POWER ELECTRONICS GROUP

DEPARTMENT OF INFORMATION ENGINEERING

UNIVERSITY OF PADOVA

Contact Information:

University of Padova
Department of Information Engineering (DEI)
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CISQCERT
UNI EN ISO 9001:2000
CISQ IQNet

PERSONNEL - 31/12/2007 (1987)

- Research/Teaching Personnel
  - 93 Professors (54): 40 full (19), 29 associate (19), 24 (16) assistant
  - 106 (38) PhD students and Research Fellows
- Staff
  - 14 (8) Units of Administrative Personnel
  - 16 (10) Units of Technical Personnel
- Students
  - 256 Students "5 years curriculum" (old system)
  - 3352 (2279+1073) Students "3+2 years curriculum" (new system)

TEACHING ACTIVITY

- Department faculty teach most disciplines of Information Engineering curricula:
  - Automation Engineering
  - Bioengineering
  - Electronics
  - Computer Engineering
  - Telecommunications
  - Information Engineering
- Department faculty teach also classes in several other undergraduate and graduate programs offered by the Colleges of:
  - Engineering
  - Humanities
  - Communication Science
  - Economics
  - Natural Sciences
  - Medicine and Surgery
  - Psychology
  - Political Sciences
  - Statistics and Demography

POST-GRADUATE TEACHING

- PhD School (Courses) in "Information Engineering" curricula:
  - Information and Communication Sciences & Technologies
  - Bioengineering
- Other PhD programs with DEI faculty involved:
  - Energy Management
  - Hydrodynamics and Environmental Modeling
  - Mechatronics
  - Clinics Methodology
  - Space Sciences and Technologies
- Master programs
  - Telecommunications Techniques and Economics
  - Applied Optics

RESEARCH AREAS

- Microelectronics
- Multimedia Telecommunications and Technology
- Operations Research
- Photonics
- Power Electronics
- Robotics
- Signal and Image Processing
- Sound and Music Computing
- Systems and Control
- Telecommunications
- Applied computation theory
- Artificial Intelligence
- Bioengineering
- Computer Systems and Networks
- Industrial Electronics
- Information Management Systems
- Instrumentation and Measurement
- Laser and quantum Electronics

The Department hosts the Centre for Science and Application of Advanced Computational Paradigms

RESEARCH LABORATORIES (1)

- Algorithms
- Data Bases
- Structural Bio-informatics
- High Performance Computing
- Real time Systems Analysis Center
- Internet Services and Information Systems
- SW Photonics
- Electromagnetic Fields
- Electromagnetic Compatibility and Electronic Measurements
- Autonomous Intelligent Systems
- Computer Vision and Autonomous Navigation 1
- Power Electronics
- Microelectronics
- Microelectronics - Clean room
- Microelectronics - Reliability Test
- Microelectronics – Design and Test
- (Information Management Systems, Microprocessors)

RESEARCH LABORATORIES (2)

