sigma CLERMONT

SIGMA Clermont

Graduate School of Engineering

A unique alliance between advanced mechanics and chemistry

Chemistry – Industrial Engineering – Chemical Engineering – Materials – Mechanics - Robotics – Structures

Welcome !

SIGMA Clermont is a human-sized engineering school connected to the industrial world, with a global and international perspective and strong ties to high-end research and entrepreneurship.

It has extensive links via its Foundation with large companies but also small businesses, underlining the importance of an active involvement of the industrial sector in its teaching programs.

Rich in its scientific tradition, strengthened through the merger of the French Institute for Advanced Mechanics (IFMA) and the National Graduate School of Chemistry of Clermont-Ferrand (ENSCCF), SIGMA Clermont offers a unique framework for research and studies, allowing us to produce engineers with responsibility, academic excellence and creativity; the future leaders of tomorrow's industry and science, both in France and worldwide.

SIGMA Clermont promotes a multi-disciplinary approach through the synergy of its competences, which include chemistry, industrial engineering, process engineering, materials, mechanical engineering, robotics and structural mechanics.

Join us in our adventure, share our values and acquire the impulse you need. Welcome to SIGMA Clermont, where the alliance of the skills and talents of each student and educator guarantees success for all.

Prof. Sophie Commereuc
Director of SIGMA Clermont

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Our Values

An internationally-oriented school, driven by research and strongly connected to the world of enterprise

950
engineering students

260
graduates per year

100%
international mobility

5500
alumni

16
weeks minimum internship abroad

120
agreements with universities around the world

60
researchers

92
PhD students

Professional Outlook

Throughout their study program, our student engineers are in contact with people from the world of industry and research, and gain concrete experience working on projects proposed by our enterprise partners.

Strong bonds with the SIGMA Foundation

SIGMA Clermont is supported by its Foundation, with more than 60 different companies from small businesses to global players. The Foundation is also strongly implicated in the school's development and governance.

Historic partnerships

Sanofi is a world leader in health science. The company actively fosters its relations with the school: "Get out of the box, have the will to create, develop your mind and curiosity, these are the drivers for our relation with the school"

Eric Berger, Senior Vice President, Global Industrial Operations Strategy Programs & Projects.

Michelin, the international tire manufacturer, is a historical partner of SIGMA Clermont. At the origin of the merger of IFMA (French Institute for Advanced Mechanics) and ENSCCF (National Graduate School of Chemistry of Clermont-Ferrand), the company takes an active role in the definition of the strategy of the school "Uniting mechanics and chemistry favors the preparation of the student engineers to work in multi-disciplinary teams coming from different horizons and with different types of technical knowledge"

Jean-Dominique Senard, CEO of Michelin, President of the SIGMA Foundation.

Why SIGMA Clermont?

SIGMA Engineering studies – 3 years of developing knowledge, skills and know-how in Chemistry and Advanced Engineering

1 Develop scientific and technical expertise

After 12 months of general studies, the student can choose a specialization:

For students in Mechanical Engineering

- Machines, Mechanisms and Systems (MMS)
- Structures and Mechanics of Materials (St2M)
- Industrial and Logistic Systems (SIL)

For students in Chemistry

- Fine and Industrial Organic Chemistry (COFI)
- High-Performance Materials (MHP)
- Chemical Engineering (GC)

2 Make a difference
- special study tracks

Optional special study tracks are available for our students to help them gain additional experiences. At the moment SIGMA Clermont offers five different tracks:

Aeronautics, design and materials, entrepreneurship, international and research.

3 Enrich soft skills

30% of the course content is dedicated to studies in languages, human and social sciences, economics, interculturality and management.

4 Multiply your professional experiences

Industrial relations are an integral part of SIGMA Clermont's identity. We are training the world's future engineers, and we give them as much exposure as possible to the world of industry and enterprise during their studies, via projects and internships.

- A total of 42 weeks of internships in companies
- Special project work and internships throughout the year

Auvergne-Rhone-Alpes is the first region in France in terms of industrial employment, and the eighth-richest region in Europe. It hosts numerous large international groups, medium-sized sector leaders and innovative start-ups.

