programme, criteria and methods were defined to organize a regional High Technology Network in Technopoles and regional thematic Platforms, setting up effective coordination and implementation methods for common actions delegated to ASTER.
Technopoles will represent an infrastructure network distributed in 10 sites within the region that will host and carry out activities, services and structures for industrial research and technology transfer and incubators for the creation of new businesses.

Promoted by the Emilia-Romagna Region together with the Universities of Bologna, Ferrara, Modena and Reggio Emilia, Parma, with Politechnic and Università Cattolica of Milan – offices of Piacenza, CNR, ENEA, Istituto Rizzoli, the local Authorities of the different areas, the Technopoles:

- host the industrial research laboratories of the Emilia-Romagna High Technology Network and are equipped with modern research tools and staff devoted to activities and services of interest to the regional companies;
- include service structures for dissemination, demonstration and information as well as welcoming structures for companies, areas for innovative spin-offs and for private research laboratories;
- promote the link between enterprises and researchers and the access to cutting-edge scientific equipment, thus bridging the gap between demand and supply in research;
- serve as an access point, each one for its own area, to the whole Emilia-Romagna High Technology Network, thus promoting its visibility at national and international level.

Access to technopoles and to the High Technology Network will be facilitate also by a “Technopoles portal”, available in each site, that will be devoted to the relation with users, primarily with companies, by offering services to identify skills and technologies and by supporting research to business relations.
Technopoles will accomodate incubators in order to promote the spin-off of new companies originated from research outcomes, training activities for technology transfer, partnerships with research laboratories and business development.

To implement this Programme, the Emilia-Romagna Region together with the above mentioned Universities and Research Institutes, have signed a Framework Programme Agreement and specific Agreements for the creation of Technopoles and of the Regional High Technology Network (see Framework Programme Agreement attached).
With the Technopoles development plan, the regional High Technology Network consists to date of 34 structures for industrial research and 11 Centres for technology transfer. Such structures will benefit from functional and operational independence, will be responsible for scientific management, will have their own set of dedicated tools and human resources.

ASTER: NETWORK PROMOTION AND COORDINATION

Within the Emilia-Romagna High Technology Network, ASTER undertakes the coordination between the Network and the thematic Platforms and develops common actions and services for the promotion and enhancement of the Network.

ASTER is the consortium where stake is held by the Region, Universities and Research Centres working in Emilia-Romagna, by Entrepreneural Associations and by Unioncamere which has supported the Regional plans for industrial research and technology transfer, namely for the promotion of Laboratories and research structures.

Within the Framework Programme Agreement signed on 11 November 2009 between the Emilia-Romagna Region, Universities and Research Centres, and therefore with the new Charter and consortium agreement for the company activities, ASTER is defined "as the association-like organization of Technopoles – Regional Emilia-Romagna High Technology Network" (Art. 4 of the Charter).
As a consequence, ASTER is tasked with:

- promoting the Technopoles development and coordination, by arranging the structures taking part in the Technopoles into thematic Platforms; by formally representing them with respect to the applicable national and international regulations and acts; by setting up and managing the physical infrastructures and technological structures designed for the implementation and development of the Technopoles;
- coordinating industrial research initiatives of interest to the regional production system promoted by the High Technology Network, and more in general by Universities, Research Institutes, companies and entrepreneural associations, trade unions and other institutions and bodies;
- developing initiatives for the access and participation of enterprises, in cooperation with the regional Universities and Research Centres, in national, international and European industrial research programmes;
- promoting initiatives for the development of skills and human capital to carry out research within companies;
- promoting and developing the performances of the Universities and Research Centres staff, including short-term contractors, committed with the Technopoles;
- developing initiatives to facilitate, promote and support the creation of new businesses to make use of the outcomes and skills resulting from research activities;
- carrying out initiatives that can be useful for the promotion and dissemination of the Technopoles and High Technology Network;
- fostering users' access to scientific and technical equipment available within the Network structures and more in general within the Universities and Research Institutes; carrying out technical support activities for the Emilia-Romagna Region and other public authorities.

TECHNOPOLES

IN EMILIA-ROMAGNA




photos by Carlo Coppitz

ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

TECHNOPOLE
BOLOGNA MANIFATTURA

Ex Manifattura Tabacchi, Via della Manifattura 3, Bologna
TECHNOPOLE AREA: 50,000 sqm

PROMOTERS

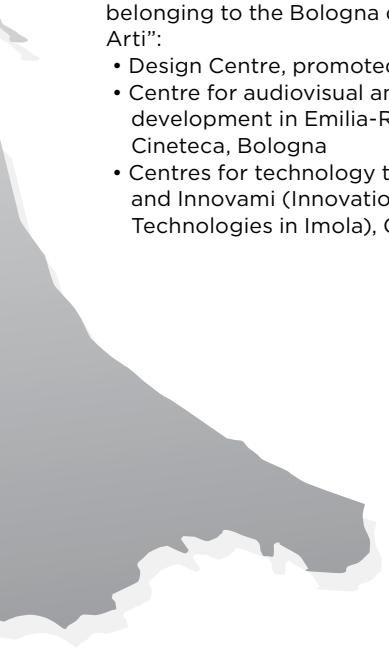
Organizations
Emilia-Romagna Region
Province of Bologna
Municipality of Bologna

Research Institutions
University of Bologna
Istituto Ortopedico Rizzoli (IOR)
ENEA
T3Lab Consortium
RICOS Consortium

In the Technopole Bologna Manifattura **ASTER** will set its offices and will play a coordination role for the whole Technopoles Network – Emilia-Romagna High Technology Network and the Regional laboratory for IT in Public Administration, promoted by Lepida.

Moreover, the regional structures representing a reference point for the activities supported by innovative technologies for security and territory will be hosted, among them:
- ARPA (regional environmental protection agency)
- Civil Protection

The Technopole will also cooperate with the structures belonging to the Bologna district of "Manifattura delle Arti":
- Design Centre, promoted by Academy of Fine Arts
- Centre for audiovisual and digital innovation development in Emilia-Romagna, promoted by Cineteca, Bologna
- Centres for technology transfer of CNA Innovazione and Innovami (Innovation Centre for the Diffusion of ICT Technologies in Imola), CITI of Alma Graduate School.



THE UNIVERSITY OF BOLOGNA LABORATORIES

MECHANICS
MATERIALS

CIRI* - ADVANCED MECHANICS AND MATERIALS

- **Structures and research fields:**
  > Unit: Automation, robotics and mechatronics
  > Unit: Advanced materials, design and photonic applications
  > Unit: Structured and/or composite materials for advanced applications
  > Unit: Virtual prototyping and experimental modelling
  > of mechanic systems

- **Focused topics:**
  Automation, robotics and mechatronics
  > Solutions based on special-purpose processors and embedded multi-core systems, with real-time operating systems, for industrial automation
  > Design of automatic machines control software, design approaches complying with "model-driven engineering", design patterns "machine-independent & platform-independent" paradigm
  > System diagnostic and supervision methods
  > Control architectures, electric components and electrochemical accumulation systems for electric vehicles
  > Energy conversion systems and motion coordinated control systems
  > Robotic and mechatronics systems with advances features for safe interaction with users and 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, design and photonic applications
  > Advanced design of product and process oriented to innovative materials and technologies, production

*CIRI: Interdepartmental Centre for Industrial Research

processes and assembling methods
> Mechanical, micro-structural, chemical-physical and technological characterization, aimed at classes of non conventional materials.
> Photonic applications
> Innovative processes for the development of materials with advanced characteristics

Structured and/or composite materials for advanced applications
> Preparation of advanced composite materials with matrices and reinforcements of different chemical nature
> Production of raw materials from recycled materials

Virtual prototyping and experimental modelling of mechanic systems
> Test characterisation of the vibro-acoustic behaviour of machine, mechanisms and devices
> Experimental analysis of vibrations and experimental modal analysis
> Monitoring and diagnostic.
> Characterisation of the mechanical properties of materials of technological interest

- **Fields of impact:** Automotive and transport; Mechanics; Automatic machinery; Robotics and mechatronics for industrial and civil use; Machine-tools; Packaging; Mechanical components; Electronics, Energy and environment, Ceramics; Logistics

ENERGY ENVIRONMENT

CIRI* ENERGY AND ENVIRONMENT

- **Structures and research fields:**
  > Unit: Bioenergies

- **Focused topics:**
  > Dedicated energy crops and residual biomass in agriculture.
  > Technologies for environment and renewable energy: catalytic processes for the production of bio-fuels, hydrogen, synthetic gas and the use of greenhouse gases; low temperature fuel cells

- **Fields of impact:** Agro-industry; Energy and environmental service; chemical and energy industry; Automotive; Nautical industry.

