



DIPARTIMENTO DI
ELETTRONICA E
INFORMAZIONE

SCUOLA DI INGEGNERIA
DELL'INFORMAZIONE

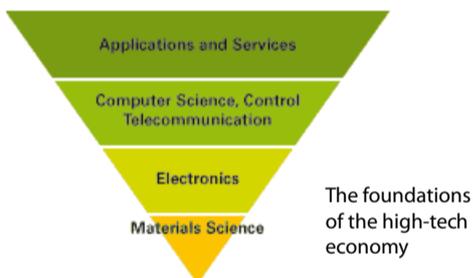


THE ICT INSTITUTE OF POLITECNICO DI MILANO

In response to the unprecedented pervasiveness of ICT in the last decades, which has deeply changed the way to do research and innovation, the Politecnico di Milano has promoted the birth of the ICT Institute (<http://ictinstitute.polimi.it/>).

This novel institution gathers the Dipartimento di Elettronica e Informazione (DEI), the Faculty of Information Engineering, a Consortium and the Spin-off companies in the ICT field. These entities play complementary roles: DEI attends to cutting-edge research, the Faculty addresses teaching activities in the ICT sector, and the Consortium and Spin-off companies cover the product/service implementation and delivery.

The ICT Institute also aims at integrating the educational programs of the Faculty of Information Engineering, the Master courses offered in collaboration with the Consortium, and DEI PhD program, and at creating, around the academia, a community of professionals and alumni to preserve the traditional strong link with the national and international companies in the ICT sector.



THE DIPARTIMENTO DI ELETTRONICA E INFORMAZIONE

The Dipartimento di Elettronica e Informazione (DEI, www.dei.polimi.it) is one of the largest European ICT departments, both for its dimensions and for the quality of its research activity.

Research is the main focus of DEI, pursued according to the highest international quality standards.

With over 500 members, researchers, collaborators, PhD students, technical and administrative staff, the Department is a vital institution capable of promoting education, fundamental and applied research, and technology transfer to companies.

In the past few decades the exponential growth of ICT technologies has boosted an impressive expansion of DEI's pool of researchers and activities. Despite the variety of its interests, however, the Department has been able to preserve a unique scientific identity. Here cross-fertilization

is a working reality and our ICT researchers and specialists are eager to tackle extremely complex and diverse problems in the many technical, economic and social fields.

Today our Department counts 185 faculty members and about 230 short-term researchers and PhD students. It is organized in four distinct scientific areas:

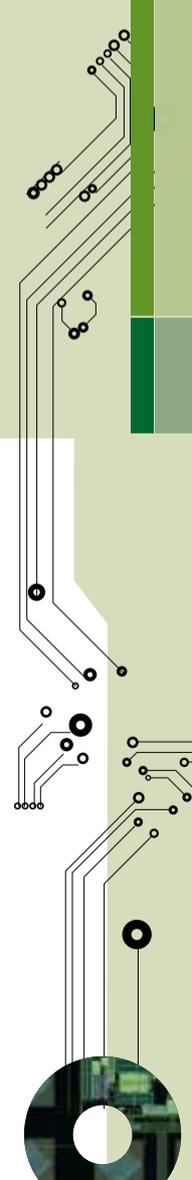
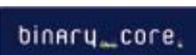
COMPUTER SCIENCE AND ENGINEERING: devoted to the disciplines regarding the development and application of computer-based systems, both hardware and software, the primary goal of the research in Computer Science and Engineering is the introduction and implementation of the Information Technology in order to support innovative products and services in many applied fields.

Examples of research projects in progress: Search Computing (SeCo www.search-computing.it), funded with 2.5M€ by the European Research Council (ERC), proposes search computing to answer questions via a constellation of dynamically selected, cooperating search services.

SMScom (Self-Managing Situational Computing <http://deepse.ws.dei.polimi.it/smscom/index.html>), funded with 2.5M€ by the European Research Council (ERC), aims at developing methods and tools to support development of pervasive software that is dependable and can adapt to changes in an autonomic fashion.

Scalopes (www.scalopes.eu), funded by the EU, studies scalable low-power embedded platforms and focuses on specific application contexts: communication infrastructure, surveillance systems, smart mobile terminals and stationary video systems.

Today the ICT field at Politecnico employs around 800 people and has a budget of about 32M€ per year



ELECTRONICS: evolutions in the science and technology of electronic, microelectronic and optoelectronic devices, circuits and systems support new developments in diversified fields of interest for the present-day society. Besides, DEI research work looks to the foundations of the high-tech economy application of nanoelectronic and diagnostic technologies to genetics and biomedicine, diagnostics of cultural heritage and analysis of objects for legal purposes.

Examples of research projects in progress:

HPFS is a research project supported by public bodies (EU and MIUR) and by semiconductor companies (Intel, USA) to improve radios in lowcost CMOS processes for higher bit rates cellular standards in terms of circuit noise and bandwidth.

Bond is a multidisciplinary project sponsored by the EU. The goal is the realization of highly selective and sensitive detection systems based on biological materials as detecting medium.



Parafiuo (www.parafiuo.com), funded by the EU, aims at developing and bringing to the market a new optoelectronic system for spectrally-resolved fluorescence lifetime imaging (sFLIM) of fast dynamical processes in cells and tissues.

