



As escolas da Rede AMPERE



Abril de 2023



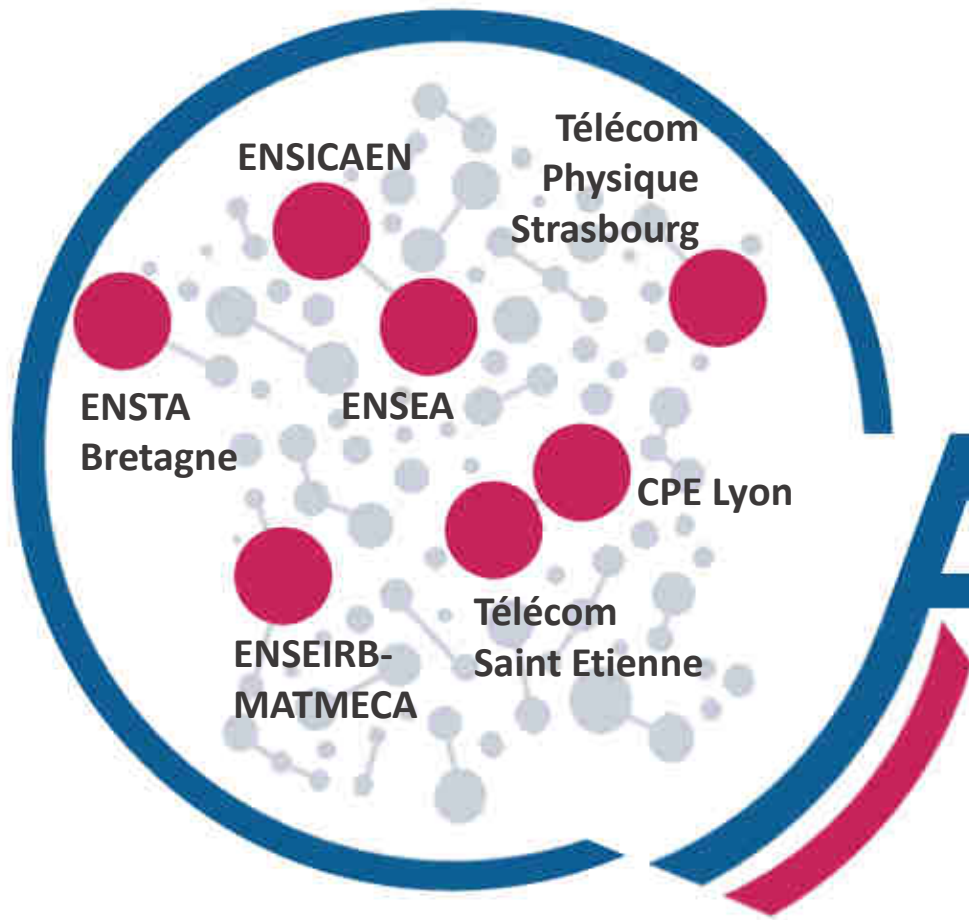
Projeto BRAFITEC ObInCo



Objetos Inteligentes Conectados
Objets Intelligents Connectés

Coord : Eduardo Stockler Tognetti, André Mariano, Chantal Gunther





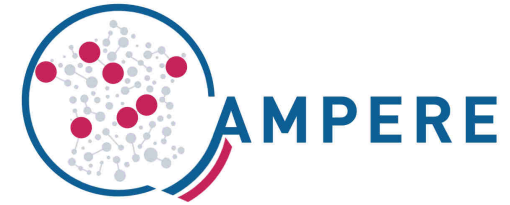
AMPERE

7 Escolas Francesas de Engenharia

<http://www.ampere-network.com/>



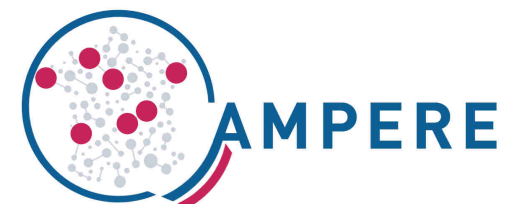
A rede de 7 Escolas Francesas de Engenharia



- Distribuem-se por todo o território da França
- Uma rede temática de escolas
 - núcleo comum de competências : computação, eletrônica, sistemas embarcados, telecomunicações, eng. Mecânica.
 - ainda que diverso: cada um tem alguma(s) especificidade(s)
- Promover intercâmbios internacionais
 - Argentina, Brasil, ... (Latin America, FITEC programs)
 - China (Wuhan)
 - USA
- Escolas públicas exceto CPE Lyon

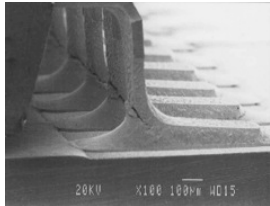
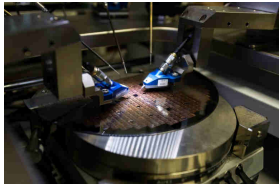


Quantos Alunos e Professores?



Escolas AMPERE	# alunos de engenharia (master)	# professores
CPE Lyon	1250	95
ENSEA	900	90
ENSEIRB-MATMECA	1200	105
ENSICAEN	790	90
ENSTA Bretagne	958	125
Télécom Physique Strasbourg	600	48
Télécom Saint-Étienne	300	35
AMPERE	~ 6000	~ 590





Grupos de pesquisa



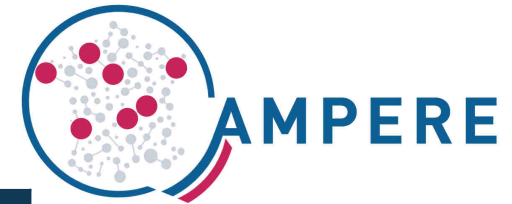
- Infra-estruturas e equipamentos compartilhados com a Universidade (no campus)
- Estreitas ligações com instituições de pesquisa nacionais: CNRS, INRIA, CEA...
- Estreitas ligações com empresas industriais
- Doutorandos das Escolas ou das Universidades

Transferência de tecnologias e de saber-fazer

- Unidades de Transferência de tecnologias dentro das escolas e dos grupos de pesquisa
- Cursos leccionados por peritos do sector da indústria.