LIFE SCIENCE

CIRI* LIFE SCIENCE

- **Structures and research fields:**
  > Unit: Industrial applications of genomic and mitochondrial medicine in Emilia-Romagna
  > Unit: Translational medicine for innovative diagnosis and treatment of degenerative disease of the nervous and cardiopulmonary systems
  > Unit: Health and life quality technologies

- **Focused topics:**
  Health and life quality technologies
  > Development of systems and devices for medical diagnosis and treatment (acquisition and processing of data, biomedical signals and 2D and 3D biomedical images)
  > Assistive and ergonomic rehabilitation technologies
  > Ambient Assisted Living
  > Health technology assessment
  > Recombinant DNA and synthetic biology
  > Development of bioreactors

  Translational medicine for innovative diagnosis and treatment of degenerative disease of the nervous and cardiopulmonary systems
  > Regenerative medicine for cardiac and nervous tissues
  > Isolation and characterisation of stem cells, preparation of primary cells culture and bio-banking services
  > Stem cells for pharmacological screening and their application on nano-biomaterials and implantable devices
  > Development of combinatorial molecules with differentiation power
  > Scaffold 2D and 3D nano-machined biocompatible materials for tissue regeneration

  Industrial applications of genomic and mitochondrial medicine in Emilia-Romagna
  > Genomics, post-genomics, transcriptomics, bioinformatics and pharmacogenomics services
  > Development of DNA-chips for genetic variability analysis
  > Identification of biosensors and biomarkers to develop diagnostic and prognostic kits
  > In vivo tumorigenesis models

- **Fields of impact:** Pharmaceutical-biotechnological; Biomedical and biomaterials; Nano-technological; ICT; Health services

CONSTRUCTIONS

CIRI* BUILDING AND CONSTRUCTION

- **Structures and research fields:**
  - > Unit: Production and management of the building heritage: sustainability, safety and energy efficiency
  - > Unit: Fluidodynamics for energy and environmental applications

- **Focused topics:**
  Production and management of the building heritage: sustainability, safety and energy efficiency
  - > Development of technological solutions and testing services for the main sectors of civil engineering: structural, thermal and energy efficiency, acoustic, user safety and environmental sustainability
  - > Development of techniques, procedures and competences to carry out complex tests to failure on scale prototype models
  - > Improvement of the static/seismic behaviour of building systems
  - > In-depth knowledge of durability and sustainability of structures, materials and structural components, with particular reference to innovative materials and technologies
  - > Integrating effectively and optimizing the global behaviour of single materials, building components, structural elements and plant engineering devices intended to be permanently incorporated in buildings

  Fluidodynamics for energy and environmental applications
  - > Hydraulic infrastructures and energy management of water resources
  - > Coastal engineering
  - > Energy production from renewable sources (wave energy, tidal energy and from the marine environment in general)

- **Fields of impact:**
  - > Construction companies
  - > Businesses producing materials, building components, structural and plant engineering elements
  - > Construction and plant installation companies and their associations
  - > Infrastructures and special works construction companies
  - > Companies providing services for constructions
    - distribution and marketing companies for construction materials, plant engineering components and their associations
    - real estate advisors
    - professional bodies and designers associations
    - Insurance companies and technical supervision agencies
  - > Producers of equipment and/or software
  - > Businesses operating in renewable energy conversion (hydroelectric energy, wind power, wave energy)
  - > Producers of components for the management and upkeep of water supply systems.
  - > Local authorities responsible for the management of coastal resources. Port authorities, companies exploiting port areas, interested in improving navigation conditions
  - > Regional Environmental Protection Agencies. Operators of the integrated water supply service, land improvement co-operative.

CONSTRUCTIONS

CERAMIC CENTRE

Ceramic Centre is:

- > a research and technology transfer structure belonging to the University of Bologna;
- > a laboratory for analysis and tests on ceramic materials and a service and technical assistance centre for companies; it is also actively involved in standardisation activities;
- > a centre for high-level and advanced education and for knowledge dissemination.

Ceramic Centre can perform simultaneously, synergistically and in an integrated manner all the three above mentioned functions. Its mission is to support and strengthen the scientific and technological progress, as well as the competitiveness of the ceramic industry thanks to the close and continuous collaboration between university and industry.

ICT AND DESIGN

CIRI ICT

- **Structures and research fields:**

> Unit: Multimedia services and networks

- **Focused topics:**
  > Middleware technologies and open platforms for the supply of adaptive, mobile and multimedia services to be used by citizens and public institutions.
  > Platforms for service management and supply, and emerging systems for Cloud Computing for the private sector, namely for public administration
  > Support systems for co-operative work and 'social networking' for users communities supported by public and private funding

- **Fields of impact:** Public Administration, Production and use of ICT services, Tourism and commerce, Multimedia service providers

STAFF

Dedicated staff: 123**
Part-time structured staff: 320**

** Total staff estimated for the industrial research Laboratories of the University of Bologna within Bologna Manifattura, Ravenna-Faenza, Forlì-Cesena, and Rimini units.

ISTITUTO ORTOPEDICO RIZZOLI LABORATORY

LIFE SCIENCE

RIZZOLI RIT DEPARTMENT - RESEARCH INNOVATION & TECHNOLOGY

- **Structures and research fields:**

PROMETEO

Products for regenerative medicine and tissue engineering in orthopaedics

The ProMeTEO laboratory is aimed at manufacturing new biomaterials and scaffolds to create products of regenerative medicine with applications in the orthopaedics field. The engineering of such new potential products will be managed by a biomaterials research laboratory and production will take place in appropriate premises (GMP)for the manipulation of cells and biological tissues.

BITTA

Biocompatibility, technological innovation and advanced therapies

This laboratory will carry out in vitro and in vivo preclinical assessments on biocompatibility, biofunctionality, bioactivity and therapeutic efficiency of biomaterials, scaffolds, prosthesis and biomedical devices compliant with the regulations (ISO 10993).
A systematic approach to the biological assessment of medical devices is required, so as to offer industries and research centres the whole range of necessary tests for marketing and transfer to the biomedical clinic field.

RAMSES

Regenerative medicine for the musculoskeletal system

The laboratory will develop the necessary skills to carry out in vitro and in vivo preclinical assessments (in cooperation with BITTA) so as to evaluate the interactions between human cells and the biomaterials used in regenerative medicine for the musculoskeletal system. To this purpose, the lab will apply cell biology, electronic histology, molecular and proteomic biology methods. The tests will be carried out on human cells (e.g. chondrocytes and adult stem cells) and on animal models.

NABI

NanoBiotechnologies laboratory

Its goal is to reach an advanced tissue engineering by merging skills and methods derived from nanotechnologies to the more typical regenerative medicine techniques.
This laboratory will be based on a magnetic bioreactor representing cutting edge device which only comes in an experimental form and in a very limited number of laboratories worldwide. This bioreactor will be used to grow bone and cartilaginous tissue by way of magnetic fields. The laboratory will also be fitted with all necessary equipment for the study, production and measurement of biocompatible materials used within the bioreactor.

BIC

Computational Bioengineering

The BIC laboratory mission will be the development and transfer – both to local industries and the National health service – of biocomputing technologies, as well as the evaluation of such technologies both in laboratory and in the clinic practice, in order to turn them into industrial opportunities. The term biocomputing, or computer aided medicine, indicates those applications where a calculator is used in the clinic practice to produce new information to be used for the prevention, diagnosis and treatment of specific pathologies. Possible applications range from oncology to orthopaedics, from cardiovascular to neurology.

CLIBI

Clinic BioInformatics

Implementation of the GephCard tool to manage data and processes related to the clinical management and research on patients with chronic pathologies, with a specific focus on inherited character pathologies. Production of software based on the 3 HL7 version, in cooperation with IBM Haifa. Definition of new tools for innovative methods in detecting gene alterations, namely the large-scale parallel sequencing by the company 454.

- **Research areas under agreement:**
  - > Production under asepsis of engineered tissues
  - > Cell therapies
  - > Production under asepsis of monoclonal antibodies to treat oncological patients
  - > Analysis and characterisation of engineered tissues or biomaterials
  - > Biocompatibility, biofunctionality and bioactivity of materials and medical devices
  - > Engineering and preclinical assessment of scaffolds for regenerative medicine and tissue engineering
  - > Preclinical assessment of the therapeutic efficacy of adjuvant treatments and advanced therapies
  - > Isolation, growth, characterisation and differentiation of primary cultures from different types of human osteoarticular tissue (such as mononuclear cells, mesenchymal cells from different sources, e.g. bone marrow, fatty tissue, etc., or chondrocytes, osteoblasts, synoviocytes, tenocytes, ligament cells) and/or cell lines
  - > Surface culture, growth of mononuclear or mesenchymal cells on biomaterials both in basal conditions and during their differentiation in osteogenic terms and characterisation of constructs (biomaterials with cells)
  - > Surface culture, growth of mononuclear or mesenchymal cells on biomaterials both in basal conditions and during their differentiation in chondrogenic terms and characterisation of constructs (biomaterials with cells)
  - > Use of normal and transgenic in vivo models for the study and correction of specific pathologies (e.g. rheumatic disease, muscular dystrophy)
  - > Study of the expression and functional proteome in muscular, neurodegenerative and haematological disease in order to identify prognostic therapeutic markers
  - > Regenerative medicine
  - > Biomaterials
  - > Development of on-line resources for biomedical industrial research
  - > Development of software solutions in the orthopaedic field
  - > Development of tools for advisory services in computational bioengineering
  - > Development of technologies for bone multi scale modelling
  - > Development of IT (Information Technology) solutions for Biomedical research
  - > Software development in the field of customized medecine (e-Health)
  - > Computational calculation applied to the study of MicroArray and New Generation Sequencing data
  - > Development of applications for the management of Clinical Trials with respect to GCP and GLP standards
- **Fields of impact:** Pharmaceutical-biotechnological; Biomedical and biomaterials; Nanotechnological; ICT; Health services; Scientific equipment production.

STAFF

Dedicated staff: 67
Part-time structured staff: 104

ENEA LABORATORIES

ENERGY
ENVIRONMENT

LECOP LABORATORY

Enea laboratory for the environment

Structures and research fields:

> LEI - LCA and Ecodesign for eco-innovation
> TIGRI - Integrated technologies for the management of water resources
> MIA - Atmospheric pollution: models and characterisation of atmospheric pollutants

- **Focused topics:**

LEI - LCA and Ecodesign for eco-innovation

> Methods for analysis, certification and sustainability assessment of processes and products: LCA, Ecodesign, green procurement, SPC, Social LCA, Risk Assessment. Tools for eco-innovation at product chain level; industrial ecology strategies applicable at Ecologically Equipped Production Areas level

TIGRI - Integrated technologies for the management of water resources

> Technologies for municipal, industrial and agricultural water saving, depuration, re-use and valorisation: optimization, assessment, management protocols of waste water treatment and depuration; waste water treatment for re-use; energy production from wastewater; microbial fuel cell; isotope sampling of nitrogenous substances in agricultural water

MIA - Atmospheric pollution: models and characterisation of atmospheric pollutants

> Atmospheric pollution: tools for environmental impact assessment, cost analysis for mitigation measures, trend analysis both through typical Integrated Assessment Modelling (IAM) approaches and experimental activities of model validation; protocols and procedures for atmospheric pollutants sampling and analysis; revision of the BATS (Best Available Technologies) for the containment and reduction of atmospheric pollutants, of interest of the regional industry

- **Fields of impact:** Agri-food; Timber and furniture; Construction; Mechanics; Chemistry; Logistics; ICT and business related services.