SIGMA Clermont engineering school is a public institution under the authority of the Ministry of Higher Education, Research and Innovation. SIGMA Clermont can provide a tuition waiver for students joining from partner universities.

Graduates

Thanks to their high-added-value studies, built on the needs of tomorrow's industry and society, SIGMA graduates are remarkably well-equipped for a rapid integration into companies and research institutes

- **82% of graduates** find a job within 4 months after graduation
- **90% work in managerial** or executive positions
- **60%** of graduates work in an **international environment**
- The initial annual gross salary for SIGMA Graduates is **37500€**

Main sectors of activities

Top 5 industrial branches for Graduates in Mechanical Engineering

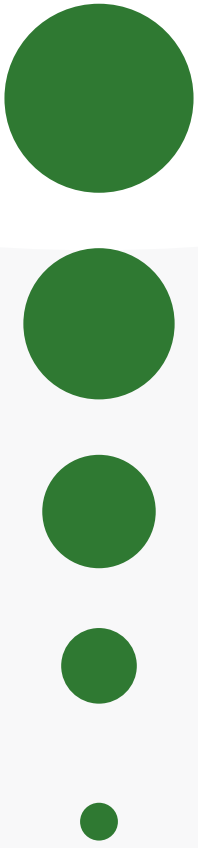
Automotive Industry, Aeronautics, Naval and Rail

Design offices, consultancy

Metallurgy and production of metal products

Rubber and plastics production

Agri-food sector



Top 5 industrial branches for Graduates in Chemistry

Industrial Chemistry

Automotive Industry, Aeronautics, Naval and Rail

Pharmaceutical and cosmetic industries

Metallurgy and production of metal products

Manufacturing of rubber, plastic, mineral and metallic products

SIGMA Clermont Global

With the beginning of the 21st century SIGMA Clermont re-structured and intensified its actions oriented towards internationalizing its activities

This internationalization - the development and implementation of policies and programs in order to integrate international, intercultural and global aspects within the purposes and functions of higher education - is crucial for SIGMA Clermont.

As a leading engineering school, SIGMA Clermont is committed to offering its students an unforgettable experience, and our international education is second to none.

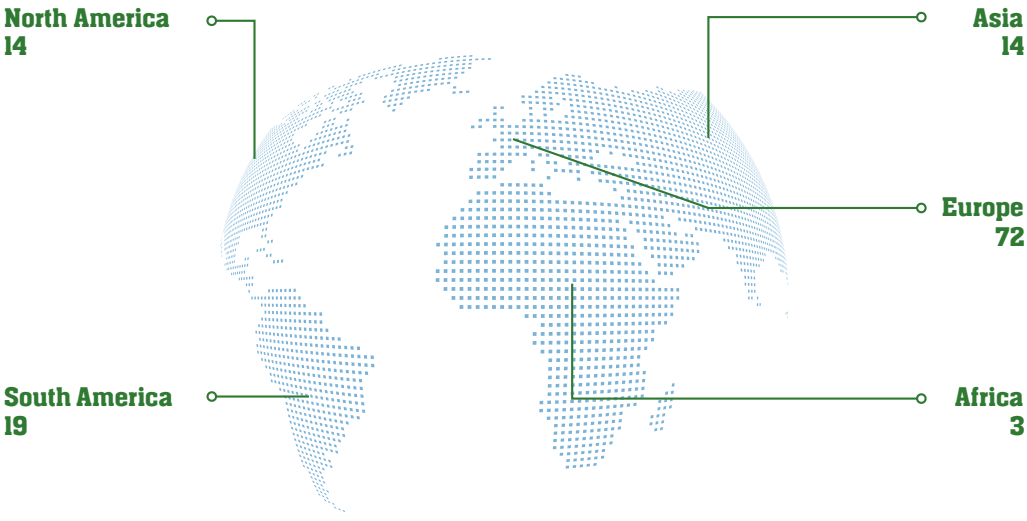
Aware of the benefits of scientific exchanges between SIGMA, the community and other international institutions (such as universities, cooperation agencies, foundations and companies), the school has established numerous agreements, actively participates in forums and seminars, promotes academic and scientific activities and mobility actions, and carries out projects in the fields of education, research and technological development.