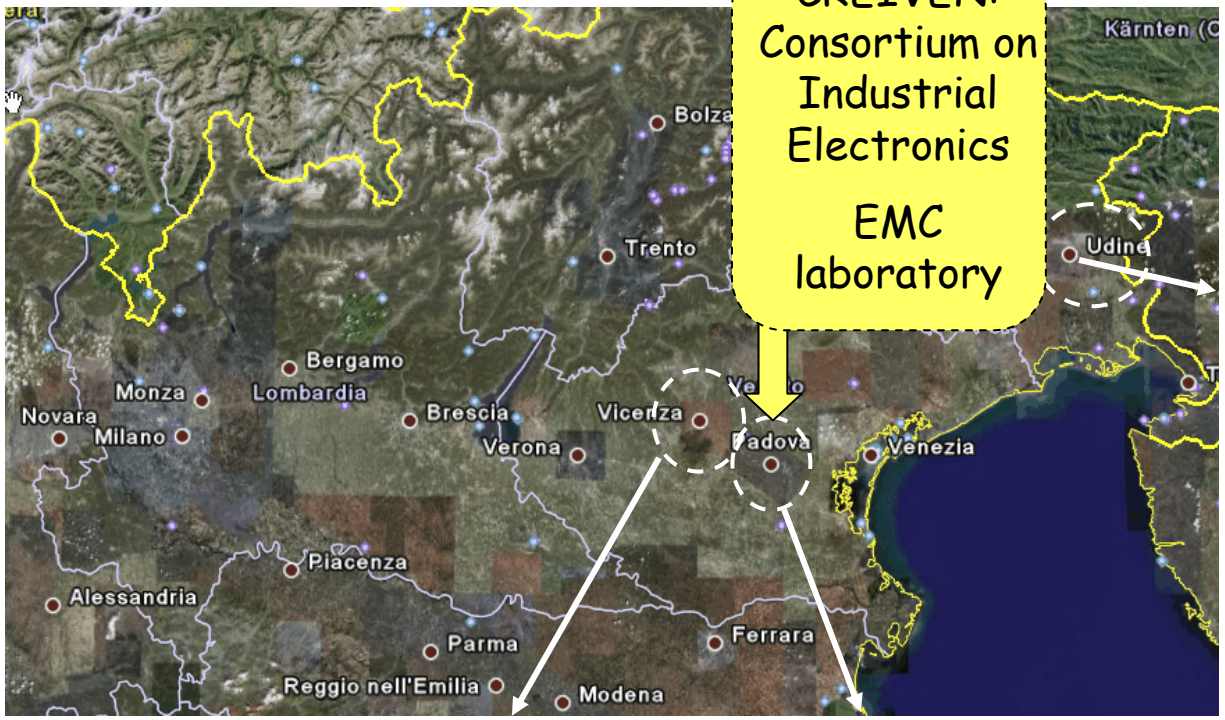
- Radio Systems 1 – 2 – 3
- CESP (Communication Engineering)
- Telecommunications
- SIGNET (Networking)
- Teleport
- Digital Signal and Image Processing
- Multimedia Technology and Telecommunications
- Biological Signal Processing
- Musical Informatics
- Computational Sonology
- (Quantum Electronics)
- Regional Center LUXOR
  - Optics
  - X Rays
  - Spectroscopy UV
  - UV/SoftX

STRATEGIC DEVELOPMENT

- Department Advancement Fund
- 3% of every research fund acquired by faculty, not taxed otherwise , is collected by the Department to develop initiatives of general interest (new labs, young researcher prize, distinguished lectures, PhD school support, …)

- Strategic Development Initiative
- The Department supports professor positions in research areas identified as strategic for Department development. A budget is set apart for this scope and assigned, on a open-contest basis, from an *ad-hoc* Department Committee where every research area is represented.

POWER ELECTRONICS LAB NETWORK



CREIVEN: Consortium on Industrial Electronics

EMC laboratory

University of Udine:

PEL-Udine Faculty:

Stefano Saggini

University of Padova

PEL-Vicenza Faculty:
Simone Buso
Paolo Mattavelli

PEL-Padova Faculty:
Leopoldo Rossetto
Giorgio Spiazzi
Paolo Tenti

MAIN RESEARCH AREAS

Switch-mode power supplies:

- Single-phase power factor correction circuits
- Three-phase inverters and controlled rectifiers
- Soft-switching converter topologies and control

MAIN RESEARCH AREAS

Switch-mode power supplies:

- Digital control techniques for dc-dc converters, inverters and rectifiers
  - Multisampling techniques
  - Event-Based control Techniques
  - Time-Optimal Control for Fast Dynamic Response
  - Autotuning Techniques based on Relay-Feedback and Model Reference
  - Efficiency Optimization
  - Digital Hysteretic Control
  - Mixed-signal Control Techniques

MAIN RESEARCH AREAS

Renewable Energy:

- Photovoltaic applications
  - 3 kW_{pk} photovoltaic generator available
- Fuel Cells
  - 7 kW_{pk} PEM Fuel Cell available
- Energy harvesting and scavenging for distributed sensors

Power Quality issues:

- Active Power Filters
- Distributed Harmonic Compensation
- Uninterruptible Power Supplies
- …

MAIN RESEARCH AREAS

Consumer electronics:

- Hi-Fi audio amplifiers

Lighting: switching power supplies for

- High intensity discharge (HID) lamps
- High-brightness LEDs
- Cold Cathode Fluorescent Lamps (CCFL) using piezoelectric transformers
- Standard and Compact Fluorescent Lamps

MAIN RESEARCH AREAS

Electromagnetic compatibility:

- EMC related aspects in power electronic systems (study of mitigation techniques, EMI filter design, etc.)
- Immunity analysis of power integrated circuits
- Investigation of advanced signal-processing techniques to EMC analysis of SMPS

Integrated projects with CREIVEN consortium (EMC lab.): www.creiven.it