ENERGY
ENVIRONMENT

LAERTE LABORATORY

Energy efficiency, renewable energy, heating systems conversion and safety

- **Structures and research fields:**
  > EDI - Energy efficiency of buildings through the adoption of innovative materials and renewable energy sources
  > SAFE - Safety and sustainability of infrastructures, plants and buildings with a multi-risk approach (seismic, fire, impact, etc.)
  > RSR - Use of heat and conversion of heating (and cooling) systems for civil works, their aggregates and industrial plants and rational use of energy

- Focused topics:

EDI - Energy streamlining of buildings through the adoption of innovative materials and renewable energy sources

> Energy balance of constructions; thermal and environmental qualification of new materials for energy saving in buildings and drawing up of manuals for their optimal use; development of modular systems (in particular for locking) for refurbishment and new constructions; natural air conditioning systems and integrated with various energy sources plants, including solar power

SAFE - Safety and sustainability of infrastructures, plants and buildings with a multi-risk approach (seismic, fire, impact, etc.)

> Development, qualification and prototyping of materials, devices and protection systems of civil works from seismic events, fire, natural disasters; integration with energy optimization systems in buildings

RSR - Use of heat and conversion of heating (and cooling) systems for civil works, their aggregates and industrial plants and rational use of energy

> Innovative plants, up to 150kW power for the conversion of traditional heating and cooling systems: characterisation, testing, drawing up of manuals for the optimal application of systems and components such as mini and micro chip plants, geothermal probes and heat exchangers, fuel cells for steady applications, materials and coverings

- **Fields of impact:** Any production chain, namely: Constructions, Mechanics, Logistics; Energy industry; Services industry.

MECHANICS
MATERIALS

TRACEABILITY LABORATORY

- **Structures and research fields:**
  > Isotopic analyses of gaseous emissions
  > Tracking and tracing of products and processes

- **Focused topics:**
  Isotopic analyses of gaseous emissions

  > Development of methods to capture CO2 emissions from power plants and incinerators and development of quick and saving methods for isotopic fractionation 13C/12C/ and Radiocarbon
  > Development of new methods to capture and analyze radioactive noble gases (Radon, Krypton and Xenon)

  Tracking and tracing of products and processes

  > Use of mass spectrometry for tracing of agri-food products origins and for identifying frauds

- **Fields of impact:** Food industry; Building; Chemistry, Constructions, Energy production in general, Waste treatment and disposal; safety, Health and Prevention, Public administrations

ICT AND DESIGN

CROSS-TEC LABORATORY

Interoperability and virtualization of processes for company networks

- **Structures and research fields:**
  > X-LAB - Technologies for interoperability and companies networks
  > PROTO-LAB - Design methods for cad/cam and new production techniques
- **Focused topics:**
  > Technologies for interoperability and X-TEC companies networks
  > PROTO-TEC quick prototyping and reverse engineering

- **Fields of impact:** ICT and Services to enterprises; Mechanics; Fashion system, Logistics

STAFF:

Dedicated staff: 35
Part-time structured staff: 53

THE T3LAB CONSORTIUM LABORATORY

MECHANICS
MATERIALS

T3 LAB

- **Promoted by:** UNINDUSTRIA BOLOGNA, University of Bologna

- **Structures and research fields:**
  > Intelligent energy
  > Digital vision
  > Radio transmissions
  > Natural interfaces (for man-machine interaction)
  > Remote monitoring of machines and plants

- **Focused topics:**
  > GPS Protocols
  > HMI SW, sensor fusion
  > Energy modelling and monitoring with telemetry
  > Industrial imaging
  > Wireless automatic identification systems (RFID)
  > Energy efficiency of buildings
  > Innovative solutions for mobility
  > Man-machine interaction with “natural” interfaces
  > Remote monitoring of machines and plants
  > Home automation

- **Fields of impact:** Electronics applied to energy production and energy efficiency; Automation; ICT for the public sector and businesses; Mechanics; Environmental monitoring; Quality control; Packaging, Home automation, Safety

STAFF:

Dedicated staff: 24

THE RICOS CONSORTIUM

CONSTRUCTIONS

LARCO ICOS LABORATORY

Research and technology transfer laboratory for safe, sustainable and efficient buildings

- **Promoted by:** Fondazione Cassa di Risparmio, ICIE

- **Structures and research fields:**
  > Materials and components for high performance buildings: development of innovative, energetically and environmentally high performing elements for infilling
  > Materials and components for high performance buildings: insulating expanded boards with renewable matrix
  > Sustainable building: study of systems and tools for managing building and micro-urban transformation programmes
  > Sustainable building: innovative tools for energetic and seismic requalification of existing buildings
  > More efficient construction processes: improving facility management operations in building by way of ICT technologies
  > Technology transfer

- **Focused topics:**
  > Development of materials and components for high performance buildings
  > Tools for the designing, control and testing of new construction procedures energy and seismic requalification of existing buildings
  > Systems and tools for managing building and micro-urban transformation programmes
  > More efficient construction processes (improving facility management operations in building by way of ICT technologies)
  > Demonstration and technology transfer activities

- **Fields of impact:** Constructions; Manufacturers of materials and components for the building sector; Process plant engineering; Suppliers of services for designing, advice and technical control; Real estate promotion; Management and upkeep of buildings and plants; Local public administration; Public-private partnership; Facility management companies; Global service and Multiservice companies

STAFF

Dedicated staff: 6
Part-time structured staff: 5

THE EMILIA-ROMAGNA REGION LABORATORY IN COOPERATION WITH LEPIDA S.p.A

ICT AND DESIGN

REGIONAL LABORATORY FOR IT IN PUBLIC ADMINISTRATION

- **Promoted by:** Lepida
- **Structures and research fields:**
  > Integration systems for telecommunication networks
  > Optimization systems for network resources
  > Multimedia transmission systems
  > Streaming enjoyment systems
  > Territorial monitoring systems
  > Resource federation systems
  > Application cooperation systems
  > Systems for intelligent cities
  > Systems and solutions for ultra-broadband
  > Systems and solutions to bridge the digital gap
- **Fields of impact:** Public Administration

FINE ART ACADEMY

ICT AND DESIGN

DESIGN CENTER

The Design Centre goal is the economic implementation of entrepreneurial activities through the design on the basis of similar experiences which are considerably widespread at international level. Its mission is to make design available to businesses by turning design into engineering, i.e. identifying and solving problems that may be related to products, to their communication, to the processes that determine their creation.

CINETECA DI BOLOGNA

ICT AND DESIGN

CENTRE FOR THE DEVELOPMENT OF AUDIOVISUAL AND DIGITAL INNOVATION IN EMILIA-ROMAGNA

This Centre, being part of the multimedia district, is focused on supporting businesses to meet market challenges, by gathering the necessary skills and resources to offer information, training, promotion and advice services within the audiovisual sector in Emilia-Romagna. The Centre aims at offering services and training and information opportunities through meetings, seminars, workshops and developing projects to be promoted and disseminated on the territory.

CNR
Area della Ricerca
di Bologna

TECHNOPOLE
BOLOGNA CNR

TECHNOPOLE AREA: 5,500 sqm

PROMOTERS
CNR - Bologna Research Area, via Gobetti 101, Bologna

MECHANICS
MATERIALS

MIST E-R LABORATORY
Integrated Manufacturing Consortium starting from the development of micro- and nano-technologies for a new-generation environmentally-sound manufacturing system

- **Structures and research fields:**
  > Micro- and nanotechnology development Sector Area: Design, Processes, Synthesis and Characterisation on Inorganic and Hybrid materials
  > Micro- and nanotechnology development Sector Area: Design, Processes, Synthesis and Characterisation on Organic and Hybrid materials

- **Focused topics:**
  Design, Processes, Synthesis and Characterisation on Inorganic and Hybrid materials

  > Enabling technologies for the creation of micrometric and sub-micrometric multi-function structures;
  > Sub-micrometric lithography (DUV Laser and/or Electron beam) and patterning with high energy ion beams;
  > Diagnostic techniques for the determination of structural properties on the submicro-nanometric scale

  Design, Processes, Synthesis and Characterisation on Organic and Hybrid materials

  > High efficiency and environment friendly light sources
  > Innovative systems for energy production from renewable sources and for energy saving
  > Diagnostic of devices and systems based on nano- and micrometric probe equipment
  > Development of biomimetic functional materials

- **Fields of impact:** Advanced functional materials, ICT, Building integration, Biomedical and biodiagnostics, Safety, Defence, Advanced manufacturing, Anti-counterfeiting, Sensor arrays, Technologies for the environment

ENERGY
ENVIRONMENT

PROAMBIENTE LABORATORY
Engineering and development of instruments and services for the environment

- **Structures and research fields**
  > Environmental control
  > Environmental remedy

- **Focused topics:**
  Environmental control

  > Development of equipment and integrated systems in-situ or remote-sensing for monitoring in atmosphere and in confined environments and remote data control and transmission systems by way of standard techniques and innovative equipment based on the use of micro- and nanotechnologies and of energy efficient techniques
  > Development of equipment and methods for the protection of cultural heritage
  > Development of integrated systems for marine environment and coastal areas monitoring and management
  > Provision of environmental certification, calibration and certification of monitoring equipment and environmental modelling services

  Environmental remedy

  > Development of techniques and processes for water, atmosphere and soil depuration and purification, for recovery and reuse
  > Development of techniques and intruments for river, coastal and marine ecosystem sustainability and of other natural and anthropic processes impacting on the water cycle
  > Development of techniques and systems, and application of new materials and instruments for the compensation and mitigation impacts on environment, productions and on production urban, rural, mountain and coastal territory
  > Provision of advanced design services for spatial planning and improvement, with a particular focus on the valorisation, recovery and development of territorial identities and their connexion systems

- **Fields of impact:** Environment, Agriculture, Constructions, Electronics, Cultural heritage, Sanitary, Logistics, Plant engineering, Food, Health, Transport, Fishery Tourism, Safety, Airspace.

STAFF
Dedicated staff: 31
Part-time structured staff: 92

University Campus of Modena, via Vignolese 905, Modena
Ex Fonderie area, viale Ciro Menotti, Modena
Ex Sipe area, via Vignolese, Spilamberto (MO)
Technopole area: 7,000 sqm.

