POLITECNICO
MILANO 1863

DIPARTIMENTO DI ELETTRONICA
INFORMAZIONE E BIOINGEGNERIA

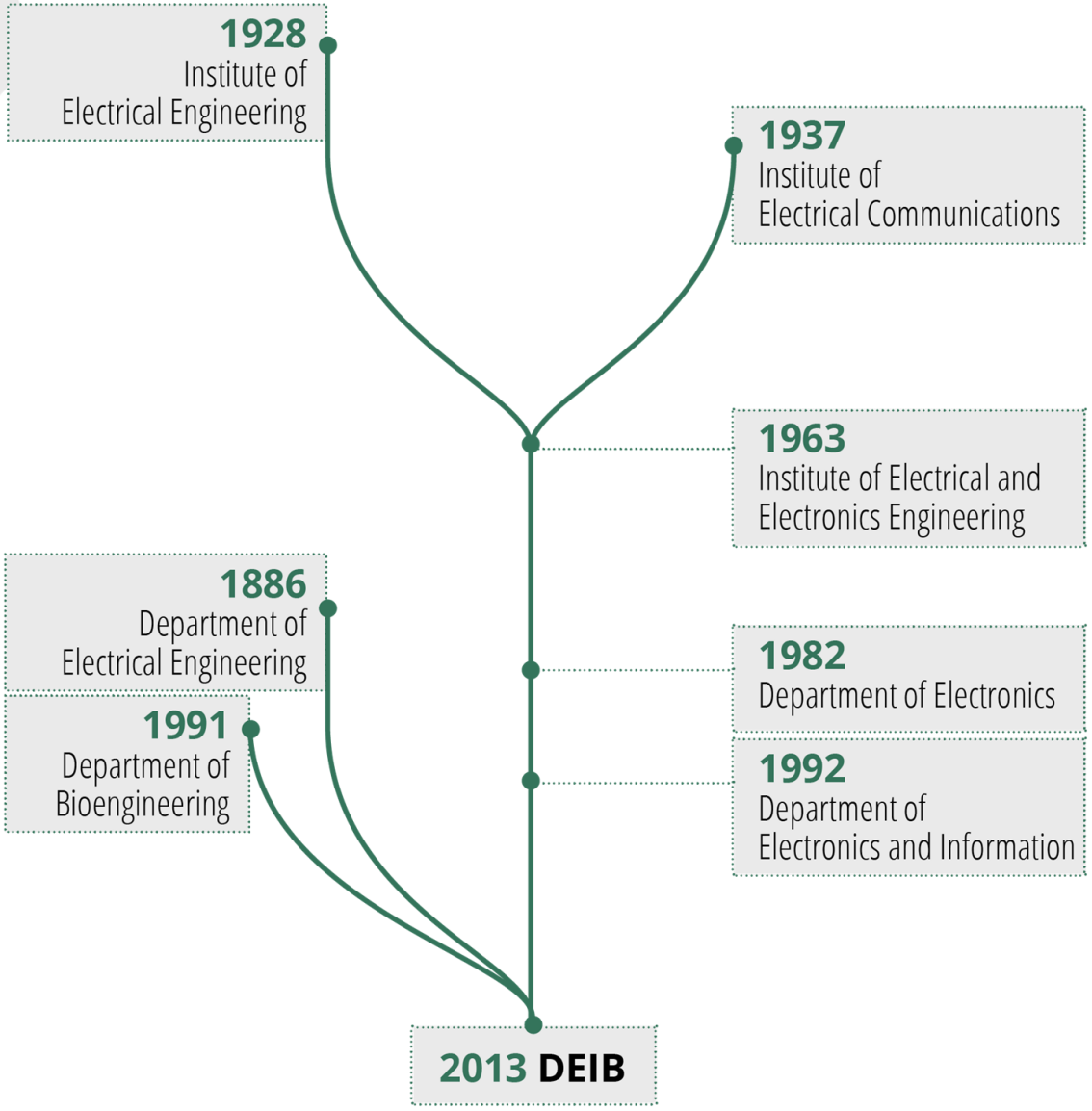
The Dipartimento di Elettronica, Informazione e Bioingegneria