Escolas AMPERE / Temáticas comuns ou menos comuns



	CPE	ENSEA	ENSEIRB MMK	ENSICAEN	ENSTA	TPS	TSE
Computação	x	x	x	x	x		x
Electrônica	x	x	x	x			x
Telecomunicações	x	x	x	x			x
Eng. Mecânica			x	x	x	x	
μ Electrônica	x	x	x				
Sistemas Embarcados	x	x	x	x	x	x	x
Controle e Automação	x	x	x	x	x	x	
Redes de Comunicação	x	x	x	x	x		x
Engenharia Química Química e Materiais	x			x			
Engenharia Física		x		x		x	x



CPE
LYON

CPE Lyon

Ecole Supérieure de Chimie Physique
Electronique de Lyon

3





KEY FIGURES



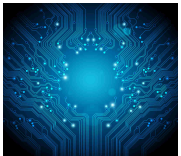
1,300 Students in CPE Lyon



340 engineers (MSc degree) graduate per year



8,500 graduates working in 200 companies all around the world



5 internationally renowned research laboratories, with nearly 400 researchers, PhD students, engineers and technicians



RECAP OF THE PROGRAM

Year 3
(3rd year of Bachelor)

- **MAIN CLASSES (SEMESTER 5 AND 6)**
- Computer Science – Electronics – Mathematics, Signals and Images – Physical Sciences

Year 4
(1st year of master)

- **MAIN CLASSES (SEMESTER 7):**
- Computer Science – Mathematics, Signals and Images – Physical Sciences
- **A SCIENTIFIC GROUP PROJECT IN GROUPS (SEMESTER 8)**
- **CHOOSE ONE SPECIALIZATION STARTING FROM SEMESTER 8:**
- 1. Electrical Engineering and Embedded Systems – 2. Image, Modeling and Computing – 3. Networks and Telecoms – 4. Software Design and Big Data – 5. Service Robotics

YEAR 5
(2nd year of master)

- **CLASSES IN THE SPECIALIZATION BETWEEN (SEMESTER 9):**
- 1. Electrical Engineering and Embedded Systems – 2. Image, Modeling and Computing – 3. Networks and Telecoms – 4. Software Design and Big Data – 5. Service Robotics
- **END OF STUDIES PROJECT (SEMESTER 10):**
- (internship/work placement of 6 months starting from February)





RESEARCH ACTIVITIES AT CPE LYON

TEACHING AND RESEARCH FIELDS:

- Internet of Things (IoT)
- Computer science and communication networks
- Robotics & IA
- Nanotechnology
- Optics, Photonics, Image



LIP Computer Science Lab
www.ens-lyon.fr/LIP/



Laboratory of Image Informatics and Information Systems
liris.cnrs.fr/en



Center of innovation in telecommunications and integration of service
www.citi-lab.fr



Optics, photonics and surfaces and Computer Science, Security, Image
laboratoirehubertcurien.univ-st-etienne.fr/en/index.html



Center for research into the acquisition and processing of images for healthcare
www.creatis.insa-lyon.fr/site7/en



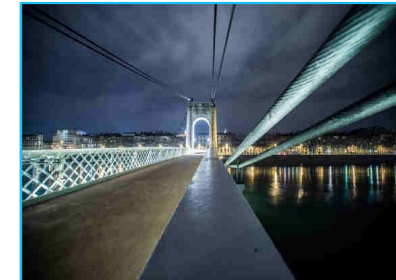
The Lyon Institute of Nanotechnology
inl.cnrs.fr/en/about-inl/





LYON: CITY OF LIGHTS

- ❖ Crossed by the Saône and the Rhône
- ❖ UNESCO World Heritage Site :
 - The districts of Old Lyon
 - The Fourvière hill
 - The Croix-Rousse hill
 - The « presqu'île » peninsula
- ❖ The Parc de la tête d'Or and its 120 hectares is the city's green lung with its lake, its zoo and its botanical garden.
- ❖ 2nd largest cultural city in France
- ❖ CPE is located in the LyonTech Campus – La Doua: 1st education and research centre in France



#BeyondEngineering

ENSEA



ENSEA & Cergy

Located on the Campus of Cergy-Pontoise

One of the largest academic centers of the region

14 academic institutions (5 Engineering Schools,
1 Business School, 1 University...)

More than 30 associations created and managed by the students
just for ENSEA: music, culture, sports, robotics, videogames,
cooking, debate club, entrepreneurs, humanitarian projects,
events, dance, astronomy, foreign students integration...



30km from Paris

Easy and direct access to Paris city center by train (RER A, 40min)

Direct bus line to Charles de Gaulle Airport (30min)

Housing :

A room in one of Cergy University's Residences :

250-350€/month

A bedroom in a shared apartment near the school :

400€-500€/month

Cost of living in Cergy :

around 600€-700€/month



ENSEA's community

Students & Staff

More than 8000 engineers trained at ENSEA (Alumni association)

900 students

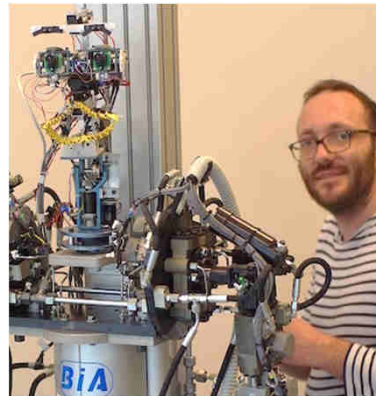
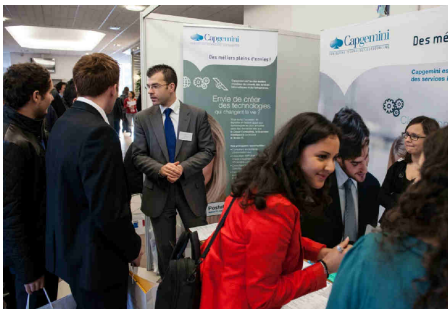
90 permanent teachers, 180 trainers from affiliated companies

30 student associations

70 PhD students and researchers

Corporate relations

The 2nd year internship and the Master Thesis are an excellent way to discover one of the French companies affiliated to ENSEA's corporate network. Every year ENSEA organizes a corporate relations forum receiving around 100 companies looking for interns.