PROMOTERS

Province of Modena
Municipality of Modena
Unione dei Comuni Terre di Castelli
with the support of: Chamber of Commerce of Modena, Democenter-SIPE

LABORATORIES

MECHANICS
MATERIALS

ICT AND DESIGN

INTERMECH-MO.RE LABORATORY, MODENA

Interdepartmental Research Centre for Applied Research and Services in the Advanced Mechanics and Motor Sector

- **Structures and research fields:**
  - > Unit: Mechanics
  - > Unit: Industrial Design for Mechanics
  - > Unit: Mechanical properties, in particular tribological (fiction and wear), surface and multiscale coatings
  - > Unit: Coating engineering for mechanics, Coating engineering at the macro-micro scale
  - > Unit: Softech, information technologies for businesses
- **Focused topics:**

Mechanics

- > Automotive, combustion analysis and control, thermo mechanical and hydraulic analysis
- > Mechanical transmissions simulation and testing
- > Automated and robotised production systems
- > CFD analysis of spray

Industrial Design for Mechanics

- > Augmented and virtual reality
- > Collaborative design validation, digital mock up, virtual prototyping exploration, and real time simulation for the design of new products

Mechanical properties, in particular tribological (fiction and wear), surface and multiscale coatings

- > Tribological processes at the macro-, micro - and nanoscale
- > Surface treatment and coatings aimed at friction and wear control
- > Analysis and control of fiction and wear phenomena at the micro - and nanoscale

Coating engineering for mechanics, Coating engineering at the macro-micro scale

- > Protection and functionalization of surfaces through surface coatings and treatments with improved nano-microstructural properties

Softech

- > Computer applications of artificial vision
- > Brokers network for logistic optimisation
- > Open-source ERP systems for small businesses
- > Video surveillance and sensor networks for safety

- **Fields of impact:** Mechanics; Automotive; Hydraulics; Mechatronics; Agricultural machinery; Automation; Industrial mechanics and industrial robotics; IT; Biomechanics and Biomedical; Electronics; ICT in general; Multimedia; Logistics and transport; Video-surveillance; Safety

LIFE SCIENCE

"STEFANO FERRARI" REGENERATIVE MEDICINE CENTRE LABORATORY

"Stem cells and regenerative medicine" Interdepartmental Centre

- **Structures and research fields**
  - > Epithelial stem cells applied in Regenerative Medicine

- **Focused topics:**
  - > Advanced therapies for of organs and tissues, in particular epithelial tissues regeneration
  - > Development of new technologies for businesses in the biomedical sector
  - > Treatment of rare diseases without alternative therapies

- **Fields of impact:** Pharmaceutical-biotechnological; Biomedical; Health.

STAFF

Dedicated staff: 113***
Part-time structured staff: 171***

*** Total staff estimated for the industrial research Laboratories of the University of Modena and Reggio Emilia within Modena and Reggio Emilia units

UNIVERSITÀ DEGLI STUDI
DI MODENA E REGGIO EMILIA

TECHNOPOLE
MODENA

Ex Reggiane area, Capannone 19, Via Agosti 27, Reggio Emilia
TECHNOPOLE AREA: 3,500 sqm

PROMOTERS
University of Modena and Reggio Emilia
Province of Reggio Emilia
Municipality of Reggio Emilia
Centro Ricerche Produzioni Animali – C.R.P.A. SpA
(Animal production research institute)
with the support of Chamber of Commerce of Reggio Emilia

MECHANICS
MATERIALS

INTERMECH-MO.RE LABORATORY, REGGIO EMILIA

Interdepartmental Research Centre for Applied Research and Services in the Advanced Mechanics and Motor Sector

- **Structures and research fields :**
  > Unit: Mechatronics
- **Focused topics:**
  > Mechatronics for hydraulic systems
  > Mechatronic materials
  > Mechatronics diagnostics and maintenance
  > Industrial electronic systems
  > Control interaction and optimization of robotic and industrial systems
- **Fields of impact:** Advanced Mechanics, Mechatronics, Hydraulics, Agricultural Machinery, Innovative Materials, Industrial Plant Engineering, Electronics, ICT, Robotics, Man-machine interfaces

CONSTRUCTIONS

EN&TECH LABORATORY

Laboratory interdepartmental Research Centre for Industrial Research and Technology Transfert in integrated Technology sector for Sustainable Research, Efficient Energy Conversion, Energy Efficiency of Building, Lighting and Home automation

- **Structures and research fields:**
  > Materials, systems and methods to enhance energy efficiency for buildings
  > Lighting and home automation
  > Efficient conversion of energy
- **Focused topics:**
  > Techniques and methods for the valorisation of thermo-physical, chemical-physical and structural properties of construction materials and components, for the study of processes from environmental stress, energy dispersions and structural characterisation of construction materials and components and of the built complex
  > Home and building automation platforms, home lighting systems with high energetic efficiency
  > Technical-experimental prototypes for efficient energy conversion of buildings in third generation photovoltaic, wind power, re generation, metal-fuel cogeneration field.
- **Fields of impact:** Companies of the building and construction sector; companies operating in the renewable energy production sector

AGRIFOOD

SITEIA-BIOGEST LABORATORY

Interdepartmental Research Centre for Agri-food Biological Resources Improvement and Valorisation

- **Structures and research fields:**
  > Food Science and Technologies
  > Science, Technologies and Protection of Raw Materials
- **Focused topics:**
  > Application on non-destructive analysis methods to asses food, production processes and raw material qualities
  > Active packaging to improve the shelf life of food
  > Development of microbic techniques to improve the shelf life of food
  > Application of objective and non-destructive systems to assess pork legs intended for PDO processing
  > Improvement of the nutritional characteristics of food
  > Identification of molecules from vegetables with nutritional and healthy functions
  > Development of an assisted improvement platform for the seed industry
  > Improvement and valorisation of fruit and vegetable raw materials
  > Development and management of a germplasm bank of grain species
  > Development of tests for the resistance to phytosanitary products of phytophagous insects
  > Development of new bioactive compounds for raw material protection
  > Development of tests for raw materials and foodstuff protection
- **Fields of impact:** Food industries, suppliers of raw materials and semi-finished products, slaughtering companies, producers of sensors and packaging materials, seed industries, mills, ingredients and semi-manufactures products companies, fruit and vegetable consortiums, phytosanitary products manufacturer

AGRIFOOD
ENERGY
ENVIRONMENT

CRPA LAB

Products characterization, processes optimization and valorisation of agri-food waste

- **Structures and research fields:**
  > Agri-food
  > Environment and Energy
- **Focused/specialization topics:**
  Food sector
  > Innovation of production processes for traditional and animal origin products: design and implementation of a dedicated structure for pilot experiences in the dairy sector in order to build product quality estimation models and assess the compatibility and efficacy of tested solutions

> Installation of equipment and data use for the hygienic-sanitary and compositional quality control of raw materials and on-farm analysis of meat and milk, together with logistic elements linked to the organization of the production chain
> Valorisation and characterization of animal origin products, in particular typical and registered designation products using sensorial analysis tools

Environment and energy sector

> Characterization of organic by-products of agri-food industries and their energetic (biogas) and material (fertilizers) valorisation. Determination of the Biochemical Methane Potential (BMP) for in batch assessment of the maximum quantity of methane that can be produced by an organic matrix; performance of continuous tests of anaerobic digestion of agro-industrial waste and other biomass in laboratory and industrial pilot reactors;
> Analysis and validation of biomass pre-treatment techniques before anaerobic digestion to increase energy performance;
> Analysis and validation of biomass post-anaerobic digestion treatment techniques for the reduction and/or recovery of nutrients load (in particular nitrogen).

- **Fields of impact:** Meat, milk and fruits and vegetables processing and transformation; effluent and organic waste management and disposal; production of renewable energy from biomass.

STAFF

Dedicated staff: 113***
Part-time structured staff: 171***

*** Total staff estimated for the industrial research Laboratories of the University of Modena and Reggio Emilia within Modena and Reggio Emilia units

TECHNOPOLE
REGGIO EMILIA

UNIVERSITÀ DEGLI STUDI
DI MODENA E REGGIO EMILIA

University Campus – University of Parma, Viale G. P. Usberti, Parma
TECHNOPOLE AREA: 5,000 sqm

PROMOTERS
University of Parma

LABORATORIES

AGRIFOOD

SITEIA.PARMA LABORATORY
Food quality and safety, healthy aspects and typical products, machines and plants for food processing and storage

- **Structures and research fields:**
  > Food: study and assessment of food quality and safety
  > Mechanic-food: optimization and innovation of machinery, plants, also intended for their hygienic safety
  > Technological: optimization and innovation of product and process

- **Focused topics:**
  Food:
  > New microbiological, chemical and physical analysis methods, to assess raw materials and food safety, quality, authenticity and functional characteristics
  > Scientific validation of healthy aspects of functional food and of the food-health relationship, also for the valorisation of typical products

  Mechanic-food:
  > Optimization and innovation of machinery, plants, also intended for their hygienic safety
  > New simulation methods, advanced design also with innovative materials, testing and diagnostic methods with reference to treated products, predictive maintenance and logistics management and TPM techniques

  Technological:
  > Optimization and innovation of product and process
  > Design, optimization and innovation of food, production processes and control systems, to increase competitiveness and sustainability, valorise typicity and preserve or introduce specific nutritional and healthy functions

- **Fields of impact:** Food industry and producers of ingredients and food additives, co-operatives and small companies producing typical and certified food, manufacturers of machines and plants for the processing, packaging and storage of food, suppliers of materials for the clearing and disinfecting of food equipment, companies operating in the large-scale distribution industry.

