



Ampère Lab

CNRS Associated Lab 5005

Electrical Engineering, Electromagnetism, Control, Environmental Microbiology and Applications

Ampère Lab

<http://www.ampere-lab.fr>

Janvier 2010





History of the CNRS lab

- ↪ 1980: Creation of the LEL, CNRS associated lab, located at l'ECL
 - 18 peoples (5 EC, 6 IATOS, 7 doctorants)

- ↪ CEGELY, merging of LEL and LCPA (INSA):
 - 1992: creation of CEGELY, merging of LEL and LCPA (INSA)
 - 1996: integration of LEEP (UCBL)
 - 2003: 73 peoples (28 Associate Professors, 4 CNRS, 11 Support staff (2 CNRS), 30 PhD)

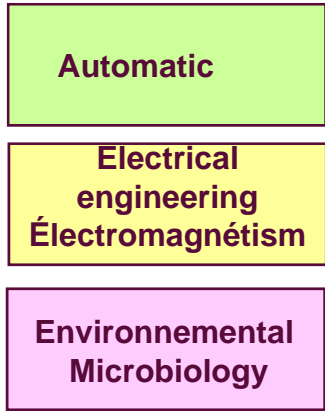
- ↪ 2007: creation of Ampère Lab
 - Merging of CEGELY and LAI (INSA), integrating the Environnemental Microbial Génomics group (UCBL)
 - Dual topics :
 - Electrical Engineering (GE) – Automatic (Autom.) : Systems studied range from conception and supervision of mechatronics systems.
 - Environnemental Microbio. (ME) : electrotransformation phenomena induced by lightning in the flux of genetic information of bacteria communities in soil
 - biodepollution by electric currents injected
 - develop the *EM Fields-Human Interaction*
 - 2007 : 145 peoples (45 Associate Professors, 7 CNRS, 4 IT CNRS, 15 Support staff (4 CNRS), 64 PhD., 14 post-PhD.)



Laboratoire Ampère: overview

4 partners
 CNRS (INSIS + INEE)
 Ecole Centrale de Lyon
 INSA de Lyon
 Université Claude Bernard

3 fields

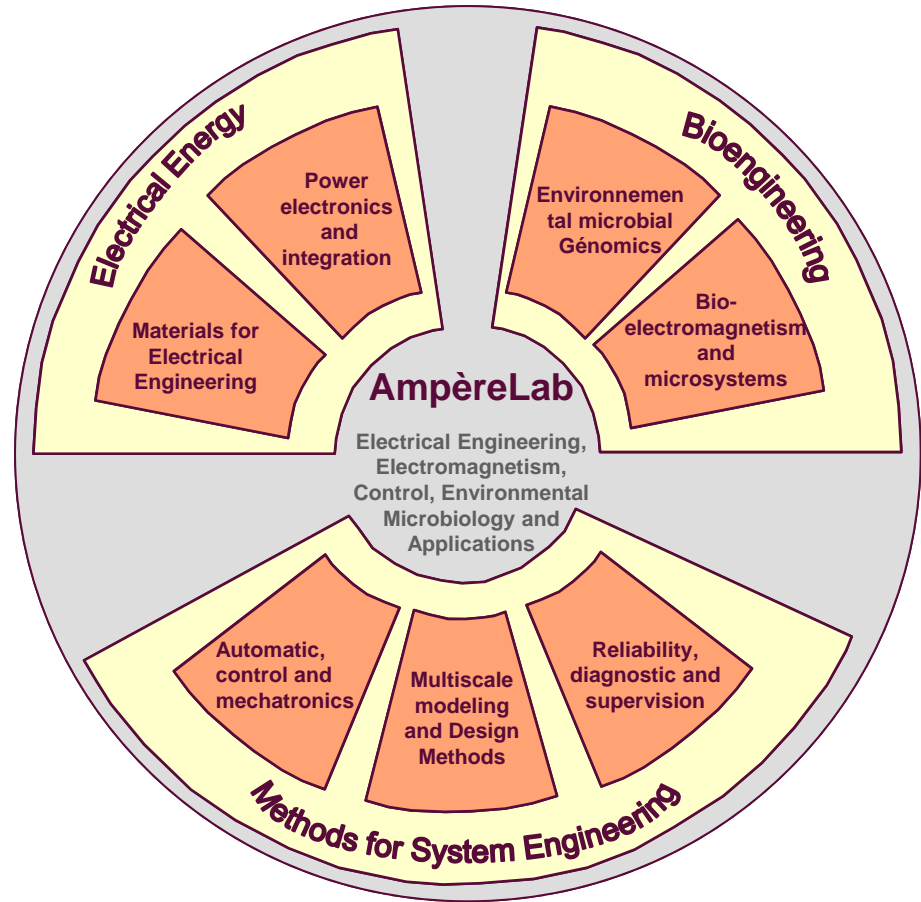


2 objectives for engineering
 Ecologic engineering
 Mechatronics systems engineering