SIGMA Clermont boasts strong international network with more than 120 international partner institutions in 38 countries worldwide.

With 100% international mobility for our students, SIGMA Clermont strives to be an example in international education, fostering relations with universities, companies and research centers worldwide. 12% of our students come from abroad.

SIGMA Clermont also offers dual-degree studies, enabling students to broaden their experience with additional specializations.

120+ international agreements



Studying at SIGMA Clermont

Preparing the professional career of our future engineers

Students are recruited after 2 years of higher education through a very selective competitive exam, the *concours*. SIGMA Clermont also proposes preparatory classes in Chemistry, allowing students who pass to enter any of the 20 schools in the French «Federation Gay-Lussac» network.

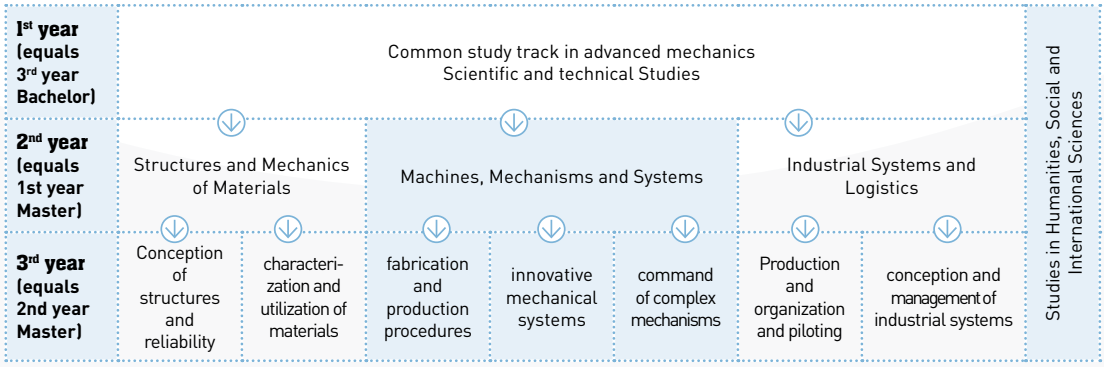
International students can join SIGMA Clermont via a different concours or by direct admission through exchange and dual degree programs.

The SIGMA Clermont engineering school offers a wide range of different specializations.

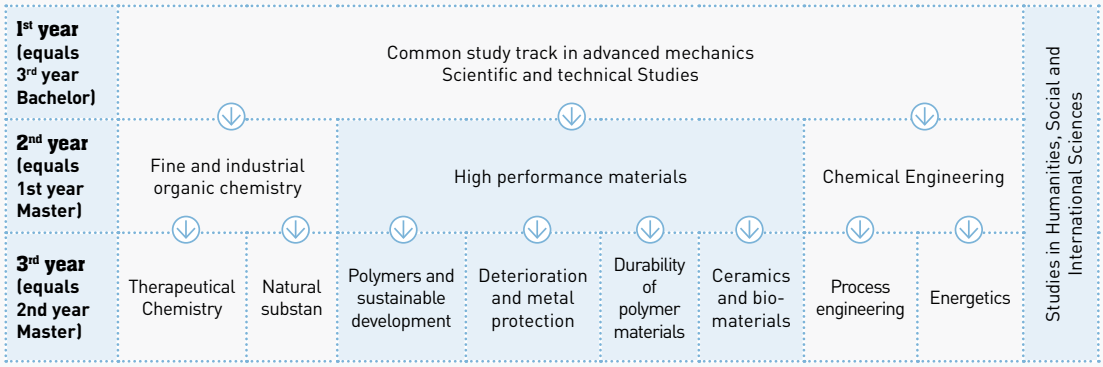
Students in chemistry can choose to focus on Fine and Industrial Organic Chemistry (therapeutic chemistry; natural substances and their applications), High Performance Materials, or Chemical Engineering.