AGRIFOOD

CIPACK LABORATORY
PACKaging Interdepartmental centre

- **Structures and research fields:**
  This Laboratory is intended as a reference point for research on packaging materials, technologies and equipment for food industry and pharmaceutical sector.
  > Innovative materials for packaging
  > Packaging quality and hygiene
  > Advanced plants for food and drug packaging
  > Environmental impact of packaging

- **Focused topics:**
  Innovative materials for packaging
  > Reduction of gas permeability and light transmission for packaging materials
  > Risk assessment of the interactions between packaging materials and food
  > Development of new forms of Active and Intelligent Packaging

- **Packaging quality and hygiene**
  > Influence of the packaging material and technology on food products shelf life
  > Maintenance of high sensorial properties in the packaged products throughout their life cycle
  > Risk assessment of pathogenic microorganisms development in packaged containers for food and pharmaceutical use
  > Chemical analysis for quality and safety assessment of packaged products (off-flavours, plasticizers in food)

  Advanced plants for food and drug packaging
  > Plant improvement of complex packaging systems
  > Modelling and simulation of packaging systems
  > Development of sterilization of containers for food primary packaging

  Environmental impact of packaging
  > Analysis of the environmental impact of the packaging (sustainable packaging)
  > Materials and treatment techniques for bio and environment friendly packaging and films

- **Fields of impact:** Food and beverage industry, packaging, chemical industry, rubber and plastic, pharmaceutical industry, glass and ceramics, machines and plants for the food industry.

AGRIFOOD

LIFE SCIENCE

CIM LABORATORY
Measurement Interdepartmental centre

- **Structures and research fields:**
  > Application of Nuclear Magnetic Resonance (NMR) for the Quality and Safety of processed food

- **Focused topics:**
  > Quality and safety of processed food: study of the presence of desirable substances (antioxidant agents, flavour enhancers, functional peptides) and undesirable substances (microtoxin and xenobiotic metabolites) to improve food quality and safety through NMR and High Resolution (HRNMR) techniques as well as high resolution mass spectrometry
  > Optimization and innovation of process/product: study of the influence of different technological processes on the nutritional and functional characteristics of food products. Determination of molecular markers for functional characteristics assessment.
  > Molecular traceability and reverse-traceability systems: development of new methods for the determination of typicity and geographical origins of food through solid state HRMAS NMR and high resolution mass spectrometry techniques
  > Supply of NMR, Mass spectrometry, AFM, Optical spectrometry and e Microcalorimetry services for the Interdepartmental Centres of the Parma Technopole and for any user of the other Regional Technopoles

- **Fields of impact:** Meat and fish processing and storage; Fruits and vegetables processing; Dairy industry; Bread and pasta production; Oils and fats industry

LIFE SCIENCE

BIOPHARMANET_TEC LABORATORY

Interdepartmental centre for Health Products Innovation

- **Structures and research fields:**
  > Pharmaceutical Technology
  > Pharmaceutical Chemistry
  > Pharmaceutical Technology, Pharmaceutical Engineering, Process Technology

- **Focused topics:**
  > Drug delivery
  > Drug discovery
  > Manufacturing and quality of medicines
  > Safety, efficacy and dedicated investigation equipment

- **Fields of impact:** Pharmaceutical; Cosmetics; Food industry (nutritional for quality regulatory aspects); Biomedical.

LIFE SCIENCE

COMT LABORATORY

Molecular and Translational Oncology Interdepartmental centre

- **Structures and research fields:**
  > Molecular diagnostics: design, elaboration and optimisation of diagnostic kits
  > Development and pre-clinic validation of biological therapeutic agents (antibody drugs)

- **Focused topics:**
  Molecular diagnostics
  > Prognostic and predictive markers for therapeutic response
  > New genetic-molecular platforms for oncology patients monitoring

  Development and pre-clinic validation of biological therapeutic agents
  > Antibody drugs/immunotherapy
  > Target therapy
  > Development and transfer to clinic of biological drugs for antineoplastic target-therapy aiming at developing personalized therapy approaches

- **Fields of impact:** Pharmaceutical-biotechnological; Health.

ICT AND DESIGN

RFID&VIS-LABS LABORATORY

- **Structures and research fields:**
  > RFID Logistics Pilot in Fashion
  > RLP – from chain to networks in the Large scale retail trade in the food industry
  > Cybercars and mobility
  > Safety and access control
- **Focused topics:**
  > Automotive
  > Artificial vision
  > Radio Frequency Identification (RFID)
  > Supply chain management

- **Fields of impact:** Automotive sector; Large scale retail trade in the food industry; Textile and apparel sector; Plant process businesses and companies operating in the automation sector, Public Administration.

STAFF

Dedicated staff: 68
Part-time structured staff: 132

Casino Mandelli, Le Mose District, Piacenza
Ex Centrale Emilia, via Nino Bixio 27, Piacenza
TECHNOPOLE AREA: 15,000 sqm

PROMOTERS

Polytechnic of Milan
Università Cattolica del Sacro Cuore
Municipality of Piacenza
with the support of Chamber of Commerce of Piacenza, Fondazione Politecnico di Milano

LABORATORIES

MECHANICS
MATERIALS

MUSP LABORATORY

Tool-machines and Production systems

- **Structures and research fields:**
  > Configuration and management of integrated production systems
  > Precision engineering
  > Advanced engineering, industrial applications of materials and innovative technological processes
  > Manufacturing technologies for the aeronautical sector
  > Economic analysis and benchmarking production system sector

- Focused topics:

  Configuration and management of integrated production systems
  > Simulation and optimization of the equipment of NC systems
  > Real time optimization of the machining programme of parts with complex geometries
  > Diagnostic methods for flow analysis and control in integrated production systems

  Precision engineering
  > 3D reconstruction of complex inner/outer geometries
  > Large scale metrology
  > Machine-tool monitoring and diagnostic

  Advanced engineering, industrial applications of materials and innovative technological processes
  > Tool-material interaction
  > Use of "spindle speed variation" (SSV) techniques in removal dynamic instability
  > Analysis of the structures dynamic and static behaviour
  > Metal foam production technologies

  Machining technologies for the aeronautical sector
  > Titanium alloy machining technologies
  > Use of special technologies for the machining of aeronautical components
  > Development of innovative aeronautical products

  Economic analysis and benchmarking production system sector
  > Study of the international market of capital goods for industry
  > Innovation matrix in the machine-tool industry
  > Innovation processes and technology transfer management models

- **Fields of impact:** Manufacturing; Capital goods for industry; Tool-machines.

ENERGY
ENVIRONMENT

LEAP LABORATORY

Energy and Environment Laboratory Piacenza

- **Structures and research fields:**
  > Thermal energy meters
  > Experimental testing of biomass heaters performance
  > Biomass plants and bio-energy districts for electricity and/or heat generation
  > Measurement of the thermodynamic properties in CO2 based blends for separation processes
  > Software for power plant calculation

- **Focused topics:**

  Thermal energy meters
  > Heat metering equipment calibration for different size plants (from condominium to district heating systems) starting from 100kW power. Technical support for the development of innovative measurement tools

  Experimental testing of biomass heaters performance
  > Gas and biomass heaters test bench with emission measurement line (fine and ultrafine particulate matter). Experimental testing and analysis of the main types of existing biomass heaters with reference to combustion quality and emission reduction. Technical support for the optimization of components and adjustment systems for the optimal plant configuration in the design of new heaters

  Biomass plants and bio energy districts for electricity and/or heat generation
  > Development of a model for the assessment of potential biomass availability for energy use; application on the Emilia-Romagna regional territory. Model for the optimal definition of closed chain bio-energy districts in terms of available biomass, territorial restrictions, energy demand; model for environmental impact assessment of the district due to biomass production and transport and to the plant emissions (greenhouse gases, atmospheric pollutants SOx, NOx, PM). All models are applicable with the support of Geographic Information Systems

  Measurement of the thermodynamic properties in CO2 based blends for separation processes
  > Test investigation and modelling elaboration in the Carbon Capture and Storage sector, with particular reference to thermodynamic properties in CO2 based blends. Cryogenic bench and test section extended to several technical gases, including toxic and explosive ones

  Software for power plant calculation
  > Development of calculation codes and models for the simulation of advanced power generation systems from fossil, nuclear and renewable (biomass and thermodynamic) sources

- **Fields of impact:** Manufacturers and users of heat meters; Generation and heat distribution plant managers; Manufacturers of boilers, Electrical industries and oil companies; Power generation and process chemistry sector; Oil&Gas sector operating in the natural gas softening field; Universities, research centres and engineering companies using process plant engineering simulation; Public administrations responsible for air quality management and/or control.

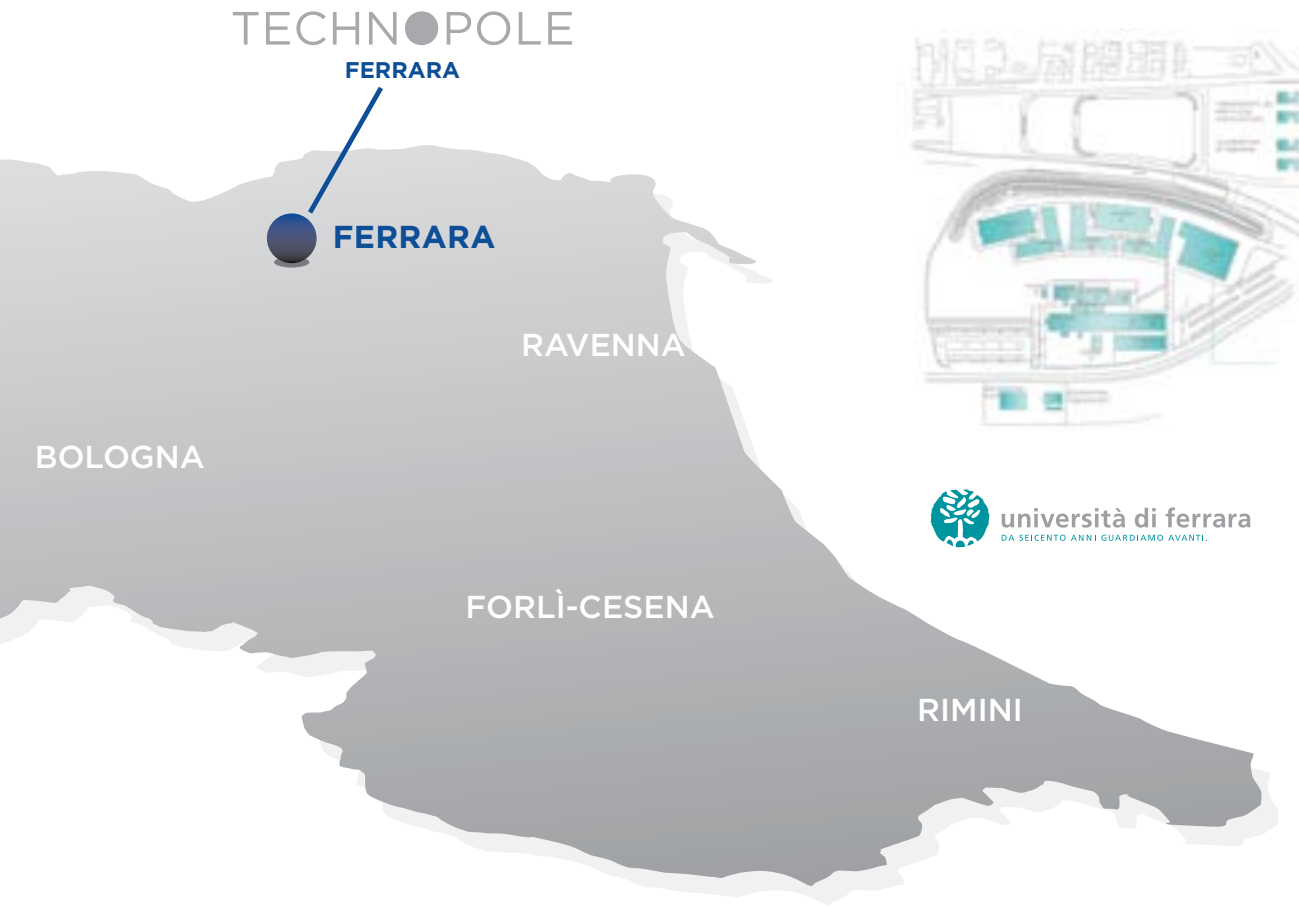
STAFF
Dedicated staff: 21
Part-time structured staff: 33