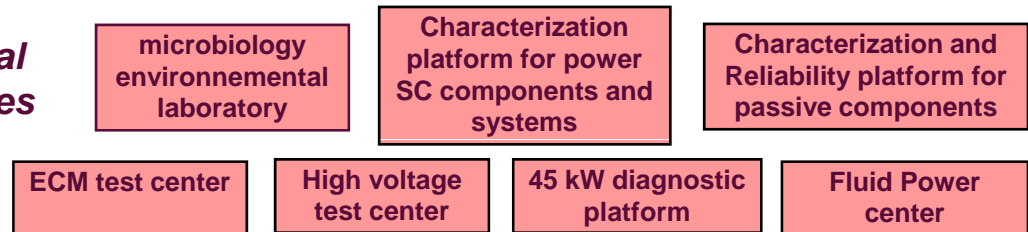
2 priorities

Bioengineering
 Power integration

3 départements
 7 research groups



7 experimental facilities





Scientific Objective and activities

↪ Scientific Objectives

- Objective : Ecologic Engineering and mechatronics systems, by integrating their energetic efficiency and interactions with the environment.
- A large variety of fields : *Electrical Engineering, Electromagnetism, Electromechanical Engineering, Control and Environmental Microbiology,*
 - *Systems studied range from power electronic components to energy system,*
 - *The frequencies of studied phenomena vary from static to microwave (GHz) ,*
 - *Application fields range from transport systems to energy, to environment and bioengineering*
- A general approach in engineering, with a duality modelisation – experimentation

↪ Two scientifics fields

- Develop Engineering concepts and techniques for biologic systems applications (**BioEngineering priority**)
- Power systems Integration with improvement of the energetical efficiency and fiability (**Power Integration priority**)
- These priorities are founded on the development of a strong methodological base related to system engineering

