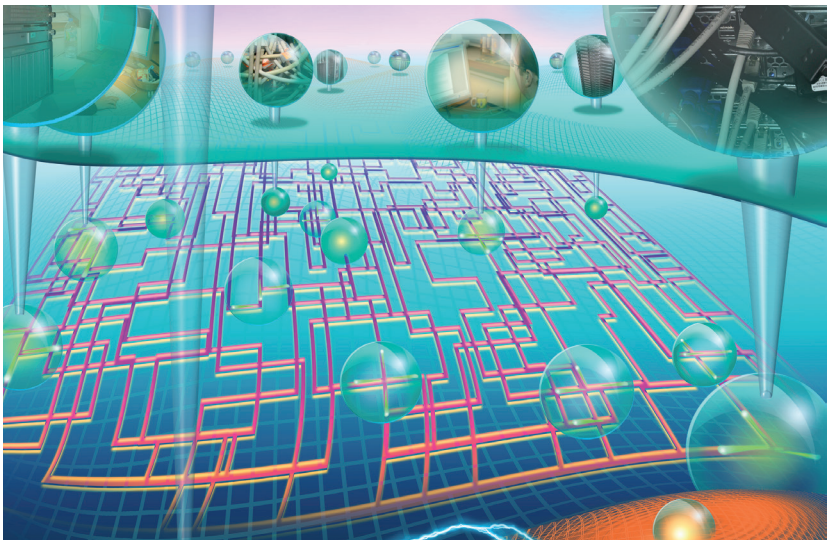
Computer Science

Sorbonne University computer science laboratories cover an extremely broad range of applications, with multidisciplinary teams at UPMC and UTC.*



Computer Laboratory of Paris 6 (LIP6)

LIP6 is a research laboratory under the supervision of UPMC and CNRS*. With 174 permanent researchers and 213 PhD students, it is one of the leading research laboratories in computer science in France, and the largest computer lab in the Paris region.

LIP6 has produced:
- 14 patents
- 34 systems or software distributed on the Internet, or by agreement with a company
- 402 scientific publications per year
- 56 theses per year

In addition to academic research, LIP6 has a long tradition of cooperation with industrial partners in many European national or international projects. Two R&D centers have been established: the CERME, European Research Centre on Micro-Electronics embedded systems and EuronetLab on the Internet and telecommunication networks.

LIP6 is also involved in the expertise clusters in the Île-de-France region: Cap Digital on digital content and System@tic embedded systems. It also has joint teams with INRIA* in algebra and distributed systems. International cooperation is standard in the laboratory's activities. LIP6 is a member of several networks of excellence and it is also developing relationships with universities in Brazil, the United States, Japan and many European countries. The laboratory is open to cooperation projects and regularly hosts visiting scientists. LIP6 is involved in teaching-related research in the Science and Technology master's program at UPMC.

Research Departments

- **Data & Machine Learning:** focuses on data science: statistical, symbolic, and fuzzy machine learning, databases, text and multimedia retrieval, interaction and user modeling, semantic web, knowledge management, and digital humanities.
- **Decision, Intelligent Systems & Operational Research:** studies combinatorial optimization, algorithmic decision theory and game theory, reasoning under uncertainty, multi-agents systems, interactive environments for human learning.
- **Networks and Systems:** researches the future Internet, mobile and ambient networks, reliable operating systems, large-scale distributed systems, faults and attacks tolerance, virtualization, and testbed operation.
- **Complex Systems:** studies objects that cannot be understood by their basic components, like large software, networks, and their use. The department develops methods and tools to observe, analyze, understand, handle, design and control such systems.
- **Embedded Systems:** studies algorithms, methods and tools to design, model and simulate many-core architectures, reconfigurable architectures, heterogeneous system on chip including sensors, with particular focus on power efficiency, security, robustness and e-health.
- **Scientific Computing:** combines reliable, efficient computing for applications in engineering sciences and cryptography. Its themes are computer arithmetics, numerical computation, computer algebra and cryptography.

LIP6's industrial partnerships include: Aerospace, Alactel, Axa, Bouygues Telecom, the French Army, Bull Dynasis, Cadence, CEA, Dassault Aviation, EADS, EDF, France Telecom, GDF, Gemplus, IBM, Intel, Matra, Microsoft, Nortel, Sagem, Snecma, Siemens, Sony, ST Microelectronics, Schlumberger, Thales, and Xerox.

SORBONNE UNIVERSITÉS

* UPMC: Pierre and Marie Curie University
UTC: Compiègne University of Technology
CNRS: the French National Center for Scientific Research

Heudiasyc

Founded in 1981, Heudiasyc (Heuristics and diagnostics for complex systems) conducts research in automation, decision-making, imaging and computing while taking human factors into account. The lab is dedicated to developing synergies between upstream and applied research to address major societal challenges: safety, transport, STIC, the environment and health.

LabEx

Control of Technical Systems-of-Systems: MS2T

Heudiasyc coordinates the Laboratory of Excellence MS2T, and the mobile robotics section of the Robotex Equipment of Excellence project; both are funded by the French government's *Investing for the Future* program. In addition, several platforms and demonstrators, developed within the laboratory, also illustrate this desire to bring fundamental research closer to the complexity of its real-life applications.

Heudiasyc's goal is to provide the means to represent, analyze and control the technical systems that are subject to the scientific, technological, economic criteria and constraints, as well as the social and human impact. The lab has a staff of 150, which includes 50 professor-researchers and 70 PhD students. It is co-supervised by UTC and the CNRS.

Heudiasyc produces:
- 2 Patents per year on average
- 11 Licensed software programs
- 5 Start-ups created
- 180 Scientific publications per year

Research Teams

Automation, Embedded Systems and Robotics is dedicated to the study and development of control, monitoring and observation methods for complex dynamic systems interacting with a human operator.

The robotics studies deal with aerial drones and intelligent vehicles in an external environment.

Research carried out on embedded systems relates to the design of real-time embedded systems, hardware architectures and non-functional properties of critical applications.

Decision and Image researches these two areas. Decision, meaning "uncertain reasoning and information fusion" and "statistical learning", covers work related to non-probabilistic modeling of reasoning and its applications in fusion, state estimation and pattern recognition along with probabilistic approaches to statistical inference. Image focuses on computer vision and medical image analysis.

Information, Knowledge, Interaction studies instrumentation and operational use of knowledge in computer systems to allow cognitive interaction between these systems and their users.

Networks and Optimization deals with optimization in logistical and information systems and with security and mobility in networks. Its objective is to define algorithmic solutions that can satisfy user requirements in terms of performance and reliability while allowing the underlying complexity to remain transparent.

Heudiasyc has partnered with GIPSA-lab to create LAFMIA*, the first Franco-Mexican laboratory partnership, and it has a joint project with LIAMA* and the Key Laboratory of Machine Perception of the University of Peking (China).

Heudiasyc also works hand-in-hand with business partners, in particular industrial companies, including: Alstom, EADS Astrium, BASF, EMI Music, Orange, PSA, Renault, SANOFI-AVENTIS, SFR, SUEZ Environnement, Thales, VEOLIA Environnement, as well as numerous SMEs.

* LAFMIA: Franc-Mexican Computing & Automation Laboratory
LIAMA: Franco-Chinese Computing, Automation & Applied Mathematics Laboratory

LIP6: www.lip6.fr — Heudiasyc: www.hds.utc.fr

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