TECHNOPOLE
PIACENZA

UNIVERSITÀ CATTOLICA DEL SACRO CUORE

POLITECNICO DI MILANO



Technological Scientific Pole, Ex Eridania Area, via Saragat and via dello Zucchero, Ferrara
Chemical Biomedical Pole, via Fossato di Mortara, Ferrara
Environment Pole, Via Conca, Malborghetto di Boara (FE)
Cento Area, Corso Guercino, Cento (FE)
TECHNOPOLE AREA: 12,300 sqm

PROMOTERS
University of Ferrara
Province of Ferrara
Municipality of Ferrara
with the support of: Fondazione per l'Agricoltura Fratelli Navarra, Chamber of Commerce of Ferrara, Cassa di Risparmio di Ferrara, Fondazione Cassa di Risparmio di Ferrara, Cassa di Risparmio di Cento, Fondazione Cassa di Risparmio di Cento, HERA, CADF SpA, AREA SpA

CONSTRUCTIONS

TEKNEHUB LABORATORY
Cultural Heritage and restoration

- **Structures and research fields:**
  > Methods and technologies for architectural restoration
  > Equipment, materials and techniques for museography and exhibition design
  > Diagnostic and preservation
  > Technologies for the recovery and preservation of the palaeontology and archaeological heritage
  > Management and enhancement of the cultural heritage
- **Focused topics:**
  > Historic built environment: architecture and urban fabric
  > Services for the protection of the cultural heritage, cataloguing, representation and valorisation
  > Archaeometric research
  > Study of intelligent materials and innovative alloys for the restoration and preservation of cultural heritage
  > Degradation assessment of stone and ceramic products, glass, metallic alloys and pictorial surfaces
  > Development of integrated digital procedures for the valorisation and preservation of cultural heritage
  > Archaeology and palaeontology
  > Economic and managerial know-how and skills for the preservation, management and valorisation of cultural heritage
- **Fields of impact:** Any field related to the protection, preservation, management, exploitation and enhancement of the cultural heritage; construction companies; publishing; ICT and services to businesses

ENERGY
ENVIRONMENT

TerraeAcquaTech LABORATORY
Environment, water, soil, territory

- **Structures and research fields:**
  > Water quality
  > Characterization of ground-water and hydrogeochemistry applied to the salt-wedge
  > Management of water supply systems and sanitary and environmental engineering
  > Innovative techniques for environmental improvement and complex matrices characterization
  > Metallurgy, corrosion and polymeric materials for the environment
  > Bio-geochemistry and bio-indication of water

> Valorisation, protection and rehabilitation of resources of agri-food interest

- **Focused topics:**

Water quality

> Methods to improve water quality and polluted sites remediation. Chemical and chemical-physical characterization of wastewater; morphological, hydrodynamic, vegetational and chemical characterization of watercourses. Water decontamination through advanced oxidation, absorption on pace bed, electro-kinetic flow cells

Characterization of ground-water and hydrogeochemistry applied to the salt-wedge

> Integrated characterization of ground-water/contaminated sites with geophysical and hydrological techniques (drilling, surveys, in situ sampling, geoelectric investigations and with use of Georadars). Determination of pollutant mobility in soils and gravitational water through test determination of hydrodynamic and chemical-physical parameters at the water/soil interface. Contrast to salt-wedge ingression in ground-water by monitoring fresh/salt water interaction, flow process modelling, artificial research pilot test in ground-water

Management of water supply systems and environmental sanitary engineering

> Models for rehabilitation intervention planning, leakage reduction, safety measures for the sewage and water supply systems. Geo referenced models for the quantitative analysis of water risk (rivers, channels). Non conventional and emerging pollutants (heavy metals, drugs) reduction in domestic, industrial and hospital waste water

Metallurgy, corrosion and polymeric materials for the environment

> Characterization of new affordable inox steel, replacing traditional steel in water treatment and distribution systems and for seawater use. New polymeric materials for drinkable water transport, distribution and treatment. Tests and samplings according to ISO standards

Bio-geochemistry and bioindication of water

> Bioindication of water, Bio-geochemistry in the agricultural sector, with particular reference to the implementation of the nitrate directive, as well as in the civil sector, with reference to phyto-treatment

Innovative techniques for environmental improvement and complex matrices characterization

> Integrated analysis of complex matrices of agro-environmental interest. Electrode materials for environmental clearing and disinfecting, electrochemical synthesis of oxidant species for fungal and bacterial disease treatment in fruit crops

> Development of new sensors and portable monitoring units for specific environmental compartments (water, air) and application sectors (agri-food, industrial, etc.)

Valorisation, protection and rehabilitation of resources of agri-food interest

> Defence of horticultural and fruit crops by using molecular techniques for early diagnostic. Treatment of phytopathology with very environment friendly antimicrobic substances (electrochemically activated solutions).

> Thermochemical processes for biofuel transformation from different biomass both residual and dedicated

- **Fields of impact:** Utility companies; Providers of sewage, water supply and depuration systems. Territory management, Environmental protection, Public utilities. Agro-industrial sector. Moulding sector for production of containers for water transport and treatment.

MECHANICS MATERIALS

MECH-LAV LABORATORY FOR ADVANCE MECHANICS

Acoustics and vibrations; Simulation and mechanic and fluid-dynamic testing

- **Structures and research fields:**
  > INTERMECH-LAV and LASSCE Development and implementation of services for businesses
  > SILAV - Development and implementation of an integrated system of Acoustic and Vibration laboratories
  > Development and implementation of a mechanical testing and simulation laboratory

- **Focused topics:**
  > Services to the mechanical businesses for:
    - vibro-acoustic diagnosis and quality control
    - modelling and testing for the solution of vibro-acoustic problems
    - characterization of materials for the active and passive control of noise
  > Services to the building and construction businesses:
    - definition of correct and sound procedures for the installation of building materials and systems
    - characterization, development and optimization of products and systems with high acoustic isolation performance
  > Vibro-acoustic certification and product development
  > Themo-fluidodynamic and mechanic engineering
  > Advanced calculation for mechanical systems engineering
  > Quick prototyping and 3D survey
  > Integrated themo-fluidodynamic and mechanical/acoustic (vibrations and noise) design
  > Open Source mechanical CAD
  > Innovative ICT for production and management processes within SMEs

- **Fields of impact:** Mechanics, Building, Energy and Environment

LIFE SCIENCE

LTTA LABORATORY

Laboratory for advanced therapy technologies: Biotechnologies applied to medicine

- **Structures and research fields:**
  > Neural stem cells for damage repair
  > Mesenchymal stem cells (MSC) in post-infarction recovery
  > Therapeutic use of the adipose tissue
  > Specific services:
    - Microscopy
    - Cytofluorometry
    - Biobank
    - Animal Facility
    - Bioinformatics
    - Molecular interactions, biomarkers and delivery

- **Focused topics:**
  > Use of human primary cells to study, tissue differentiation and/or regeneration mechanisms with applications purposes
  > Identification of prognostic and predictive biomarkers through genomic and post-genomic investigations, in high assistance impact diseases (cardiovascular, neurodegenerative and neoplastic diseases)
  > Activities managed as high qualified Services: Human Cell Banking service; Cytofluorimetry/Cell sorting Service; advanced Microscopy Service; Bioinformatics Service; Molecular interactions, biomarkers and delivery Service; Animal facility.
  > Preclinical testing activities on in vitro and in vivo (animal models) systems

- **Fields of impact:** Pharmaceutical-biotechnological; Parapharmaceutical; Health.