Research

27 teaching laboratories

2 research laboratories :

ETIS

Information, Communication, Imagery, Multimedia Indexing and Data Integration, Artificial Intelligence and Robotics, Electronics, Reconfigurable Computing and Image Processing
QUARTZ

Systems Conception, Analysis and Control, Material/Structure Dynamics, Mechatronics and Complex Systems, Informatics, Mechanics, Mathematics, Cyber Physical Systems (CPS), Internet of Things (IoT), Semantic web

International Relations

145 agreements and more than 30 double degrees across the five continents

General study plan

Last year : Specialization (8 advanced study tracks)
ENGLISH-TAUGHT OPTIONS
&
Final internship (6 months) + Master Thesis

Second Year Internship (Engineer Assistant) : 3 to 4 months

Second year : Fundamentals, Specialization track (3 advanced subjects, 1 elective) & Project
ENGLISH-TAUGHT OPTIONS

First Year Internship : 1 to 2 months

First year : Fundamentals (Electronics, Telecommunication, Computer Science) & Project



2nd YEAR STUDY PLAN

First Semester		Second Semester	
Automation (major o minor)*	6/4 ECTS	Electronic Systems (maj./min.)*	6/4 ECTS
Signal Processing (maj./min.)	6/4 ECTS	Signal Processing (maj./min.)	6/4 ECTS
Electronic Systems (maj./min.)	6/4 ECTS	Management & Project	6 ECTS
Computer Science & Engineering (maj./min.)	6/4 ECTS	Languages : French & English	4 ECTS
Management & Project	6 ECTS	Engineer Assistant Internship: 3 to 4 months in a company or lab	4 ECTS
Languages : French & English	4 ECTS		
		Elective Subject : Electrical Vehicles, Drones (in English), Defense & Security, Multiphysics & Systems, Microelectronics, Electronics and signal for musical applications, Internet of Things (in English), Security of Information Systems and data, Innovation and Entrepreneurship, Artificial Intelligence and Big Data (in English), Image and Virtual Reality (in English), Human centered design (in English)	6 ECTS
	30 ECTS		30 ECTS
*Each student chooses two « major » subjects (6 ECTS) and two « minor » ones (4 ECTS) – The Signal+Electronics major track is entirely English-taught		*Each student chooses one « major » subject (6 ECTS) and another « minor » one (4 ECTS), Both majors and both minors are available entirely in English	

3rd YEAR: each student chooses one of the 8 specialization tracks

<u>Control & Power Engineering</u>	<u>Biomedical Engineering</u> (IN ENGLISH)	<u>RF Engineering</u>	<u>Embedded Systems</u>	<u>Computer Science and Systems</u>	<u>Mechatronics</u>	<u>Networks, Security and Telecommunication</u> (IN ENGLISH)	<u>Signal processing & AI</u>
Renewable energy, Inverters and power quality, Non-linear automation, Diagnosis, Advanced automation, Acquisition systems, AI for System Control, Actuators, Direct digital control...	Smart biosensors, Medical Imaging, Physics, Acquisition systems, signal characterization, image processing and reconstruction, Deep Learning...	RF Communication Systems, Antennas, Guided waves, High-speed electronics, RF components, Non-linear RF design, Linear RF design, Circuits, CAD and measuring tools...	Microcontrollers, Real-time kernel, Sensors and conditioning, Actuators & automation, Sensors & Network, Advanced digital processing, EMC, Industrial networks, Embedded Linux, Electronic systems for the automotive industry...	Digital circuits, System on Chip, Networks, Algorithmics, Software Engineering...	Mechatronic System Control, Acquisition systems, Digital control of actuators, EMC, Bus and network, Measurement chain, Design and dimensioning of mechanical systems, Robotics...	Digital Communication, Wireless communication, Network protocols, Software security, Java for Networks, Architecture of information systems, Network security...	Advanced Signal Processing, Audio processing, Image and video processing, Machine Learning, Hardware for digital processing, Deep Learning for visual recognition...

Contacts & Info

www.ensea.fr

ri@ensea.fr



A photograph of four students in a library setting. They are gathered around a table, looking at a laptop and some papers. The background is filled with bookshelves. A semi-transparent blue overlay covers the left and center parts of the image, with the text 'INP ENSEIRB MATMECA' written in white on it.

INP
ENSEIRB MATMECA



ENSEIRB-MATMECA

- **Some key figures**
 - Founded in 1920
 - 1200 students
 - 105 permanent professors
 - 4 research laboratories
 - 350 non-permanent teachers
- **Engineering programs**