Students studying advanced mechanics may choose between Machines, Mechanisms and Systems, Structures and Mechanics of Materials, or Industrial and Logistic Systems. Additional study tracks enable all students to further specialize in fields such as aeronautics and entrepreneurship.

Mechanical Engineering flow chart



Chemistry flow chart



The 6+1 departments

The specializations taught at SIGMA Clermont are concentrated around 6 scientific departments and one transversal department

- **COFI – Fine and Industrial Organic Chemistry**
  This department prepares students for the needs of the pharmaceutical and cosmetic industries, agriculture and the perfume sector.

- **MHP – High Performances Materials**
  Students specialize in the elaboration, development and evaluation of material characteristics.

- **GC – Chemical Engineering**
  The Chemical Engineering department allows students to gain expertise in industrial processes, production and optimization, as well as effluent management.

- **MMS – Machines, Mechanisms and Systems**
  Students acquire skills in the design, control and performance optimization of complex mechanical systems and manufacturing processes.

- **St2M – Structures and Mechanics of Materials**
  This department prepares students focusing on the design of materials and structures.

- **SIL – Industrial and Logistic Systems**
  Students in this department specialize in the management of production systems or services.

- **MICSE – Transversal department**
  This human science and business-oriented department provides courses in languages, management, personal development, economics and human resources. Classes in this department represent around 25% of the curriculum and are mandatory for students of all scientific orientations.

Additional proficiency tracks

SIGMA Clermont students may also follow additional proficiency courses enabling them to strengthen their skills in specific fields like Aeronautics, Industry of the Future, Materials and Design, Innovation and Entrepreneurship

INNOMECH

An English-language Masters program in Clermont-Ferrand

INNOMECH (Innovative Mechanisms: Materials, Design and Control)

It focuses on advanced materials and mechanism design & control in order to manage complex systems. Research activities are supported by the Institut Pascal (National Center for Scientific Research – CNRS)

The master is designed to promote a high-quality educational offer in the areas of **advanced materials** and the **design and control of complex systems** (with a particular focus **on industrial machines and robots**)

After completion the students will have mastered the different areas of complex mechanisms (such as mathematical modelling, mechanical design, material modelling, control engineering and sensor integration)

The course covers all the main themes necessary to be able to deal with complex mechanisms as a whole, rather than just concentrating on one particular area. Students may take the **master** as a **professional terminal degree**, or to join **PhD programs** afterwards.

SIGMA Clermont and Companies

a strong industrial culture

Industrial relations are an integral part of SIGMA Clermont's identity

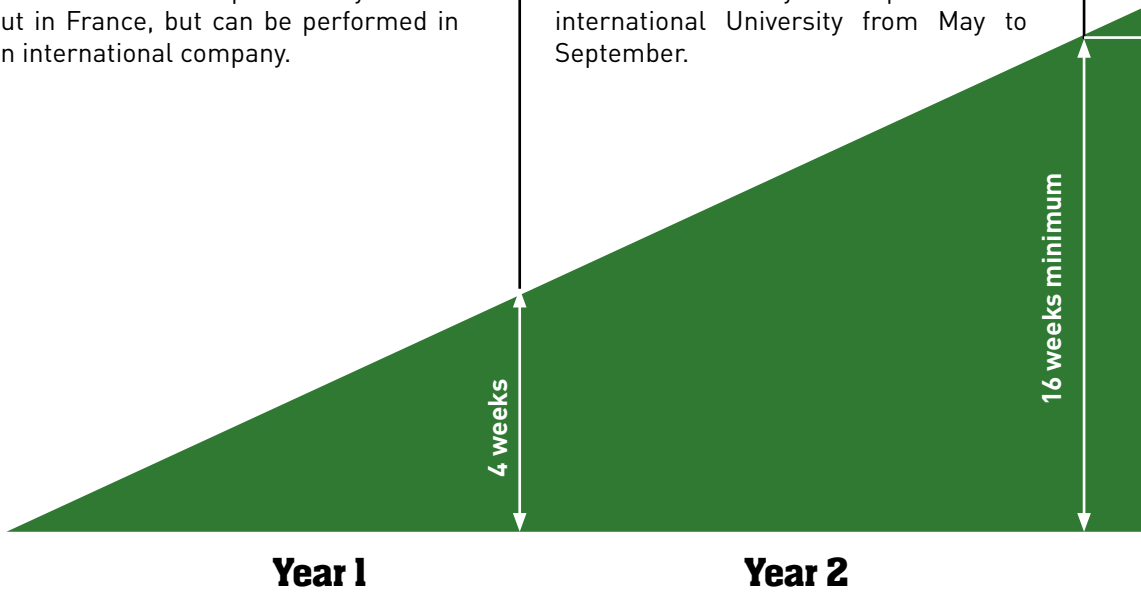
We are training the world's future engineers, and we give them as much exposure as possible to the world of industry and enterprise during their studies, via projects and internships.