STAFF

Dedicated staff: 71
Part-time structured staff: 147

ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

TECHNOPOLE
RAVENNA - FAENZA

ex Sarom Area, Harbour area, Ravenna
Rivoira Area, sinistra Canale Candiano, Ravenna
Parco Torricelli, via Granarolo 62, Faenza (RA)
TECHNOPOLE AREA: 6,500 sqm

PROMOTERS

University of Bologna
Province of Ravenna
Municipality of Ravenna
Municipality of Faenza
with the support of: Chamber of Commerce of Ravenna, Port Authority of Ravenna

LABORATORIES

ENERGY ENVIRONMENT

CIRI* ENERGY AND ENVIRONMENT

- **Structures and research fields:**
  > Unit: REACH (Registration Evaluation and Authorization of Chemicals)
  > Unit: Biomass

  > **Focused topics**:
  REACH
  > Chemical, bio-toxicological and ecological-environmental research on chemical substances used in production processes aimed at the implementation of the REACH regulation, as well as the development of methods based on genetically engineered cell lines

  BIOMASS:
  > Conventional and non-conventional anaerobic digestion of organic matrices (algae biomass included)
  > Biotechnological processes for the production of algal biomass in an incubated microcosm
  > Production and optimization of anaerobic digestion plants, both at laboratory and pilot scale

- **Fields of impact:** Any production chain using chemical substances; Chemical companies; Biotechnologies; Biogas engines; Water disposal; Bio-refineries and industrial biotechnologies

CONSTRUCTIONS

CIRI*BUILDING AND CONSTRUCTION

- **Structures and research fields:**
  > Unit Innovative technologies applied to the renovation and recovery of historical buildings / formation and recovery of materials

- **Focused topics:**
  > Development of intervention protocols on the architectural, archaeological and historical-artistic heritage
  > Development of analysis methods using dedicated software and of a mobile diagnostic investigation laboratory for the performance assessment of the built heritage
  > Development of innovative products and techniques for the restoration and rehabilitation of buildings

- **Fields of impact:** Construction companies (civil, building, restoration, archaeological excavation); manufacturers of materials and components for the building sector; real estate management companies; cultural agencies and institutions, cultural heritage management companies; advisory companies for museum exhibition, site and archaeological parks; local authorities, Superintendence, Museums

MECHANICS MATERIALS

CIRI* ADVANCED MECHANICS AND MATERIALS

- **Structures and research fields**
  > Unit: Simulation and calculation methods for nautical sector

- **Focused topics**:
  > Design of new materials
  > Application of environment-friendly boating materials
  > Simulation and optimization of the operating conditions of the boat and the setting for interior design
  > New non-intrusive quality test systems and smart navigation systems
  > Nanomaterials
  > Composite and/or structured materials
  > Characterization and performance enhancement of materials and devices, especially advanced ceramic materials and composites
  > Design of thin films, conductors, functionalized membranes, polymer or ceramic coatings for metal surfaces, polymer-matrix, ceramic-matrix or metal-matrix composites, etc.

- **Fields of impact**: Boating; Plastic; Biomedicine; Ceramic; Mechanics; Electronics; Energy and environment.

STAFF

Dedicated staff: 123**
Part-time structured staff: 320**

** Total staff estimated for the industrial research Laboratories of the University of Bologna within Bologna Manifattura, Ravenna-Faenza, Forlì-Cesena, and Rimini units

*CIRI: Interdepartmental Centre for Industrial Research

Aeronautical Technological Pole, via Seganti, Forlì (FC)
Gallerie Caproni, via Zoli 63, Predappio (FC)
Villa Almerici, via Ravennate 1020, Cesena (FC)
Rocca delle Caminate, Predappio (FC)
TECHNOPOLE AREA: 10,600 sqm

PROMOTERS

University of Bologna
Province of Forlì-Cesena
Municipality of Forlì
Municipality of Cesena
with the support of: Predappio Municipality, Chamber of Commerce of Forlì-Cesena, Fondazione CARIFO, Fondazione Cassa di Risparmio di Cesena

ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

LABORATORIES

MECHANICS
MATERIALS

CIRI*AERONAUTICS

- **Structures and research fields**
  > Unit: Fluid dynamics
  > Unit: Mechanics and technologies applied to aeronautics, space and mobility

- **Focused topics:**
  Fluid dynamics
  > Aerodynamics of industrial and propulsion systems
  > Numeric models for the simulation of fluid dynamic fields and the estimation of aerodynamic strenght
  > Dynamics and statistics of the transport of a granular fluid on a network

  Mechanics and technologies applied to aeronautics, space and mobility
  > Development of new processes and manufacturing techniques applied to the aerospace industry, to surface means of transport and to high tech industrial sectors

*CIRI: Interdepartmental Centre for Industrial Research

> Modelling and development of components and innovative systems for simulation, driving, navigation and control, design and prototyping, propulsion

- **Fields of impact:** Aerospace sector; Energy sector; Advanced mechanics; ICT; Production of advanced sensors and measuring systems; Surface transportation.

AGRIFOOD

CIRI* AGRi - FOOD

- **Structures and research fields**
  > Unit: Processing area, food, consumption and health
  > Unit: Bioanalytics, bioactivities, microbiology and valorisation of microorganisms for industrial purposes

- **Focused/specialization topics:**
  > Thermal and non-conventional treatments for food stabilization
  > Evaluation of technological processes and effects on food quality
  > Suitability of animal/vegetal raw material for technological processes
  > Evaluation of bioavailability of nutrients related to the applied process
  > Shelf-life and packaging studies, usage of modified and protective atmospheres
  > Sensory analysis
  > Creation of fast and/or innovative methods for quality control
  > Functional food and validation of functional claims, health claims and nutriceutical aspects
  > Study on food consumption trends relating to health contents and dietary habits and at-risk behaviour
  > Analytic methods for raw materials and fast analytic methods
  > Optimisation of processes and product innovation, also depending on particular consumers' needs
  > Selection of microbial strains according to specific application requirements, optimization of strain performance and conditions of use
  > Molecular and physiological characterization of isolated microbial strains and technological characterization relating to the area of usage
  > Recovery and use of bioactive constituents from waste and vegetal by-products of agri-food industry
  > Evaluation of quality, safety and typicality of transformed food and their impact on human health
  > Assisted selection of vegetal products based on quality characteristics
  > Enzymes production and characterization of enzymes and microbial metabolites

- **Fields of impact:** Dairy, bread and bakery products, enological, fish, meat processing, fruits and vegetables processing, beverage industry, canning industry, animal feed, food supplements, pro biotic and symbiotic food, fresh cut and pre-cooked food, ice-creams and deep frozen products.

ICT AND DESIGN

CIRI* ICT

- **Structures and research fields**
  > Unit: ICT Technologies and services for sustainable development

- **Focused/specialization topics:**
  > Process control and logistics (transports, fleet management and storage)
  > Embedded technologies for monitoring applications in the industrial sector, product classification, home automation and energy management
  > Business intelligence (integration between monitoring and control systems and business management systems)
  > Systems of automated software development and pattern recognition systems

- **Fields of impact:** Agro-food, logistics and transports, business management, industrial safety, environment and energy cogeneration

STAFF

Dedicated staff: 123**
Part-time structured staff: 320**

** Total staff estimated for the industrial research Laboratories of the University of Bologna within Bologna Manifattura, Ravenna-Faenza, Forlì-Cesena, and Rimini units.

ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

TECHNOPOLE
RIMINI

Area Ex Macello Comunale, via Dario Campana, Rimini
TECHNOPOLE AREA: 1,400 sqm

PROMOTERS

University of Bologna
Province of Rimini
Municipality of Rimini

LABORATORIES

ENERGY ENVIRONMENT

CIRI* ENERGY AND ENVIRONMENT

- **Structures and research fields**
  > Unit: Industrial eco-design, waste recovery and products life cycle
- **Focused topics :**
  > Eco-design, Eco-efficiency and Industrial ecology for economic and environmental sustainability of industrial activities
  > Sustainable management of waste life cycle, from preventions to re-products
  > Instruments for the validation of process sustainability (LCA, LCC, LCM)
  > Biological, chemical/physical and mechanical processes for the recovery of chemicals from biomass (biorefineries)
  > Microproduction of energy at a local level and energy optimization for factories
  > Techniques of “soil washing”
- **Fields of impact:** Service companies; Public Utilities; Manufacturing Industry; Chemical industry; Food sector; Re cycling and material and energy recovery from waste.

MECHANICS MATERIALS

CIRI* ADVANCE MECHANICS AND MATERIALS

- **Structures and research fields**
  > Unit: Innovative technologies for fashion
- **Focused topics:**
  > 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
- **Fields of impact:** Materials industry, fashion and cosmetics industry.

STAFF

Dedicated staff: 123**
Part-time structured staff: 320**

** Total staff estimated for the industrial research Laboratories of the University of Bologna within Bologna Manifattura, Ravenna-Faenza, Forlì-Cesena, and Rimini units.

*CIRI: Interdepartmental Centre for Industrial Research

REGIONAL THEMATIC PLATFORMS

Based on the acts set forth by the Framework Programme Agreement for the creation of the Regional High Technology Network, the research structures belonging to the Network will not only be based in the Technopoles, but will also cooperate within Thematic Platforms so as to ensure a critical mass of synergic and complementary research skills that will allow to:

- meet companies' research demand
- identify the technological scenarios and the needs that are still to be perceived by the industry
- foster the shift from incremental research to medium and long term innovation for companies
- compete at international level and become a reference point for industrial research
- ensure the Platforms self-sustainability in the medium term
- define one or more "technological districts" for the involvement of enterprises in the Platforms.

	BOLOGNA MANIFATTURA	BOLOGNA CNR	MODENA	REGGIO EMILIA
 **AGRI-FOOD** PLATFORM				• SITEIA-BIOGEST Laboratory • CRPA LAB
 **CONSTRUCTION** PLATFORM	• CIRI BUILDING AND CONSTRUCTION • LARCO ICOS Laboratory • CERAMIC CENTRE			• EN&TECH Laboratory
 **ENERGY AND ENVIRONMENT** PLATFORM	• CIRI ENERGY AND ENVIRONMENT • LECOP Laboratory • LAERTE Laboratory	• PROAMBIENTE Laboratory		• CRPA LAB
 **ICT AND DESIGN** PLATFORM	• CROSS-TEC Laboratory • Regional laboratory for IT in Public Administration • DESIGN CENTER • Centre for the development of audiovisual and digital innovation in Emilia-Romagna • CIRI ICT		• INTERMECH-MO.RE Laboratory-Modena Unit	
 **MECHANICS AND MATERIALS** PLATFORM	• CIRI ADVANCED MECHANICS AND MATERIALS • TRACEABILITY Laboratory • T3 LAB	• MIST E-R Laboratory	• INTERMECH-MO.RE Laboratory-Modena Unit	• INTERMECH-MO.RE Laboratory-Reggio Emilia Unit
 **LIFE SCIENCE** PLATFORM	• CIRI LIFE SCIENCE • RIZZOLI RIT DEPARTMENT Research Innovation & Technology Laboratories - Istituto Ortopedico Rizzoli		• CENTRE FOR REGENERATIVE MEDICINE "STEFANO FERRARI" Laboratory	
CENTRES FOR TECHNOLOGY TRANSFER	• CNA Innovazione • INNOVAMI • CITI • CISA • ISML-CERMET		• DEMOCENTER REI	• DEMOCENTER REI

