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The European Commission awards a Jean Monnet Chair to the IDP

The IDP (Development and Prospective Institute) laboratory is one of 5 French teams to have received this label, in recognition of the quality of its teaching and research projects in the field of European Union law. The associated funding will be used to develop both the international and European legal training department (with classes on European law in English) and research projects on competition law, regulated markets and regional policy.

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The TEMPO laboratory is awarded the Label Carnot in recognition of its research partnerships

The TEMPO (Thermal, Energy, Mechanical and Materials, Modelling and Production Processes) laboratory comprises 31 teaching/research staff and 38 PhD students. Their work focuses mainly on issues such as: consumption by motor vehicles, the noise made by a train passing through a tunnel or the reduction of traffic jams. The award of this label of excellence is a reward for the laboratory’s research partnerships with various socio-economic stakeholders, both private and public. Awarded for a 5-year period by the Ministry for Higher Education and Research, the Label Carnot seeks to promote research conducted by public laboratories in partnership with socio-economic stakeholders, especially companies.

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ENSIAE ranked as one of the top 10 engineering schools

ENSIAE has been ranked as one of the top 10 engineering schools with the highest number of students with apprenticeships and vocational training contracts. This is a sign of ENSIAE’s great expertise in this field, acquired over almost 20 years. Sandwich courses allow students to acquire solid professional expertise with a different style of teaching, which is seen as a plus by companies currently recruiting engineers with experience ‘in the field’. At ENSIAE, two of the five specialisations are taught through sandwich courses:
- Industrial engineering
- Electrical engineering and industrial information technology

A PhD student from the materials laboratory wins the international textile innovation prize from the Fondation Théophile-Legrand

Munir Ashraf was rewarded for his research on a self-cleaning, anti-bacterial textile. This 29-year-old Pakistani carried out the work for his thesis in 2 laboratories: Ceramic Materials and Associated Processes (LMCPA) at the UVHC and Textile Engineering and Materials (GEMTEX) at the ENSAIT.
The University is considering the means of transport of tomorrow: safer, more ecological and more accessible

The University’s “Sustainable Transport and Mobility” research centre is harnessing the expertise of two research laboratories in mechanics, materials and automation in order to design the means of transport of tomorrow. Means of transport that will be safer, more ecological and more accessible to persons of reduced mobility.

“‘For a long time, it was believed that automation, i.e. robots, excluded men from society. What we do is the exact opposite: we observe human behaviour in certain situations, such as falling asleep at the wheel or what happens just before a crash, to implement safety systems,” explains Eric Markiewicz, head of the University’s ‘Sustainable Transport and Mobility’ Research Centre.

The human aspect is just what distinguishes this research centre from many other French and overseas laboratories who also work on automation, mechanics, materials and information technology. Through its two laboratories (LAMIH (Automation, Mechanics, Industrial and Human Information Technology) and TEMPO (Thermal, Energy, Mechanical and Material, Modelling and Production Processes)), it develops control, protection and energy saving systems tailored to human behaviour.

 Structures which optimise the absorption of energy from impacts

How can the protection offered by a vehicle in the event of an impact be improved? The research teams are working on the structure of the vehicles so that they can absorb the maximum amount of energy generated during an impact, as well as remaining light in weight to reduce fuel consumption. “This is a new challenge,” explains Mr Markiewicz. “To find materials which reduce the weight of the vehicle without reducing the safety level attained over the last few years.” The Centre has impressive and original on-site testing facilities to characterise the properties of the materials and test the structures. In works particularly closely with C3T-Valutec, a neighbouring private company with a surface area of a few dozen metres, a subsidiary of the University.

 Predicting the risk of injury in the event of a crash

The researchers are also interested in predicting the risk of injury for the persons in the vehicle and vulnerable road users, pedestrians and those on two wheels. They are attempting to create a virtual model of the human body. Several countries are contributing, with each focusing on one body part. The studies in Valenciennes concern the bone structures of the skull, thorax and upper limbs. “We are interested in the upper limbs, because we have observed that, when a crash is just about to occur, while attempting to avoid an accident, people’s forearms often make contact with the driver’s airbag unit. There is then a risk of trauma, or even the forearm being smashed against the face when the airbag is deployed at almost 200 km/hour.”