An international hub of research and innovation in ICT

1st Italian Workshop on Embedded Systems
Pisa, Italy
19-20 September 2016

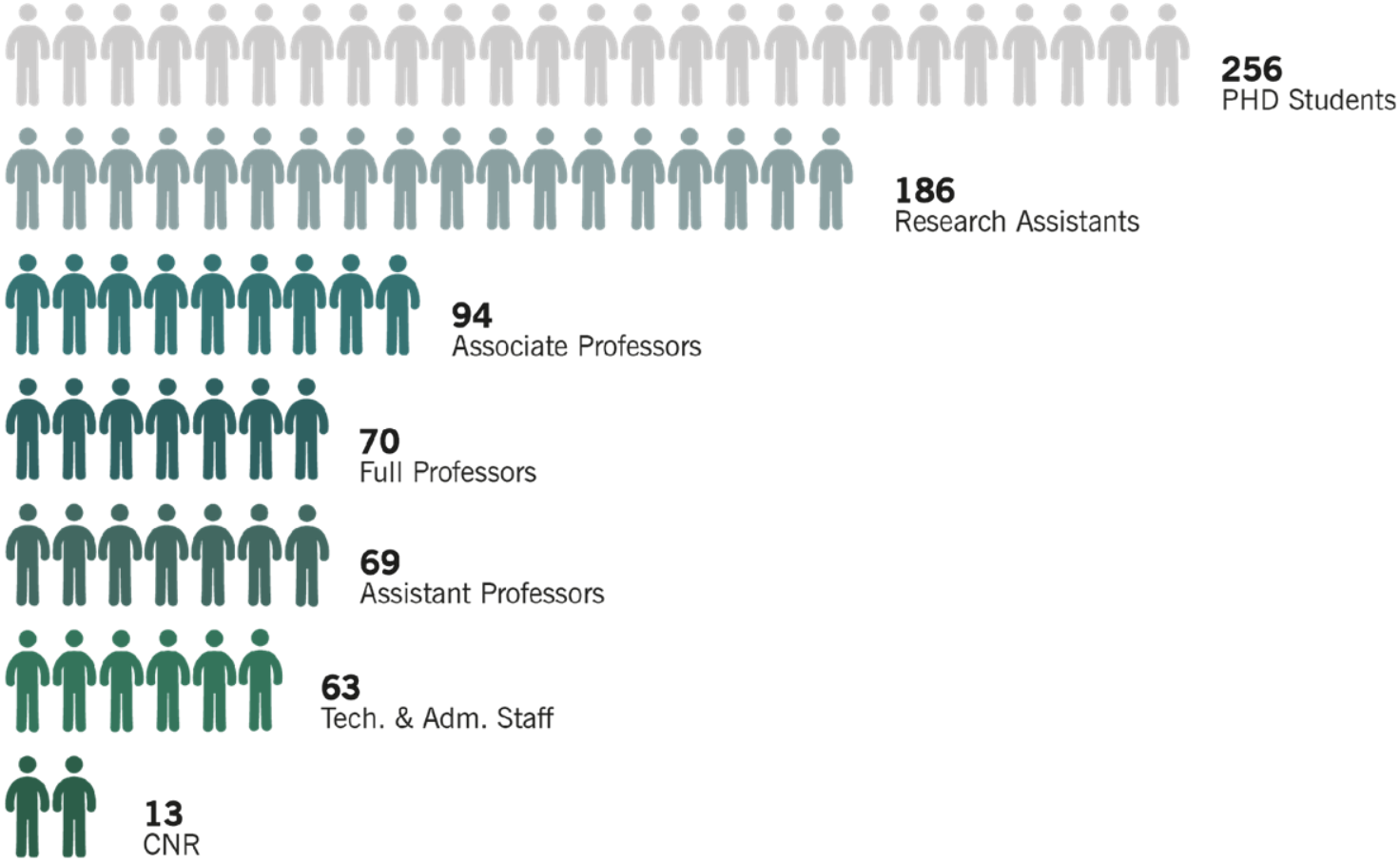
Prof. William Fornaciari
william.fornaciari@polimi.it

HISTORY


1928
Institute of
Electrical Engineering
1937
Institute of
Electrical Communications
1963
Institute of Electrical and
Electronics Engineering
1886
Department of
Electrical Engineering
1982
Department of Electronics
1991
Department of
Bioengineering
1992
Department of
Electronics and Information
2013 DEIB