The Platforms “organised within the scope of ASTER, will address specific coordination activities” and “may be represented by ASTER as a consortium, also with respect to the provisions or requirements of the applicable national and international rules and acts, namely for the “technological districts” creation programmes (Art. 5 of the Programme Frame work Agreement).
To date, the 6 Emilia-Romagna Platforms are:

- AGRI-FOOD Platform
- CONSTRUCTIONS Platform
- ENERGY AND ENVIRONMENT Platform
- ITC AND DESIGN Platform
- MECHANICS AND MATERIALS Platform
- LIFE SCIENCE Platform

PARMA	PIACENZA	FERRARA	RAVENNA / FAENZA	FORLÌ / CESENA	RIMINI
• SITEIA.PARMA Laboratory • CIPACK Laboratory • CIM Laboratory				• CIRI AGRI-FOOD	
		• TEKNEHUB Laboratory	• CIRI BUILDING AND CONTRUCTION		
	• LEAP Laboratory	• TerraeAcquaTech Laboratory	• CIRI ENERGY AND ENVIRONMENT		• CIRI ENERGY AND ENVIRONMENT
• RFID&VIS-LABS Laboratory				• CIRI ICT	
	• MUSP Laboratory	• MECH-LAV Laboratory for advanced mechanics	• CIRI ADVANCED MECHANICS AND MATERIALS	• CIRI AERONAUTICS	• CIRI ADVANCED MECHANICS AND MATERIALS
• BIOPHARMANET_TEC Laboratory • COMT Laboratory • CIM Laboratory		• LTTA Laboratory			
	• CITIMAP		• CENTURIA RIT	• CENTURIA RIT	

FRAMEWORK PROGRAMME AGREEMENT BETWEEN THE EMILIA-ROMAGNA REGION, THE UNIVERSITIES OF BOLOGNA, FERRARA, MODENA AND REGGIO EMILIA, PARMA, THE CNR, ENEA, THE POLYTECHNIC AND UNIVERSITÀ CATTOLICA OF MILAN WITH ITS OFFICES IN PIACENZA, FOR THE CREATION OF THE REGIONAL HIGH TECHNOLOGY NETWORK AS PART OF THE IMPLEMENTATION OF PRIORITY I ACTIVITY 1.1 OF THE ERDF 2007 – 2013 ROP, AND OF THE CONSORTIUM AGREEMENT FOR THE ACTIVITIES OF ASTER CONSORTIUM.

The Emilia-Romagna Region hereby enters into the Framework Programme Agreement with the Universities of Bologna, Ferrara, Modena and Reggio Emilia, Parma, the CNR, ENEA, the Polytechnic and Università Cattolica of Milan with its offices in Piacenza, to ensure the continuity and development of common activities already implemented in accordance with the Regional Law 7/2002 with the participation of ASTER consortium, and with the Regional Plan for Industrial research, Innovation and Technology transfer (tender notices of 2004 and 2007 for research and technology transfer laboratories and innovation centres programmes); as well as to implement Priority I Activity 1.1 of the ERDF 2007 – 2013 ROP, based on Guidelines set forth on 19th May 2008, Regional Council Resolution No. 736, with the definition of this common intent within which specific programme agreement will be inscribed concerning the partnership between the Region and each individual subscribing Institution.

WHEREAS

the Emilia-Romagna Region under its Regional Law No. 7/2002, has launched several Programmes for research, innovation and technology transfer, and at the same time has started a cooperation with the above mentioned Universities and Research Centres of the region for a coordinated development of initiatives specifically devoted to industrial research and technology transfer;
based on this, a common involvement was defined within the activity of ASTER consortium to promote a first creation of laboratories for industrial research, as set out in the above mentioned programmes launched in 2004 and 2007, currently running; as well as a first cooperation of such laboratories within thematic areas/regional technological platforms, coordinated by ASTER;
the ERDF 2007-2013 Regional Operational Programme, Priority I Activity 1.1, has set the goal to support and further develop such programmes; providing for the implementation of other new initiatives, always in partnership with the Region and the Universities and Research Centres working in Emilia-Romagna, to promote industrial research, as well as infrastructures devoted to industrial research and technology transfer, and the design, organization and final creation of a Regional High Technology Network;
- with the ERDF ROP Activity 1.1 implementation Guidelines, set out on 19th May 2008, the Region has identified the features and nature of such structures and initiatives, in terms of unites devoted to industrial research and technology transfer, promoted by Universities and Research Centres and being granted, by way of acts defined on the basis of the Universities and Institutions Regulations, functional and operational independence, specific responsibility of scientific management and specific set of tools and human resources, employment of professors and researchers already working within the Universities and Institutions as well as with young researchers – with specific new contracts – to carry out the defined programme; the Region has also defined the setting of such structures and initiatives within dedicated infrastructures, set up by Universities and Institutions and/or by the Region itself, also in cooperation – where envisaged – with Local Authorities.
the project drafts were presented to the Region by the Universities and Research Centres, as well as the commitment, as required by chapter 7) of the same Guidelines "to contribute to the shared development of the Regional High Technology Network, also through the participation in shared initiatives promoted by ASTER and by the Region, according to the provisions of art. 6 of the Regional Law 7/2002"; moreover, the availability of infrastructures was presented to the Region by the Local Authorities.

NOW, THEREFORE,

the parties hereto agree as follows, considering the present Framework Programme Agreement as forming an integral part of subsequent single agreement between the Region and Universities/Research Centres and between the Region and Local Authorities:
1. The underwriting Region, Universities, Research

Centres agree that the industrial research structures created, managed and controlled by the single Institutions within the scope of the Technopoles, will participate in the setting up of the Regional High Technology Network, and will identify memorandums of cooperation and common actions, and among these a specific memorandum of accreditation pursuant to the requirements of the Emilia-Romagna Region. The infrastructures that will host the industrial research structures are named Technopoles of the Regional High Technology Network, the research structures are named "Network Laboratories" or Net-Labs or any other name defined by the regulation of Universities and Research Centres.

The Universities and Research Centres are committed under the present Agreement to defining together with the Region, within the programme agreements, the final configuration of the proposed structures, starting from the suggestions made by the expressions of interest, consistently with the provisions of the Guidelines mentioned in the preamble, and to carry out their best harmonisation and coordination of the forthcoming activities, notwithstanding the obligations imposed by the Staff Regulation and in line with the bylaws, strategic lines and financial limits of the Universities and Research Centres.

2. The cooperation between the Regional High Technology Network structures and businesses and other R&D players, including private ones, will be promoted within the scope of the technological platforms the Network consists of. However, such activities of primary importance for Universities and Research Centres do not be exclusively binding in their relationship with businesses and other research centres.

3. The collaboration activities and common actions of those structures belonging to the Regional High Technology Network will also fall within the "consortium agreement" for the activities carried out by ASTER consortium, defined between the Region, Universities and Institutions, based on the provisions of the company Charter as renewed and approved by the Shareholders' Meeting on 06/05/2008. ASTER will therefore change its registered name – as previously set out – into "ASTER Emilia-Romagna Science and Technology Association, Regional High Technology Network".

4. The Network, within the scope of the identified platforms, will be entitled to seek participation and involvement of other industrial research and technology transfer structures set up by other public and private research bodies working on the regional territory.

5. Based on the already established participation of Universities and Research Centres in ASTER, the promoted structures will therefore participate in the consortium activity carried out by ASTER; and notwithstanding the independence of individual research programmes in the different structures and the direct control, management and liability for such structures by the Universities and Research Centres, in conformity with the charters and bylaws of Universities and Research Centres, the Regional High Technology Network common actions will be defined in ASTER's consortium activity plan. The Network organisation will require not only the installation within the Technopoles, but also the specific cooperation of the research structures in thematic Technological Platforms, always organised within the scope of ASTER, which will address specific coordination activities. Following to appropriate negotiations between the signatories to the present Agreement, such Regional Platforms within ASTER's scope may therefore be represented by ASTER as a consortium, already established also with respect to the provisions or requirements of the applicable national and international rules and acts, namely for the "technological districts" creation programmes.

6. The Region specific arrangements with each University and Research Institution will lead to partnership agreements, as far as the use of physical infrastructures and scientific equipment is concerned; the infrastructures and equipment will therefore be considered, on the basis of an appropriate regulation, to be defined in concert with the Universities and Research Centres, within the limitations of their charters and regulations, and made available for the Network and for those uses allowed to third parties, within the scope of ASTER's consortium, but not in an exclusive way.

7. For the recruitment of new research staff devoted to the Technopoles structures, three-year contracts will be issued and shared, within the limitations defined by the applicable national law for Universities and Research Centres.

8. The Region will define, in accordance with the Universities and Research Institutes, other specific Agreements with the Local Authorities for the infrastructures to be created with their support and for the multi-year availability of such structures for the activities of the Network Technopoles.

9. A scientific and industrial Committee will be created following methods to be agreed upon for the Network activities, this Committee will assist also ASTER's administration bodies, and specific committees and coordination activities will be set up so as to cooperate with ASTER's offices in charge of common actions.

10. ASTER will draw up its provisional budget and final balance every year, an integrated Report, both provisional and final, on the Regional High Technology Network activity to be examined by the steering Committee.

The present Framework Agreement and the specific arrangements will be valid until 31/12/2015.

TECHNOPOLES
IN EMILIA-ROMAGNA

Contacts:

ASTER

CNR - Bologna Research Area
Via Gobetti, 101
40129 Bologna - ITALY
Ph. +39 051 6398099
Fax +39 051 6398131
info@aster.it
www.aster.it
htn.aster.it

ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA

università di ferrara
DA SEICENTO ANNI GUARDIAMO AVANTI.

UNIVERSITÀ DEGLI STUDI DI MODENA E REGGIO EMILIA

UNIVERSITÀ DEGLI STUDI DI PARMA

UNIVERSITÀ CATTOLICA DEL SACRO CUORE

POLITECNICO DI MILANO

CNR
Area della Ricerca
di Bologna

ENEA