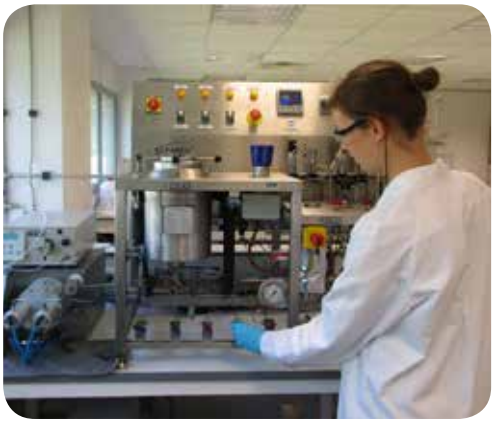
These are a large, obligatory part of our teaching program. Many of these internship periods are carried out internationally; every year students go to over 40 countries.

Internships and Projects

Year 1 - Shop-floor internship (4 weeks)
The internship takes place after completion of the 1st year of studies. It aims to allow the student to discover the industrial environment, the world of production and the way a company works. The internship is usually carried out in France, but can be performed in an international company.

Year 2 - Chemistry Research Assistant internship (16 weeks minimum)
During this internship the student discovers the world of research work, laboratory projects and scientific communication. The students participate in technical studies as part of a research group, providing expected results within a certain time and budget, and with the required quality. The internship takes place after finishing the 2nd year of studies and usually takes place in an international University from May to September.





Optional International Gap-Year SIGMA+ (2 internships with 43 weeks in total)

At the end of their 9th semester, students put into practice, in one or more large rojects, the skills acquired during their engineering and laboratory courses, and enhance their knowledge in specific associated fields.

In the SIGMA+ year, students generally perform two different internships abroad: one in a company and one in a university.

Year 2 - Mechanical Engineering assistant Engineer Internship (16 weeks minimum)

From May to September, at the end of their second year at SIGMA, students in mechanical engineering must perform an internship in a company in France or abroad. During this training period students participate in a technical study, integrating a project team, providing results and respecting specified costs, delays and quality levels. They can also work in an operational position with responsibility, as project team leader.

43 weeks in total

Year 3 - Final-Year Engineering Internship (22 weeks minimum)

After their 9th semester at SIGMA Clermont, students must carry out a final-year internship, usually between March and September. This training period enables student engineers to consolidate their scientific studies and bring into focus their professional objectives. The aims of this internship are:

- Via a real industrial problem in a company, to put into practice the skills acquired during their studies, and to deepen their knowledge in specific fields.
- To assume the responsibility of obtaining a concrete industrial result, within a fixed time-frame and in a multicultural environment.
- To enhance their skills in the management of the resources (both technical and human) necessary to obtain the desired results.

22 weeks in total

Year 2 **Year 3**

International at home

SIGMA Clermont offers its students a unique opportunity to become open-minded engineers who think globally. Our school welcomes more than 26 different nationalities and more than 18% of the teaching staff is international

Languages

Students at SIGMA Clermont have mandatory language classes in English and another second language, such as German, Italian or Spanish.

The school also provides classes in Portuguese and Chinese as a third language option.

Students from SIGMA Clermont must pass official and internationally recognized language certifications in order to graduate (Cambridge, TOEIC, TOEFL, etc.)