PEOPLE

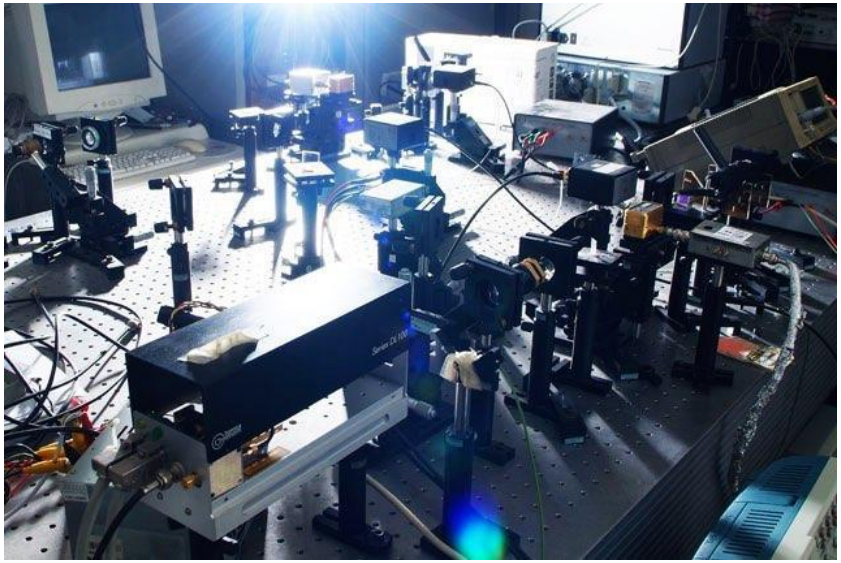
More than **750** people plus a member of external collaborators.

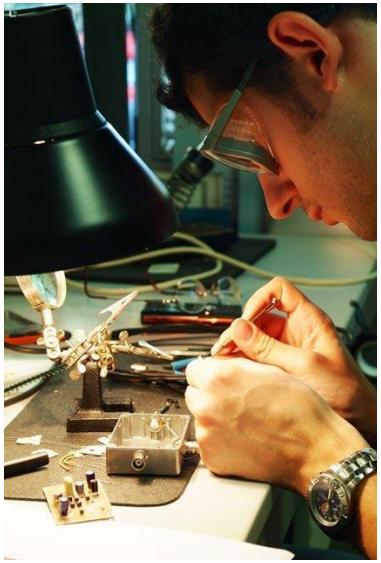


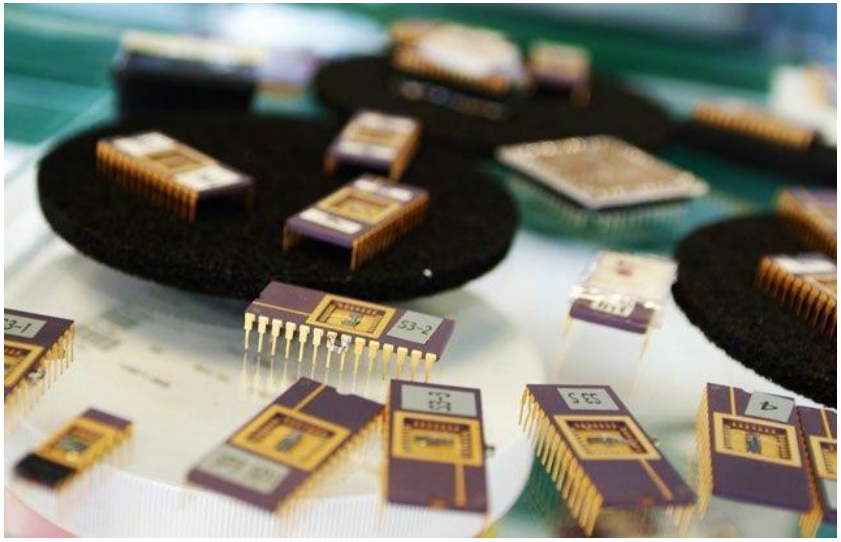
CURRENT RESEARCH LINES

- Advanced software architectures and methodologies
- Artificial intelligence and robotics
- Data, web, and society
- Information systems
- System architectures