SYSTEMS AND CONTROL: despite the rich variety of topics (Control System Science, System Theory, Ecology, Operations Research, and Electrical and Electronic Measurements), both theoretical and application-oriented, a unifying system viewpoint is generally adopted, which enables the analysis, the management, and the design of complex systems, through the powerful theoretical tools of mathematical modeling.

Examples of research projects in progress:

HD-MPC (www.ict-hd-mpc.eu), funded by the EU, aims at developing methods for designing controllers for complex large scale systems based on such a hierarchical control framework.

Rosetta (www.fp7rosetta.eu), funded by the EU, develops "human-centric" technology for future industrial robots that operate more autonomously, but also learn, safely cooperate and interact with humans in a way which is perceived as natural and harmless.

Safespot (www.safespot-eu.org), is a co-founded project by the European Commission Information Society Technologies, with the aim of improving awareness of the vehicle's surrounding situation through a concurrent and synergic behavior between vehicle and infrastructure.

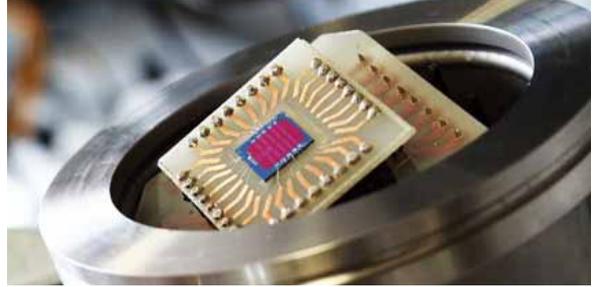
TELECOMMUNICATIONS: this interdisciplinary research covers a broad spectrum of competences, including: transmission systems and telecommunication networks, radio and optical wireless transmission, digital signal processing and electromagnetic methods, remote sensing methods and systems.

Examples of research projects in progress:

Sar.net (www.treuropa.com), is a project coordinated and sponsored by the Department of the Italian Civil Protection to integrate the information coming from the remote sensed data available from active microwave and passive optical instruments into the Civil Protection operational chain for hazard monitoring connected to terrain motion.

Alphasat/TDP#5 satellite

(<http://risorse.dei.polimi.it/ApEMG/spinoX.html>), is a project supported by Agenzia Spaziale Italiana for the future of satellite communications at millimetre wavelengths. It is a new experiment based on a geostationary platform using the DEI experimental station of Spino d'Adda, as the main terminal for both Italian and European researchers.



Scenic project is aimed at developing a comprehensive set of methodologies and analysis tools that will enable acoustic systems made of microphone and speaker arrays to self-calibrate and autonomously learn the geometric and physical characteristics of the environment that they operate in.

DEI in figures:
> 500 employees
~ 12M€ revenues

DEI is also a key node of many research networks, and is a widely recognized gateway to a highly qualified know-how and expertise.

Its participation to EU research programs is consolidated and successful. In FP6, DEI researchers were partners in 34 projects, for a total of 6.662.875 € funding. In the FP7, DEI was coordinator in 4 projects, partner in 42 projects and its research projects totalled 15.335.145 € funding. DEI's researchers publish their works in the proceedings of numerous international conferences and on major international journals. Furthermore, from 2002 to 2008, they have published about 84 books and have filed 47 international patents.

The V School of Engineering

The V School of Engineering (www.inginf.polimi.it) coordinates the courses of B. and M. Sc. Degree in Automation, Electronics, Computer Science and Telecommunications Engineering. With more than 180 professors and researchers, the School operates in 2010/2011 seven B. Sc. Degree courses, one provided on line, and five courses of M. Sc. Degree, one entirely in English, attended by about 6000 students. Since 2007/2008, the School has launched the Information Technology Engineering Degree, delivered in collaboration with the Politecnico di Torino and the Tongji University in Shanghai.

Cefriel

CEFRIEL (www.cefriel.it) is a not-for-profit center of excellence for research, innovation and education in the field of Information and Communication Technologies. Since its foundation in 1988, it has been focusing on the technology transfer to companies and public authorities, thus becoming one of the leading European actors in this area.

The spin-off companies

2000: the first spin-off company of Politecnico, called **TRE** (TeleRilevamento Europa), was launched with the mission of producing technology for natural risk prevention. www.treuropa.com

2000: the patented technique for the computer-aided development of Web applications is licensed to **Web Models**, the second spin-off company of the Politecnico. www.webratio.com

2003: **ARESIS** is active in spaceborne synthetic aperture radars (SAR) and geophysical prospection systems. www.aresis.it

2004: **Micro Photon Devices** exploits a long standing expertise in detection systems using ultra-fast photon detectors. www.microphotondevices.com

2006: **Binary Core** operates in FPGA programming, with focus on mo-demodulator for telecommunications. www.binarycore.it

2006: **Wisytch** develops HW and SW products for testing and prototyping of advanced wireless communication systems. www.wisytch.com

2007: **Kee Square** focuses on the development of innovative techniques for the processing of video and audio signals, with applications to biometric recognition and environment monitoring. www.keesquare.com

2008: **MOBIMESH** develops innovative products and solutions for wireless mesh networking. www.mobymesh.it

2009: **XGLab** operates in the field of the detectors and electronics instrumentation for X-ray spectroscopic analysis and for Gamma imaging and deals with the design and realization of advanced ionizing radiation systems. www.xglab.it