Electrical Engineering

Computer Science

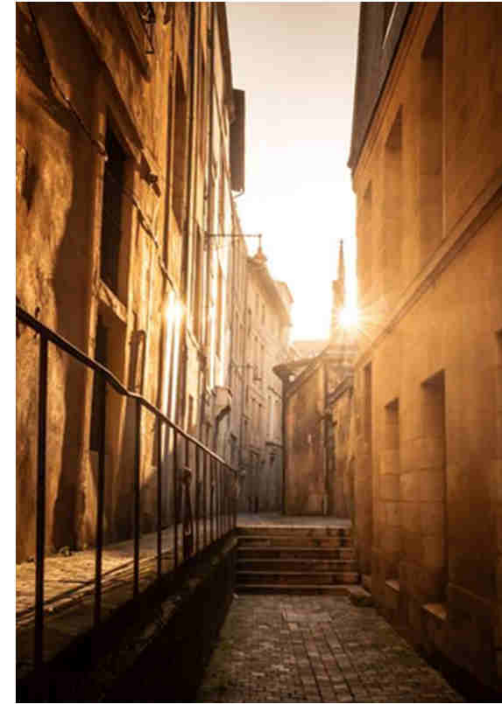
Mathematics and Mechanical Engineering

Telecommunications



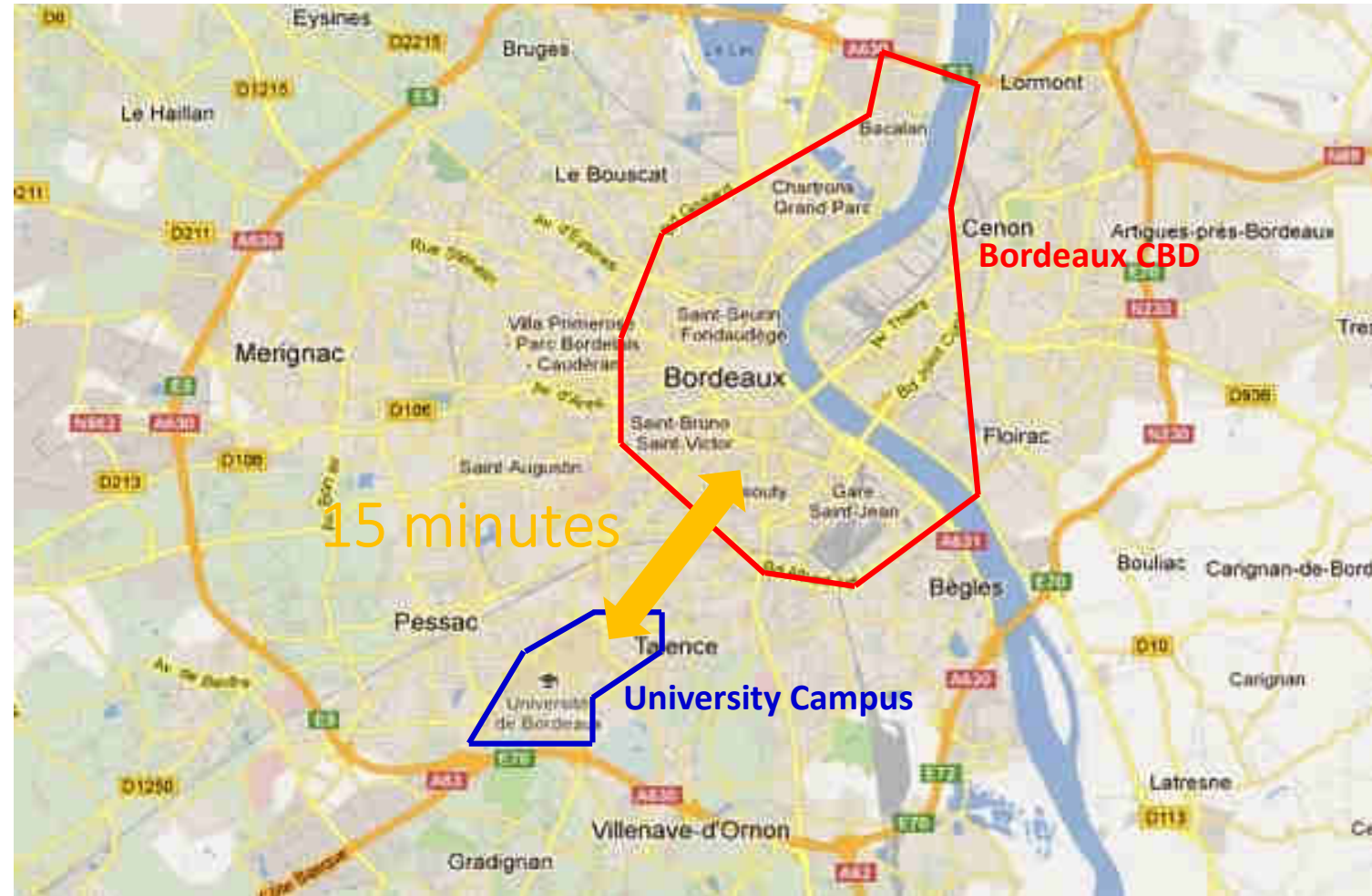
Bordeaux

- **A 1 million inhabitant urban area**
 - Capital city of South West of France
 - 100 000 students in higher education
- **A world heritage city**
 - 2000 years of history
- **A easy way of life**
 - Ground transportation, safety
 - International city
- **2 hours to Paris**
 - High Speed train (TGV)
- **3 hours to the Pyrenees mountains**
 - Ski resorts
- **45 minutes to Atlantic Ocean**
 - Surf !



University campus Bordeaux INP - ENSEIRB-MATMECA

- **Close to the city**
 - 15 minutes by tram
 - 1 tram every 5 minutes
- **A single campus**
 - The University of Bordeaux
 - Bordeaux Institute of Technology



ENSEIRB-MATMECA : departement & research

Computer Science Dept.

- Software Engineering
- Parallel computing, Regulation et Distributed computation
- Networking and Distributed Systems
- Robotics
- Artificial Intelligence
- European Studies in Software Verification

Mathematics & Mechanics Dept.

- Fluid mechanics and energetics
- Material and structures
- Scientific computation

Electronics Dept.

- Circuits and Integrated Systems
- Radio and Telecommunications Systems
- Signal and Image Processing
- Automatics, Mecatronics, Automobile, Aeronautics and Space
- Embedded Systems
- Bio medical

Telecom Dept.

- Digital Communicating Systems
- Networks and Telecommunications Software Engineering
- Networking and Communicating embedded Systems

EMMK professors have their research activities in 4 associated research laboratories :

LaBRI

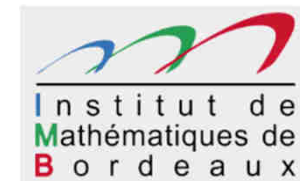
Computer
engineering



Electronics
engineering



Mechanics
engineering



Mathematic





ENSEIRB-MATMECA

- **Technical content**
 - You sit in amphitheatres,
 - You work in small groups,
 - You have practical demo,
 - You have fun in technics !
- **Non-technical content**
 - You learn English,
 - You learn a second foreign language (Chinese, Arabic, Japanese, ... French),
 - You learn management.
- **Number of students:** 1250
- **Services on campus:** Housing (pre-booking in residences), French language & Cultures courses, 40 student associations
- **Research fields:** electronics, computer science, telecommunications, mathematics and mechanics



A man with a beard and curly hair is holding a Raspberry Pi board. The board is green and has several USB ports on the left side. A white USB dongle is plugged into one of the ports. The background is blurred, showing what appears to be a classroom or laboratory setting with a green chalkboard. The image has a blue overlay on the left side.