Study abroad experience

All students wanting to graduate from SIGMA must have at least one international mobility period (16+ weeks) during their studies. They can opt for an internship abroad or for exchange studies in one of our 120 partner universities.

SIGMA Clermont also offers various dual programs studies with selected partners, covering a wide range of scientific and technological fields such as cosmetics science, robotics, chemical engineering, organic chemistry and mechanical engineering.

Globally responsible students

The International Students Team organizes events and activities around studies and internships abroad. They also play a huge role in welcoming and assisting our international incoming students.

A student mentoring program enables SIGMA students to accompany each incoming international student during his/her stay according to his/her needs.

State-of-the-art equipment

A cutting-edge technology platform of more than 3200 m²

Educational activities, research and technology transfer at SIGMA are centered around a technological platform covering various different technical aspects: testing and trials, measurement,characterization, design, manufacturing and robotics.

Equipped with the same state-of-the-art devices as those currently used in industry and research, our technological platform is used for teaching, research and providing consultancy services to industry. It comprises various high speed multi-axis machine tools, flexible sheet metal cell, milling-turning machine tool, PKM parallel kinematic tool, various industrial robots for machining and finishing, NMR, FTIR, XRD, X-ray fluorescence, LC-MS, GC-MS, DSC. SIGMA Clermont is also one of the best-equipped schools in France for Chemical Engineering, and the only one having a predictive-control instrumented chemical reactor.

FabLab

Since 2016, SIGMA Clermont has had its own FabLab, containing various types of equipment for digital design and the construction of prototypes.

The FabLab is accessible to our students for their coursework but also for their personal projects.

Research
a synergy of competences

As the leading engineering school in Central France, we recognize research and research-led teaching as primary responsibilities of our academic staff. We place great value on fostering and publishing research of the highest quality

The role of our Research and Innovation department is to provide end-to-end services which facilitate and support all stages of research and innovation development conducted at SIGMA Clermont and its research facilities, from the initial funding of the research through to the commercialization of the outcomes, where appropriate.

The Research and Innovation department provides assistance to the school's academic staff in their quest for research funding and other support.

SIGMA Clermont faculty members conduct their research activities within the framework of three high-level laboratories, in collaboration with the CNRS and Clermont-Auvergne University, and cover a broad range of chemical and mechanical research fields.

ICCF

A Research Unit (UMR 6296) created in 2012, the **Chemistry Institute of Clermont-Ferrand** is under the joint supervision of SIGMA Clermont, Clermont Auvergne University, and the CNRS.

It brings together in a single structure over 300 people (77 professors, 17 researchers, 33 Technicians, 60 PhD students) related to almost all fields of Chemistry, gathered in six teams:

- Medicinal and Organic Chemistry
- Inorganic Materials
- Photochemistry
- Thermodynamics
- Bio-catalysis and Metabolism
- Materials for Health

- Budget per year: 3,220,000€
- 60 PhD Students
- 140 publications per year
- 6 patents per year
- Accompanying 2 start-ups: Revlum and INNOPAIN
- Co-founder of Institut Analgesia – Europe's 1st pain research center

LIMOS

The Laboratory for Informatics, Modelling and Systems Optimization (UMR 6158) has three main research branches: models and algorithms for decision making, information and communication systems and decision tools for production logistics.

Institut Pascal

Since its creation in 2012, the Institut Pascal has become a key structure in the field of «Engineering and Systems Sciences» aimed at national and international commitments and with strong links to the socio-economic world.

The scientific backbone of this research lab is composed of four core disciplinary departments. We believe in an interdisciplinary approach to promote innovation at the interfaces. The Transversal Program addresses this challenge and de facto has proven to be the true bedrock of the Institut Pascal.