LABORATORIES







7 Bioengineering Labs

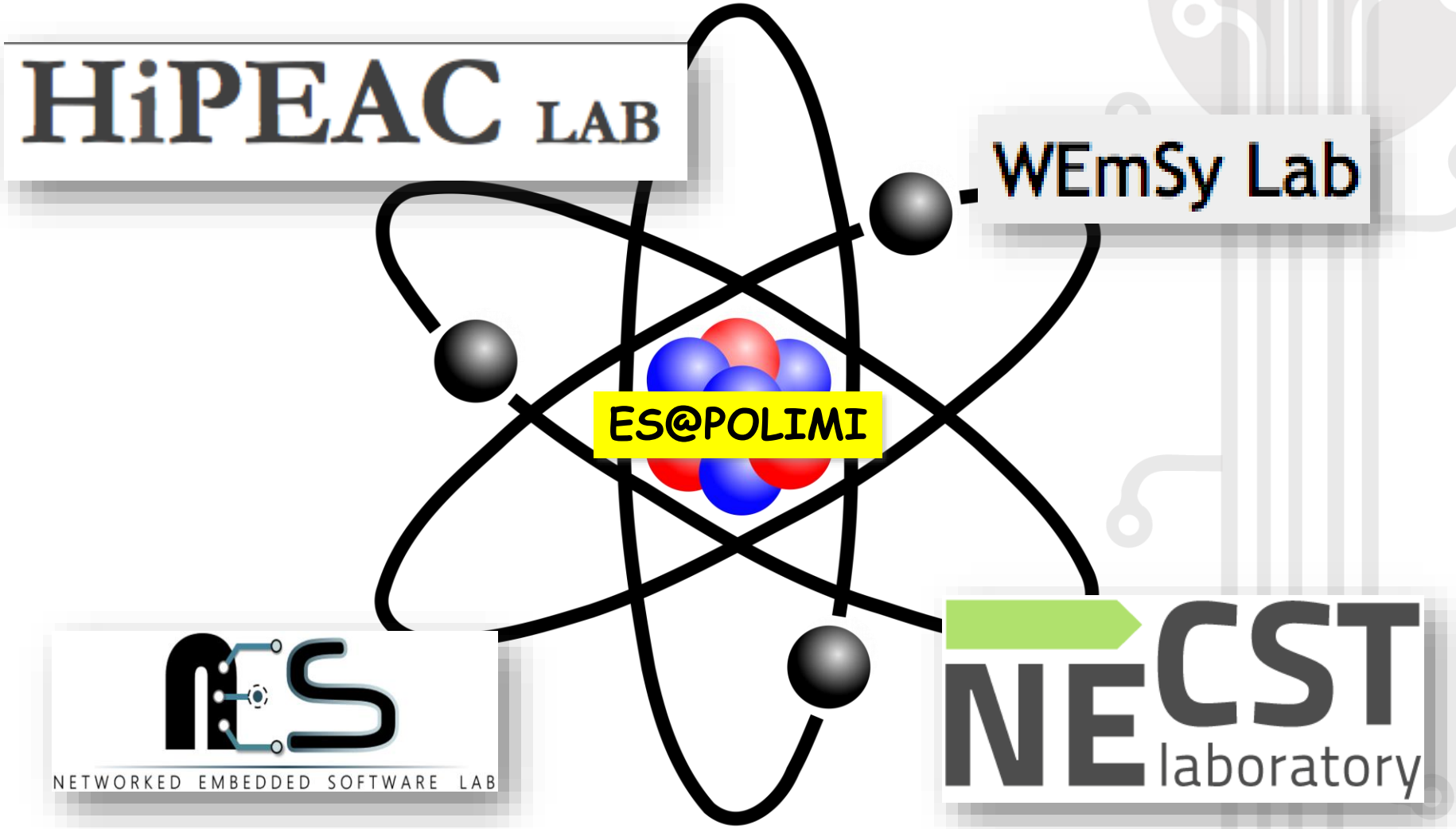
13 Computer Science and Engineering, System and Control Labs

5 Electrical Engineering Labs

6 Electronics Labs

11 Telecommunications Labs

ES@POLIMI - Laboratories



HIPEAC LAB

Topics

- Wireless sensor networks
- Thermal management and control aspects
- Run-Time management of multi-many cores
- ES for automotive, wearable computing, IoT
- Security for embedded systems
- Computer architectures
- Application and system autotuning
- Automatic Design space exploration
- Design of low power Hw/Sw systems

Contacts

William.Fornaciari@polimi.it

Running projects

Safecop (ECSEL) H2020

MANGO (FET) H2020

ANTAREX (FET) H2020 -- coord

CONTREX (IP) FP7

HARPA (STREP) FP7 - coord

M2DC H2020

- Close cooperation with industries and startup, possibility to develop and commercialize products
- Availability of use cases (embedded systems) for projects
- Teaching
  - Embedded Systems, Advanced Operating Systems, Computer Architecture, Digital design, Energy aware computng

NETWORKED EMBEDDED SOFTWARE

- Software powering CPS, IoT, and robot drones
- Current focus
  - transiently-powered computing
  - programming systems
  - low-power wireless protocols
  - verification and validation
- Real-world deployments
  - heritage and archeological sites, energy-efficient buildings, …
- More at www.neslab.it!