The University of Valenciennes hailed as an ‘Innovative Campus’ in the field of sustainable transport.

The Ministry for Higher Education and Research has awarded four “Innovative Campus” labels, including one to the University of Valenciennes and Hainaut-Cambrésis for its sustainable transport project. It rewards 25 years of work in this field and reinforces the ambitious approach launched with the creation of CISIT in 2007 (International Transport Safety and Intermodality Campus) within the framework of the State-Region Project Contract. CISIT coordinates transport-based research conducted by twelve regional laboratories.
But the topic is extremely complex to master, as the scientist explains.

Bones’ resistance to impacts differs greatly from one person to another. Results may also vary dramatically with just one person, as the skeleton is constantly changing, with old cells being more or less replaced by new ones. However, the researchers are working on how to take these variations into account. In ten or fifteen years, car manufacturers around the world will doubtless use the virtual model of the human body, to which the Research Centre of the University of Valenciennes contributed, to improve vehicles and their protection systems.

The sizes of today’s vehicles are based on dummies, which only represent a maximum of 60% of the human body. Using driving simulators, we are focusing on the atypical positions of an individual and his/her ‘reflex movements’ when a crash is about to occur, in order to adapt the restraint systems.

How can you get into a vehicle if you have back problems? How can you turn the wheel if you have problems with your shoulder or elbow? The laboratory has been working with Renault on the ergonomics of accessing the driver’s seat for persons who find it hard to bend and with the Japanese company JTEKT, the world leader in enhanced steering wheel assistance for disabled persons.

Protecting the environment is another key area for the Research Centre. One PhD student at the TEMPO laboratory is working on greener lubricants for pressing sheet metal for cars within the context of an industrial partnership contract. In just a few years, car manufacturers could be using this product. “We are also optimising the injection control commands for a hybrid combustion engine which consumes less fuel and emits less pollution”, adds Thierry-Marie Guerra, director of the LAMIH laboratory. Whereas a company, Valéo, is designing the structure of the start-stop system, the laboratory is drawing up the energy distribution law (electrical and thermal energy).

Many other partnerships link the “Sustainable Transport and Mobility” Research Centre with French and overseas companies. Toyota is a partner for studies into polymers for pedestrian impact, while Alstom and the I-Trans competitiveness centre are working on the transformation of the thermal energy given off during the braking of TGV high-speed trains. Valéo is contributing to the work on the greenest hybrid vehicle.

The University of Valenciennes houses a part of the RAILENIUM Technological Research Institute at its Mont Houy campus. This European rail infrastructure institute has been selected by the government, along with five other projects. It will receive 550 million Euros from the State, local authorities, manufacturers and training and research establishments to help the French and European rail industry become a leader in terms of Research and Development and Innovation. Bringing together the best public researchers and manufacturers in France (and soon Europe), it will provide the only equipment and research platforms of their kind in Europe: 7 km rail test circuits located at Bachant, tramway test tracks, fatigue test circuits, dynamic test benches, tertiary centre etc.

“A European rail research institute. Coming soon to Valenciennes!”
Ceramics can help; make no bones about it!

The University’s Materials, Ceramics and Associated Processes Laboratory is working on bioceramics capable of rebuilding human bones.

Explanations.

Over a million bone transplants are carried out in Europe every year to repair compound fractures, replace a bone afflicted by cancer or bacteria. For around fifteen years, surgeons have preferred an artificial material, bioceramics, to autologous bone grafting or animal bones which were widely used in the past. “In medical terms, bioceramics have a great deal of advantages,” explains Dr Michel Descamps, head of the biomaterials team. “Their chemical composition is very close to that of bones, they can be assimilated by living tissue and encourage bone regrowth, while being porous, or even biodegradable. In technical terms, unlimited quantities are available and the quality is constant because we are in total control of the chemistry of the materials.”