A nationally- and internationally-recognized Research Center (UMR 6602), the Institut Pascal is under the joint supervision of SIGMA Clermont, Clermont Auvergne University and the CNRS. It brings together in a single structure over 300 people (135 professors, 3 researchers, 33 Technicians, 138 PhD students) related to disciplinary fields in Engineering Sciences (automation, mechanical, electronic, engineering processes) and Pure Sciences (physics, biochemistry), associated in four teams and a transversal program:

- **GePEB Department:** Process Engineering, Thermodynamics and Biosystems
- **ISPR Department:** Image Perception Systems, Robotics
- **MMS Department:** Mechanics, Materials and Structures
- **PHOTON Department:** Photonics, Waves, Nanomaterials

The annual budget of the institute (excluding the salaries of permanent staff) is **€3,3M**, 80% coming from own resources. Every year, 30 new collaborative contracts are signed.

Since 1st January 2017, the Institut Pascal has welcomed a new research theme, Image-Guided Therapies (TGI), involving 3 teams: ISIT - UMR 6284, IGCNC - EA 7281 et PEPRADE - EA 4681.

This thematic diversity favors the creation of a critical mass and a breeding ground for a real multidisciplinary synergy, giving rise to innovative systems and technological creations meeting economic and societal demands (transport, factory and hospital of the future).

The Institut Pascal coordinates the **LabEx IMobS3** (Innovative Mobility of people, goods and machinery) program, and participates in **EquipEx RobotEx** (robotics) and **LabEx GaNeX** (nitride semiconductor element III).

Foundation

A keystone for the school

With strong ideas and concrete actions the Foundation, which was founded in 1991 at the creation of IFMA, comprises more than 60 companies and public institutions. It is thus a historic mainstay of SIGMA Clermont and played a key role in the IFMA - ENSCCF merger

Since the founding of the school, the foundation has taken part in the daily life of SIGMA Clermont:

- Through the foundation the world of enterprise is part of the school's governance.
- Companies are involved in the educational mission.
- During the recruitment process, the foundation helps to assess the students' interest in industry and entrepreneurship.
- Implementation of specific training in leadership, personnel development and management that complements the scientific and technical program.
- Establishing of a mandatory period spent abroad for all students and an advanced mastery of foreign languages.

Every year, the SIGMA Foundation:

- Contributes to the school's daily life.
- Finances an industrial chair for education and research.
- Supports quality and sustainable development management.
- Helps to integrate business professionals in different juries and specialized courses.
- Organizes company visits, conferences and job meetings for students.
- Awards the Foundation Prize for excellence.
- Finances internship and academic periods abroad for students through a special grant.
- Provides the sponsors of the graduation class.

Dynamic Student Life

The Student Office manages around thirty clubs and associations run by and for SIGMA Clermont students, where they can develop their talents as organizers, managers and communicators. These include sporting, outdoor, humanitarian, technological and cultural activities, as well as microenterprises and the organization of events like the annual GALA and the Graduation Day.

Many different areas are concerned by the various clubs and associations which create a family - like atmosphere

- **Sports / Outdoor:** many individual and team sports are available to our students thanks to the Sports Office, which organizes training and competitions on sports grounds near the school.

  SIGMAtelot is concerned with water sports (participation in the EDHEC sailing race); AéroSIGMA is for aviation (BIA and CAEA training programs), and OXYGENE organizes outdoor sports (skiing, hiking, etc.)

- **Culture:** the school has a theatre troop, Comedia del SIGMA, and SIGMA Clermont's musicians can join ZIKMA.

- Two journals (Le Macaque Déchaîné and Le CHMURF) keep everbody informed of the latest news. The BDA, Nunchak'art, International Team and SICom (Sound, Image, Communication) participate in the cultural life of the school.

- **Technology:** the student associations in the field of technical performance are numerous and varied, with Mécaction, SIGMA team Eco-Challenge (2nd-place in the 2014 national prototype challenge), SIGMEKATRO (robotics), Racing, and SIGMoto.

- **Humanitarian, Sustainability:** students can participate in humanitarian actions through associations like AFM Telethon, ACTIS (working with primary schools) Maroc'Ailes (SIGMA student teams participating in the annual 4L Trophy), and Solidarité Internationale des Etudiants Clermontois (construction of a school in Togo). EQUILIBRE team proposes fresh products direct from the market, and other «fair trade» actions.