ENSICAEN

Génie Physique & Systèmes embarqués

Les chiffres clés



Ecole

820

Apprenants, dont
790 élèves-ingénieurs

4

Diplômes d'ingénieur

- Génie physique et systèmes embarqués
- Informatique
- Matériaux-Chimie
- Génie Industriel

100

Projets étudiants par an

Étude de marché, prototypage,
simulation numérique, veille
technologique...

80

Interventions de professionnels/an
Conférences, cours, travaux
pratiques

90

Accords
internationaux

300

Entreprises partenaires

85%

Taux d'activité
< 3 mois après la
diplomation

18%

Des diplômés en
poursuite d'études

38k€

Salaire moyen brut
d'embauche (hors
prime)

Centre de Recherche

7

Laboratoires de recherche CNRS
Laboratoire commun Murata

700

Personnes au centre de recherche

Chercheurs, enseignants-chercheurs, professeurs invités,
ingénieurs, techniciens, doctorants et post-doctorants

50

Thèses par an

400

Publications scientifiques par an

22

Brevets déposés en 5 ans

Génie physique et systèmes embarqués

- **Systèmes embarqués et automatique SATE**

⇒ Objets connectés, véhicules, satellites, radars...

- Objets électroniques intelligents
- Systèmes embarqués énergétiquement autonomes
- Conception de logiciels embarqués
- Traitement du signal
- Supervision et implémentation de systèmes numériques

- **Ingénierie physique et capteurs IPC**

⇒ Conception de systèmes d'instrumentation de mesure en vue de créer un système d'acquisition de données ou de commande.

- Photonique, Modélisation physique,
- Électronique analogique et embarquée.
- Ingénierie biomédicale

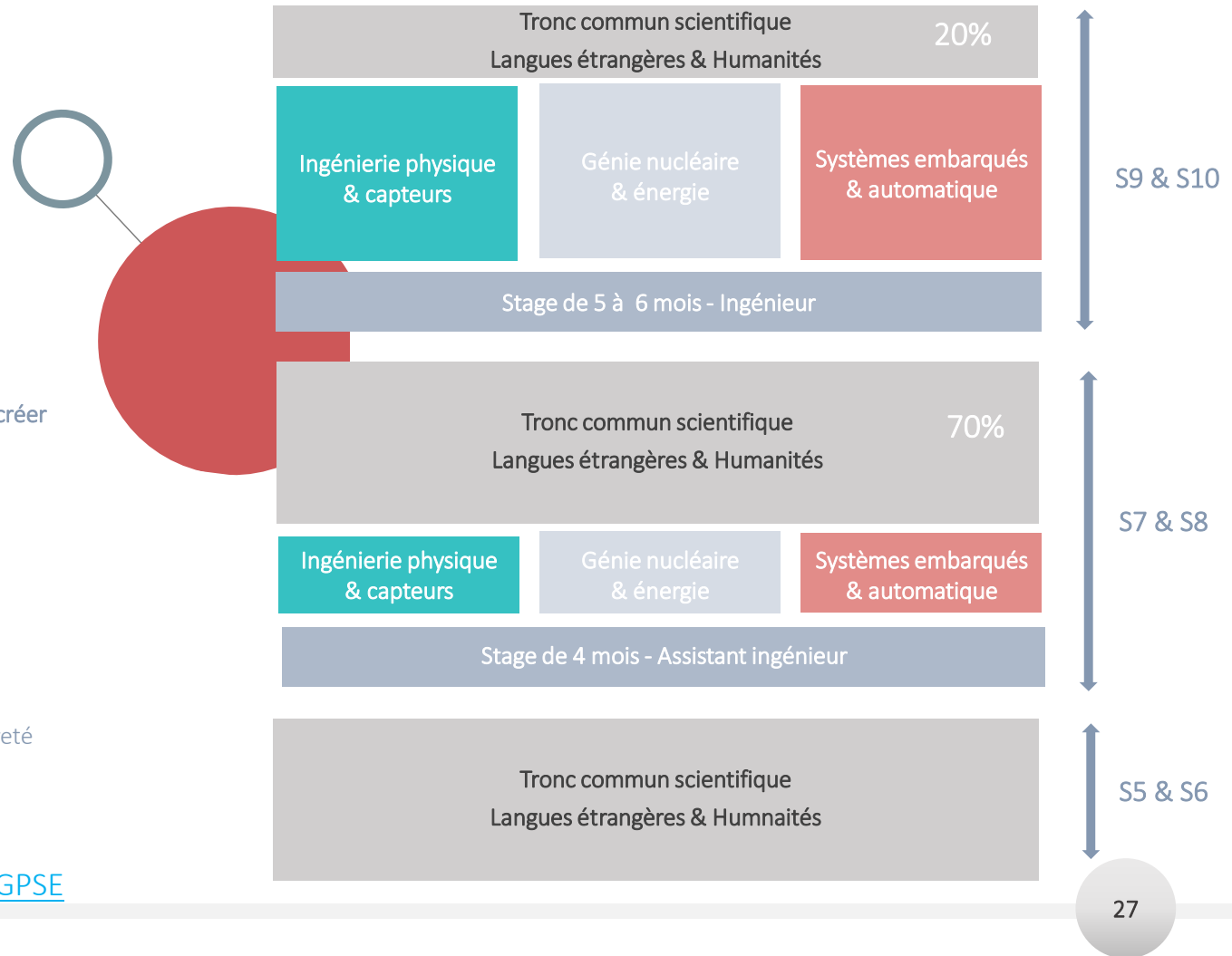
Master Instrumentation, Mesure, Métrologie