Biomaterials recolonised by natural bone
The University of Valenciennes and Hainaut-Cambrésis is a genuine leader in this field. Its Materials, Ceramics and Associated Processes laboratory has been working on this subject since 1995. The first challenge faced by the laboratory was to create bioceramics with both macroporosity and interconnected porosity, enabling bone cells to fill all the holes, right up to the heart of the patch. The reformed bone thus stabilises the artificial element, which may be absorbed entirely after a few months or years, depending on its composition; it will then be replaced by a newly formed, 100% natural bone.

Technical expertise
The laboratory then proceeded to synthesise powders included in the composition of the ceramics, which it used to buy at high prices and variable quality from the United States and Japan. It took several years to be able to control all the synthesis parameters of these powders. Its latest work seeks to protect the newly formed bone from bacterial attacks. The development of even finer microporosity, from 0.5 to 1 microns in size, will enable scientists to fill the biomaterials with antibiotics. The latter will resist bacterial attacks during the surgical introduction of the implant. Researchers from Valenciennes also introduce ‘doping products’ into the powders, silver and copper, which act as bactericides. Lastly, phage therapy uses genetically modified viruses to attack the targeted bacteria.

Biomaterials: bioceramics and bio-glasses, developed for a wide range of clinical applications, such as bone replacement.
Thermomechanical and piezoelectric ceramics, used in massive form or as a coating to improve the properties of materials.
Since 2003, the laboratory has also included an evaluation unit for companies to assess its activities.

Mann has always needed to replace the missing parts of the skeleton. Thousands of years ago, he used gold, brass or wooden legs. A branch of science began to be developed 20 or 30 years ago from the demand for biomaterials.

Another application with ocular implants: a macroporous sphere, decorated with an eye pattern, replaces the missing eyeball. Surgeons can sew muscles onto the ceramic to make the replacement eye mobile.
From the coal mine to the image mine

The University of Valenciennes and the community of the Porte du Hainaut conurbation are creating the Image Factory. This is a space dedicated to research and innovation for the cinema, broadcasting technology and digital media, located in Wallers.

"When we talk about jobs in television or cinema, we are often thinking of directors, writers and actors. In fact, most of the jobs in this fields are technical," explains Sylvie Merviel, head of the DeVisu (Visual and Urban Design) laboratory at the University of Valenciennes and Hainaut-Cambrésis. For 4 years now, she has been responsible for a project to situate the University’s research component and audiovisual training programme within a regionally oriented technological centre. Her dream is now about to become reality. The University of Valenciennes and the community of the Porte du Hainaut conurbation have signed an agreement to create a site dedicated to research and innovation for the cinema, broadcasting technology and digital media: the Image Factory.

The old mine at Arenberg

The site chosen is exceptional and lies barely 10 km from where the University’s audiovisual facilities are currently located. It is the former coal mine at Arenberg, in Wallers, which first came to prominence during the filming of Germinal by Claude Berri. It has since been the setting for a range of other films: Moi, Louis, Enfant de la Mine; L’Oeil de l’Astronome; La Compagnie des Glaces etc. The buildings are now classed as historical monuments and protected by UNESCO. “The space was identified by experts from the cinema and audiovisual industries as soon as it ceased its activities. The mine closed in 1989 and Claude Berri filmed Germinal there in 1993,” explains the specialist.

The project begins

The project, one of the most important in the Hainaut region over the next few years, has now begun. The building contracts have been awarded and the work will finish in 2015. The Arenberg mine employed almost 2,000 during its peak years and soon, we hope, just as many image and digital professionals will find work here.

Cutting-edge expertise in creating images and digital effects

The University has set up its research centre in a 400 m² building, nestled between the mine headframes and a stone’s throw from the levelled slag heaps, home to some fifty lecturers/researchers, young researchers and Master’s 2 students. This move from Mont Houy sur Wallers will raise the University’s profile and its first-class infrastructure will allow it to welcome greater numbers of foreign researchers. The Image Factory will also house an incubator for innovative businesses, film sets and a cultural, technical and industrial centre open to the public. A kind of museum of the image. “We will display the first studio handy cameras and cutting-edge technology, such as motion capture systems which can create animated characters more real than nature itself or drones providing images like you have never seen before,” explains Sylvie Merviel.