Clermont-Ferrand

Volcanic by nature

Volcanic by nature, volcanic by culture, Clermont-Ferrand nurtures a close relationship with the dormant volcanoes. It was through them that the city came to life in faraway times

Clermont-Ferrand, part of the Auvergne-Rhône-Alpes Region, is located in the center of France and well connected to Bordeaux, Paris, Lyon and Montpellier.

Clermont-Ferrand is the natural gateway to the vast Massif Central territory, and has a strategic position in the center of France at the crossroads of Europe.

The ancient capital of the Auvergne region has **exceptional surroundings**, between the Puys Mountain Range and its volcanoes, majestically overlooked by the famous Puy de Dôme, and the former battlefield of Gergovia where Vercingétorix defeated Julius Cesar. At Vulcania, Europe's only theme park dedicated to volcanoes, your heart will beat to the rhythm of the universe. To the north are the fertile cereal plains of the Limagne; **to the East, the sun rises over the wooded mountains of the Livradois-Forez, highlighting their remarkable beauty.**

Even though old and rich in history, **the city is perfect for students.** Housing costs are amongst the lowest in France and we at the SIGMA Clermont International Office can find housing possibilities for all our international students. With 470.000 inhabitants in the conurbation area, Clermont-Ferrand offers a **rich cultural and student life**. The public transport system ensures quick connections to make your transit time as short as possible.

The City of Clermont-Ferrand is home to **first-class sports clubs and athletes,** like the top French ASM Rugby Club and world pole-vaulting champion Renaud Lavillenie. And thanks to SIGMA Clermont's numerous student sports clubs, **you can play almost any kind of sport.** Due to its proximity to the mountains, **the city has winter sport resorts** right at its doorstep. With the famous volcano national park right outside the city, Clermont-Ferrand is also a renowned hiking and outdoor spot.

One of the big cultural events of the year is the **International Short Film Festival,** the world's biggest meeting dedicated to short movies and one of the four leading festivals in France. Not forgetting Europavox, one of France's biggest annual music festivals.

Join us at SIGMA Clermont!

Engineering Master's degree (Diplôme d'Ingénieur)

You have several options if you wish to join us for degree-awarded courses: you can apply via programs such as n+i or Campus France, or through specific collaboration agreements (dual degree, etc.).

- Full degree students on program mobility start with the 1st year of Master's level (S7).
- All classes are given in French.
- Courses also include social studies, economics and languages.
- In order to obtain the SIGMA master's degree, students are required to perform two different internships in companies.
- Students wanting to study full-time must register and pay a full tuition fee, although tuition fees do not apply for students coming from partner universities.

We also offer dual degree programs for students from selected partner universities worldwide.

Find more information about course contents and the application process at
www.sigmaclermont.fr/en/admissions

INNOMECH – Master's program

Students may take this one-year master's program in English as a professional terminal degree, or to join PhD programs afterwards.

Exchange studies

Within the framework of our agreements with over 120 universities around the world, you can join us for between one and four semesters for exchange studies and credit-awarded work. European students can integrate SIGMA via the Erasmus+ program, too.
All classes in the general engineering master's program are given in French. Courses in English are available through the INNOMECH Master's program.

Projects / Internships

It is possible to carry out a university project or research internship lasting from 3 months to a whole semester.

- We offer a wide range of topics in different areas in Chemistry and Mechanical and Industrial Engineering.
- Students will have a hands-on learning experience through interactions with teachers, researchers and students.
- This project work / internship can be performed entirely in English. We do, however, recommend that you have a basic knowledge of French.
- The program is also open to certain undergraduate students.
- International students can benefit from our student mentoring program and have access to free French language classes.

SIGMA Clermont
at a glance

950
students

17
dual degree programs

260
graduates per year

120+
international agreements

100%
student mobility abroad

350
students abroad per year in 40 countries

30
students union associations

5500
alumni

27
different student nationalities

SIGMA Clermont

International Office

Pôle scientifique du campus des Cézeaux, Clermont-Ferrand
CS 20265 – 63178 Aubière Cedex – France
international@sigma-clermont.fr
www.sigma-clermont.fr