- **Génie nucléaire et énergie GENE**

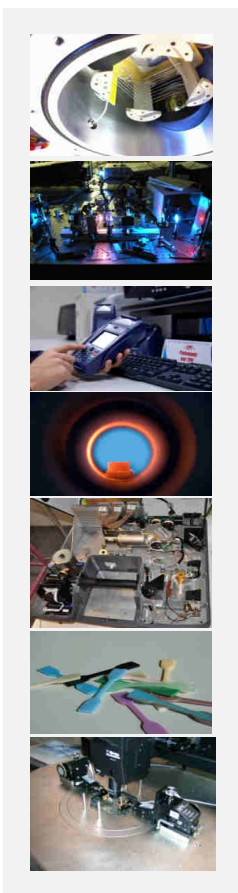
Conception et exploitation des installations nucléaires, sûreté nucléaire, démantèlement, Systèmes de production d'énergie (solaire, éolien, hydraulique)



[Livret pédagogique-spécialité GPSE](#)



Centre de recherche



Six unités mixtes de recherche en cotutelle avec le CNRS et l'Université de Caen Normandie, dont un avec le CEA

LPC Laboratoire de Physique Corpusculaire

CIMAP Centre de recherche sur les Ions, les Matériaux et la Photonique

GREYC Groupe de Recherche en Informatique, Image, Automatique et Instrumentation de Caen

CRISMAT Laboratoire de Cristallographie et Science des Matériaux

LCS Laboratoire de Catalyse et Spectrochimie

LCMT Laboratoire de Chimie Moléculaire et Thio-organique

LIS Laboratoire d'Ingénierie des Systèmes

IPDN Laboratoire commun ENSICAEN MURATA



PROJET IMMERSIF

Pédagogie par projet



La vie étudiante



Caen

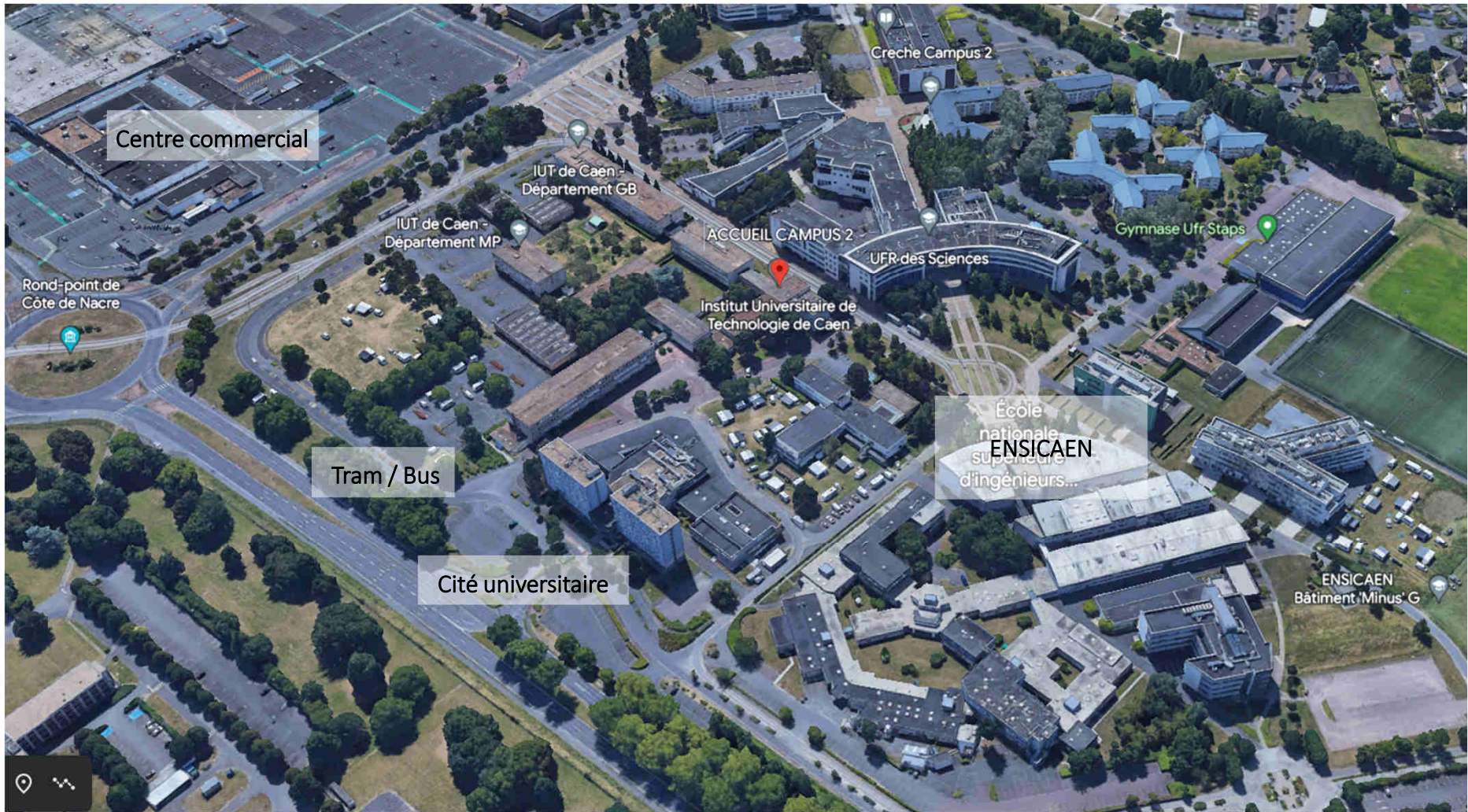
400 000 habitants à Caen et sa banlieue

24 000 étudiants

Théâtre, cinémas, centre commerciaux, patinoire, stade de foot

Ville à 15 km de la mer

Booklet - Informações para alunos brafitec





ENSTA
BRETAGNE

ENSTA Bretagne

Brest, Brittany - France

Photo de votre école

↑ DÉPARTEMENT MÉCANIQUE
LABORATOIRE IRDL

↑ DÉPARTEMENT STIC
LABORATOIRE LAB-STICC

ENSTA Bretagne

TRAINING - RESEARCH -

INNOVATION

Partnerships with Industries and French Ministry of Armed Forces



20%
INTERNATIONAL STUDENTS
5 000+
GRADUATES & ALUMNI



AUTONOMOUS ROBOTICS*



~ 350
MSc & PhD Engineers graduate /year

OBSERVATION SYSTEMS AND AI, EMBEDDED SYSTEMS



~ 1000
Students (graduate, post graduate and PhD)