Electronics and IT professions are as important for television and the cinema as artistic roles.

Focus on the University’s audiovisual department

For 30 years, the University has developed a solid reputation in the field of vocational training for sound and image-related professions. The skills and versatility of its graduates are appreciated both in France and abroad by television channels, production companies etc. depending on the specialisation chosen.

- **Bac + 3 training**
  - Bachelor’s degree in Information Sciences, Broadcasting Technology and Digital Media
  - Professional bachelor’s degree JORIS - Sound and Image Journalist/Editor

- **Bac + 5 training**
  - Master’s in Digital Sound and Image Editing (TRUCIS)
  - Master’s in Audiovisual Communication Management (MCAV)
  - Master’s in Sound and Image Systems Engineering (ISIS)
Designing products and services with the Faculty of Sports Sciences and Professions

Geared towards companies and research, the Master’s in “Engineering and Ergonomics of Physical Activity” has a range of innovation-developing manufacturers as partners, such as Oxylane (DECATHLON), Damart and Ciel Bleu.

The Master’s in ‘Engineering and Ergonomics of Physical Activity’ (IEAP) is training its third class of students in the design of products and services. Companies play a major role in this course: they participate in the design of the modules, welcome students doing work placements or sandwich courses and their staff deliver lectures.

“Some of our partners design products, such as Damart and Oxylane, while others provide services, such as Ciel bleu for the disabled,” explains Franck Barbier, head of the Faculty of Sports Sciences and Professions (FSMS).

▶ Vocational and research Master’s
The Master’s degree in IEAP also stands out from the crowd through the freedom awarded to each student when it comes to weighting the research and vocational parts of his/her training. Some choose the corporate world (policy officers), while others prefer research (research engineers). When the course ends, some are directly hired while others may carry on and do a PhD.

▶ Improving products for companies
In order to understand the jobs chosen by young people, it is necessary to consider them prior to the creation of the product or service in question. They design or optimise the physical properties and ergonomics of the products, while the designers are then put in charge of integrating the new characteristics. Here is just one example: the students have optimised sports footwear products. The results have led to the submitting of a CIFRE (Industrial Training through Research Agreements) to Oxylane to extend the initial studies.

▶ Going the extra mile
In order to really follow through on their ideas, the FSMS partner companies can call on PhD students, who are carrying out CIFRE theses, as well as on the skills of the Automation, mechanics, industrial and human information technology laboratory (LAMIH - UMR CNRS 8201).

The DEMOH team: The Decision, Emotion and Human Motor Functions team are specialised in the ergonomics and sciences of movement.

The CIFRE thesis
For over 30 years, the CIFRE - Industrial Training through Research Agreements - has subsidised any French company which hires a PhD student, giving him/her a key role in research cooperation with a public laboratory. The work culminates with the viva of a thesis after three years. Half of the funding for the CIFRE theses comes from the Ministry of Higher Education and Research and the other half from the company where the PhD student carries out the work for the thesis.
The Oxylane group (DECA THLON) has been a partner of the Faculty of Sports Sciences and Professions for around fifteen years. It participated in the design of the “Physical Activity Engineering and Ergonomics” (IEAP) Master’s and regularly welcomes students into its product research and design teams. “Even ten years ago, Oxylane and the University of Valenciennes were already working together on the carrying bags. Nowadays, our collaboration is based on the design of sports shoes,” explains Nils Gueguen, head of the Oxylane laboratory.

In order to design our products and innovate, we need to understand the human body during sport. UVHC has cutting-edge expertise in this field,” states Nils Gueguen. Since its creation in 1976, the Oxylane group has chosen to work to ensure the well-being and safety of sportsmen and women, irrespective of the product cost and the level of discipline practised.

Few universities offer a vocational Master’s in sports sciences and professions combined with biomechanics and the product-based approach.
Researchers taking care of our communications signal

A group of researchers from Valenciennes are offering original solutions to optimise the performance of telecommunications systems.