NETWORKED EMBEDDED SOFTWARE LAB

Formal Methods for safety-critical systems

CURRENT RESEARCH TOPICS

- Formal languages for the description of cyber-physical systems
  - (metric) temporal logics over both discrete and continuous time
- Formal verification techniques for temporal logics: bounded satisfiability checking
  - SAT- and SMT-based techniques
- Formally-based model-driven design
  - from UML (and UML-like) notations to formal models, to formal verification
- Application/adaptation to novel domains
  - Human-Robot Collaborative (HRC) applications (SAFER-HRC)
  - Data-Intensive Applications (DICE EU project, www.dice-h2020.eu)

- (tangentially related) Distributed systems for smart mobility applications (IT2Rail EU project, www.it2rail.eu)

- **Contact: Matteo Rossi (matteo.rossi@polimi.it)**

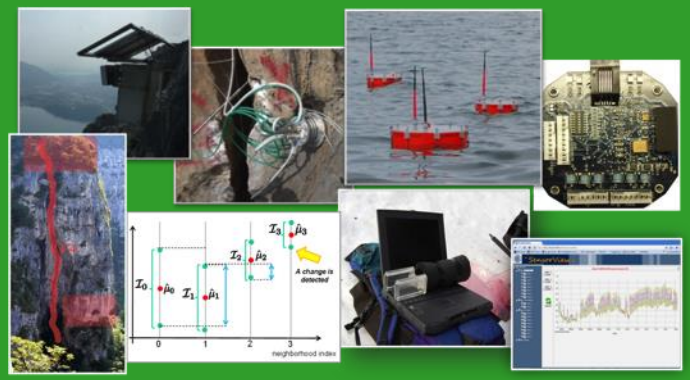
New
Theory

Intelligent [illegible]yber-physical Systems

New
Problems

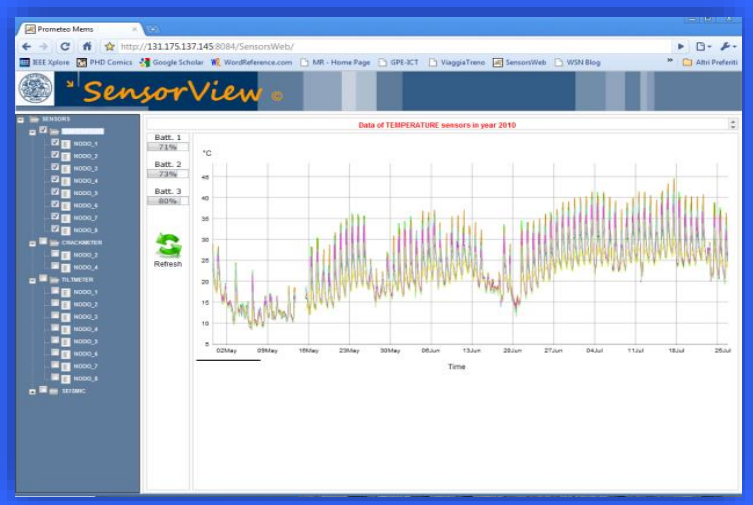
New
Solutions

Real-world
Applications



Intelligent embedded and cyber-physical systems

Adaptive intelligent systems in nonstationary environments



CURRENT RESEARCH LINES

•On-line fault detection and Fault Tolerance strategies for the design of self-adaptive systems with a tunable level of dependability

•Lifetime estimation and improvement by means of runtime resource management in heterogeneous system architectures

•Machine-learning techniques to improve effectiveness in functional diagnosis

Contact
cristiana.bolchini@polimi.it

Research lines

ORCA
Unleashed computer architecture and operating systems
From embedded to HPC computing systems, focusing on computer architectures, OS and monitoring infrastructures.

DReAMS
To discover the world of FPGA-based systems
Design and implementation of reconfigurable computing: from architectural aspect to CAD development
How to use CS to “speedup/improve” biomed applications

RIBS
To make smart ambient coming true!
On how to make heterogeneous components to coexist to improve quality of life and comfort while minimizing power and energy consumption
Emotional and Physical Comfort
Biometric Human recognition

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