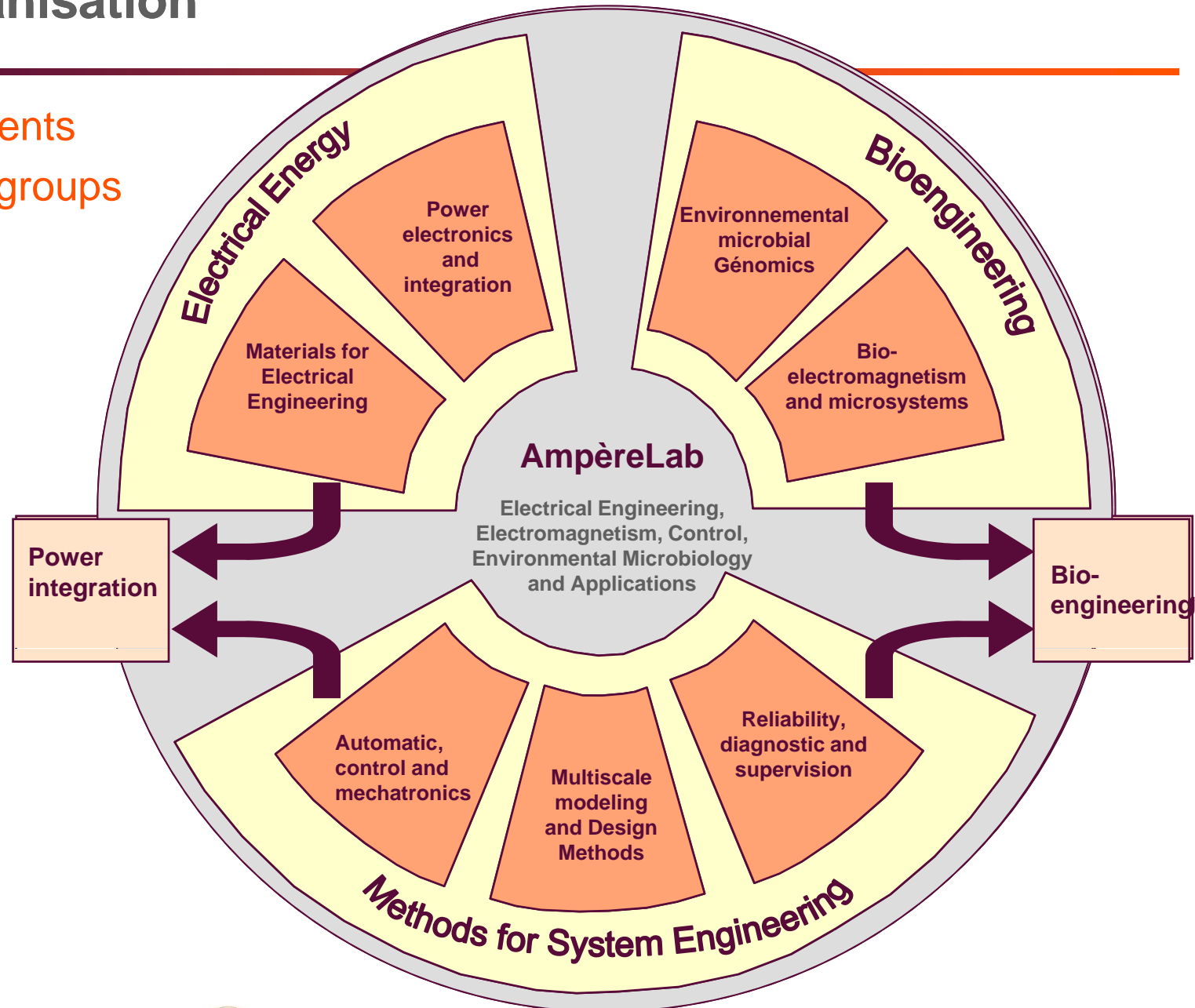
↪ Scope of activities and key words

- Dielectric and magnetic materials, Power electronics, High voltage, Electromagnetic compatibility, Electromagnetic modeling
- Driving and control, Mechatronics, Fluid power, Medical robotics, Diagnostics and operational security
- Ecological engineering, Bacterial adaptation and gene transfer



Organisation

- ↪ 3 départements
- ↪ 7 research groups





Partners

↳ Regional

- Rhône-Alpes clusters : *7.Energy 2.Info 8.Transport systems 6.Environment*
- Competitive clusters : *Axelera, Lyon Urban Truck&Bus 2015, MOV'EO, ASTech, MTA*

↳ National

- GDR SEEDS (*Systemes d'Energie Electrique dans leur Dimension Sociétale*)
- GDR Ondes
- GDR MACS (*Modélisation, Analyse et Conduite des Systemes Dynamiques*)

↳ International

- Member of the « Centre de compétence européen en électronique de puissance » (ECPE)
- Member of the « réseau d'excellence du Fluid Power » (FCPE)
- International Consortium of Soil metagenomic du *Terragenome*
- International Lab Associé franco-brésilien *James Clerk Maxwell*





Key figures

- ↳ **Personnel (1/9/2009) : 173 employees**
 - 50 Professors and Associate professors
 - 9 CNRS researchers (4 DR and 5 CR)
 - 1 CR IRD
 - 19 support staff (8 CNRS)
 - 2 other personnel
 - 12 post-doct, 80 PhD Students

- ↳ **Scientific Production 2006-2009**

	ACL	ACT	Patents	PhD and HDR
2006-2009	216	332	8	52



Budget

↳ Results 2006/2009 : 3100 k€

- Increasing : 1900 k€ for 2006 - 4500 k€ for 2009
- Financial support for 2006-2009 :

French research ministry - CNRS	Europe	Région	ANR	Other Institutionnel	Industry
8%	5 %	7 %	23 %	39 %	18 %

- Financial support by activity for 2006-2009

Energy	Transports	Environ/ bioengineering	Other
28%	16 %	48 %	7 %

↳ Budget (2006-2009) : 7 800 k€

- 6100 k€ for 2006, 9900 k€ for 2009

↪ Electromagnetic Compatibility test center

- 7.5m x 5m x 3.5m anechoic chamber (1 MHz - 10 GHz)
- Conduced and radiated EMC measurements



↪ Environmental microbiology laboratory

- 150 m²
- Traditional and innovative microbiology and molecular biology equipments: robots for microarray hybridization, quantitative PCR, pseudo-confocal microscope



↪ High Voltage test center

- 170 m² Faradized hall with 1MV - 50 kJ impulse generator
- 300 kV DC-15 kW, 200 kV DC-400 W, DC 300 kV, DC 200 kV - 400 W, 200 kV - 2 kJ generators

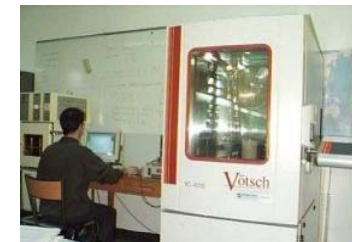


↪ 45 kW Diagnostic platform for electrical systems

- Rotating machines and power electronics converters with reversible defects, special machine with instrumented slots
- Electrical, thermal and mechanical measurements facilities

↪ Characterization and Reliability platform for passive components

- Dedicated to electrical energy stocking systems
- 2 controlled environment chambers and specific ageing platforms



↪ Characterization platform for power SC components and systems

- Static forward and reverse, automatic I(V) and C(V) measurements
- Characterization up to 600°C

↪ Fluid Power center

- 140 m² with electro-pneumatic and electro-hydraulic test benches
- Mass flow, pressure, position, speed, acceleration, force and temperature measurements facilities