SECURITY AND DIGITAL SYSTEMS



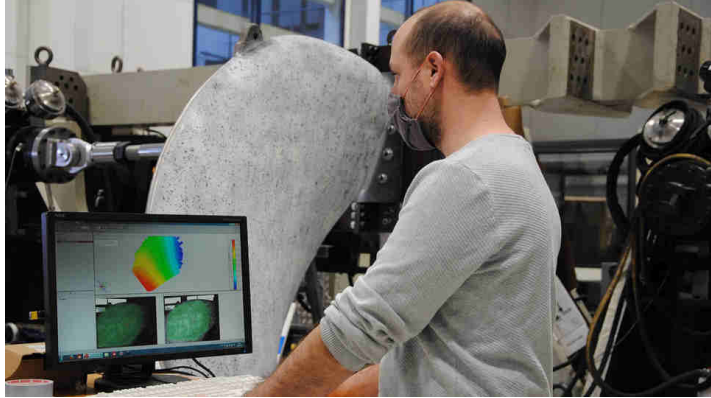
> 1000
Industrial partners





Field or Lab Experiments

A Focus On
Innovation & Research





On campus activities



Student housing on campus

Student Life & Experience



**Various Student
Clubs**



Eco Marathon Shell



Student Air Rally



**ENSTAéro
Experimental
rocket**

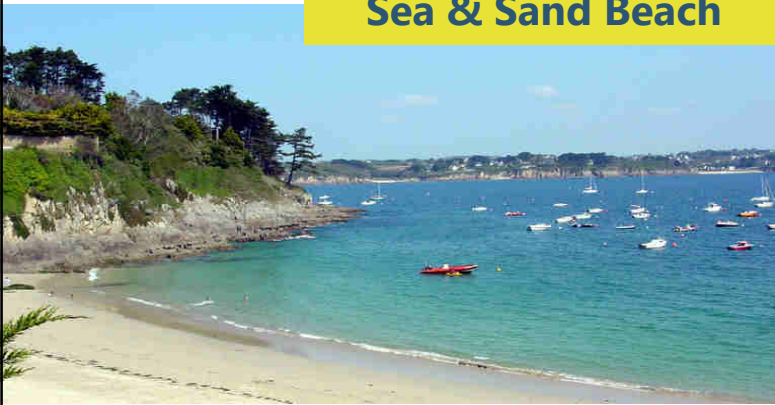


Watersports
Hiking

BREST



Nature
Sea & Sand Beach





601 –
800th

World University Rankings
2023

The “Bienvenue en France” Label - 3



Stars



l'Étudiant
(2023 - National Ranking for Engineering Sci



www.ensta-bretagne.fr/en



Télécom Physique Strasbourg



About us



600 students
48 Professors
4 departments
1 master degree

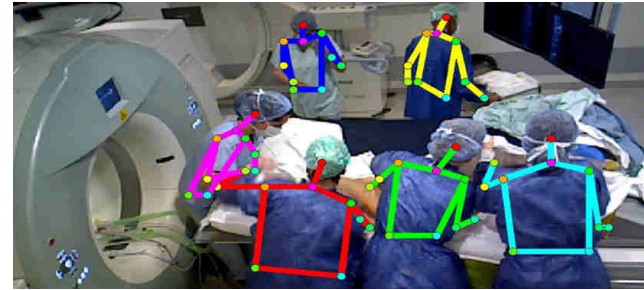


Télécom Physique Strasbourg is:

- a French “Grande école”
- a school of the University of Strasbourg
- affiliated to Institut Mines-Télécom, a group of French graduate schools in engineering and management



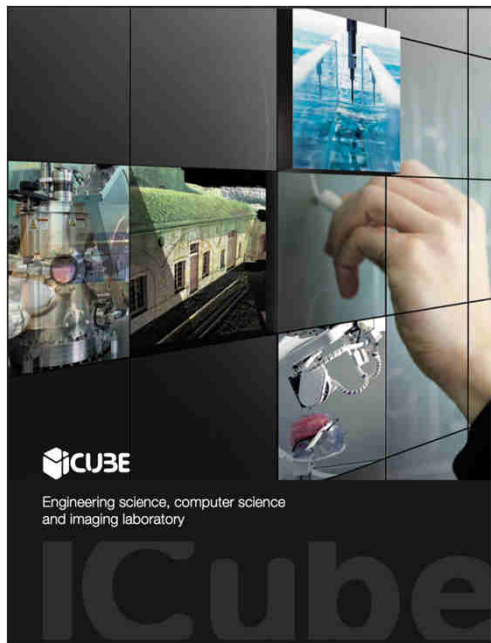
About us



Credit: CAMMA & ICube

Télécom Physique Strasbourg is:

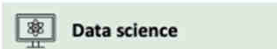
- an engineering school supported by **two internationally renowned research institutes ICube and IPCMS**
- a school where **25% of the graduate students do a PhD !**



HealthTech | Training program

International graduate program

- Elective courses and complementary research modules in a laboratory
- Pluridisciplinary training, involvement of full-time researchers and outside professors
- Project-integrated teaching



Data science



Medical device



Economics & innovation



Medical imaging



Biomedical engineering



Research



About us



56000 students
2 814 professors
35 departments
70 research units
4 active Nobel Prizes

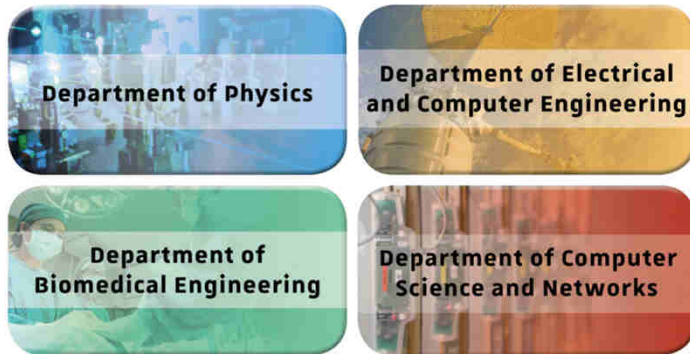
The University of Strasbourg:

- **“European by nature international by design”** The **international dimension is fundamental for the University of Strasbourg**, which capitalizes on its prime location to develop a strategic axis within Europe
- **Research is another major asset for the University.** Thanks to the worldwide reputation of its research teams, built on excellence, **the University of Strasbourg emerges among Europe’s foremost research universities.**



What could you study at Télécom Physique Strasbourg ?

4 departments



3 engineering degrees, 2 “BRAFINITEC-compatible”:

- **general engineering**
- **information technology for healthcare engineering**
- computer science and networks engineering

Main topics selected by BRAFINITEC students:

- engineering for healthcare
- control theory and robotics
- physics and photonics
- AI, signal and image processing



Strasbourg, Capital of Christmas, in the center of Europe



Soyez les bienvenus !



MobEntrante Bresil

<https://www.youtube.com/watch?v=iWYz44x5INs>



A photograph of a modern building with a glass facade and brickwork. The building is reflected in the glass. The text 'Télécom Saint Etienne' is overlaid on the image.

Télécom Saint Etienne

Photo de votre école



Generalist Engineering School

École affiliée
IMT

700 students

1 start-up incubator

3 associated
research
laboratories

Engineering

Engineer Telecom Saint-Etienne

Image & Photonics, Smart-Industry
Apprenticeship Engineer

Data Engineering Apprenticeship Engineer

Integrated preparatory course "Citise"

Communication

Master in Communication Design,
Innovation and Digital Mediation

Licence 3 in alternation "Innovation,
Design and Digital"

Bachelor Global Communication &
Digital Design

Areas of scientific excellence :

- Computer science
- Embedded electronics
- Image science & Computer vision
- Networks & Telecommunications
- Optics & Photonics



Combining communication, IT and web
development



elico

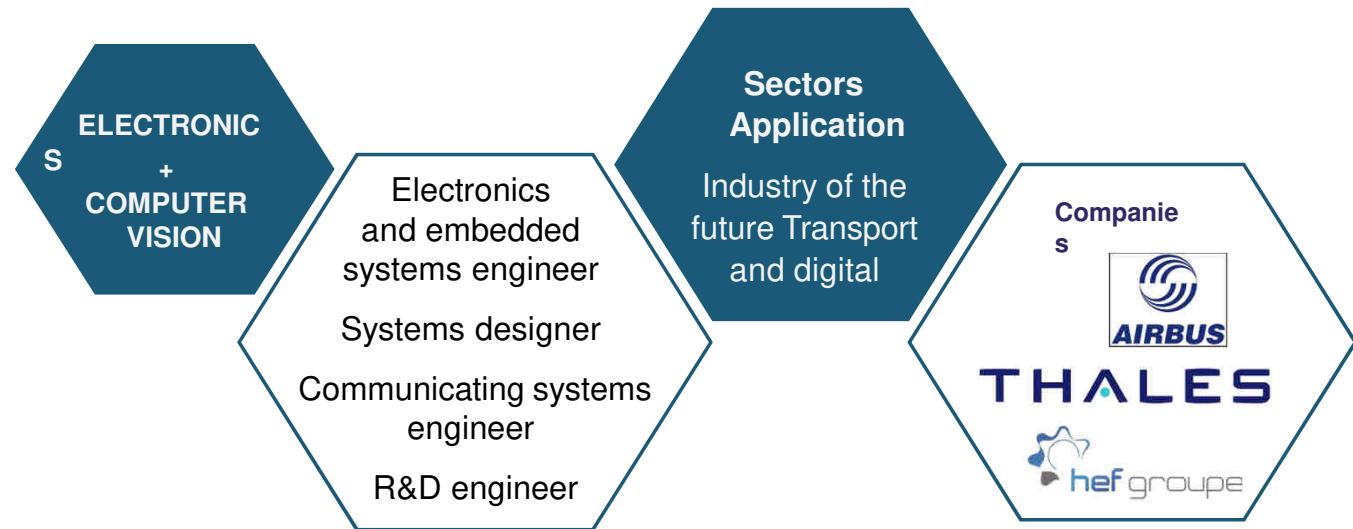
Équipe de recherche de Lyon en sciences
de l'information et de la communication



Dual-skill engineers



Example



+ Engineers open to society :
Humanities and Social Science
Sustainable development
CSR (Corporate Social Responsibility)



STUDENT LIFE AT TELECOM SAINT-ETIENNE



Federation of Associations of
Telecom Saint-Etienne



Sports
Office

Robotics Association



Junior
Enterprise



Students' Office

Arts Office



DISCOVER SAINT-ETIENNE

28,500 students in Saint-Etienne

Accommodation: approx. 300€ / month

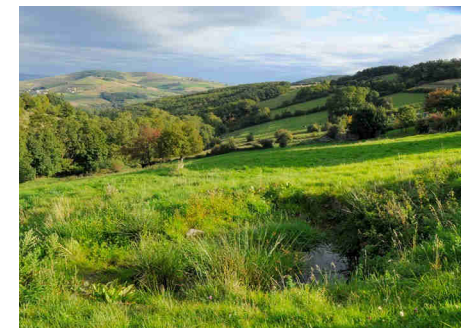
4th best city to study in: l'Etudiant 2021 ranking



🕒 Under 3 hours from Paris by train

🕒 45 minutes from Lyon by car or train

🕒 1h from Lyon International airport



MERCI



Chantal GUNTHER



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