Being a long way from the telephone exchange can be a real disadvantage when it comes to receiving high-definition television via ADSL. The further away from the telecommunications exchange the subscriber is, the more performance will deteriorate. A group of researchers from Valenciennes are improving the visual quality of the images and extending the signal broadcasting zone to a larger number of eligible customers. They have actually developed a system which adapts the signal data rate to the characteristics of the telephone line and optimises the broadcasting parameters.

Improving digital communications and radio frequencies

This group, known as COMNUM (Digital Communications) is part of the opto-acousto-electronic (OAE) department of the Electronics, Microelectronics and Nanotechnology Institute. It works on improving digital communication and radio frequencies and its fields of application concern multimedia broadcasts, multicellular networks and radio-over-fibre communications. Recently the COMNUM group overcame a real challenge. They designed a communication system which ensures the highest current data rates with wireless connections, e.g. between a camcorder and HDTV screen.

Transport that communicates

The group also works on intelligent transport. For example, it is developing an anti-collision radar for road vehicles capable of detecting the nature of the obstacle (motorbike, pedestrian, motorway crash barriers etc.). The radar system designed by the group indicates to the driver all the obstacles detected in a 360° radius, using spatialised alarms (3D sound). The system is being developed within the framework of a project known as I-Trans.

Intelligent radio on trains

Finally, an ANR* research project on cognitive radio for railways is currently in development. It seeks to make radio systems able to adapt automatically to the various broadcasting standards and systems available (GSM, EDGE, LTE, Wi-Fi, WiMAX etc.). It is bringing together academic partners and manufacturers, such as IFSTAAR, THALES, Télécom Bretagne, EURECOM, SNCF, Labsticc etc.

*ANR: National Research Agency
Biomechanics to tackle back ache

Imen Bourigua, a 26-year-old PhD student at the LAMIH* research institute, is introducing biomechanical sciences at the Functional Rehabilitation Centre at the Polyclinique du Parc in La Rougeville to help doctors diagnose patients with chronic lumbago.

What exactly is the research work you are doing about?

Imen Bourigua: My research is a biomechanical analysis of the movements of persons with chronic lumbago, in other words people suffering from acute lower back pain. In a nutshell, the LAMIH and I are attempting to complete the doctor’s diagnosis so that he can better tailor the treatment to the patient’s situation and developments.

Why have you chosen the LAMIH laboratory to conduct your research?

Not only have I found an excellent support team and great colleagues, but also a wonderfully well equipped laboratory. In addition, I was immediately interested in the field we wished to cooperate on. For all these reasons, I signed up for a three-year thesis.

You divide your time between the laboratory and the Polyclinique du Parc in Saint-Saulve. What is your role at the clinic?

I am part of the medical team and carry out tests on the clinic’s patients. In a room equipped with a movement analysis system comprising ten infrared cameras, the patients execute six movements which are recorded in three dimensions and analysed by a calculation program designed by the team at the research laboratory. We then determine the range of motion of the back, the movement speed and rhythm. I conduct this test seven times on each patient: before the treatment, at the start, during, after and several months later (3, 6 months and 1 year).

How are your results interesting in medical terms?

The objective, detailed and quantitative data we obtain enable doctors to have better knowledge of their patients and be certain of both their diagnosis and treatment. Our movement analysis system provides non-observable and targeted information that cannot be obtained with any other tool, such as movement speed and rhythm. Doctors can then adapt their treatment because they have more precise knowledge of the development of the disorder. My thesis is the second financed by the Polyclinique du Parc, within the framework of an industrial convention on training through research (CIFRE); this proves how useful it is.

What are your professional plans after you finish your doctorate?

I would like to teach biomechanics at the University and continue my research activities. I am fascinated by this science because it can be applied to so many other fields. It was used in sport to improve the performance of both athletes and equipment and is now used in ergonomics and the medical field.

* LAMIH: Automation, Mechanics, Industrial and Human Information Technology laboratory

Industrial Conventions on Training through Research

The CIFRE - Industrial Conventions on Training through Research - system has never stopped growing since its launch. Its purpose is to contribute to the innovation process of French companies and their competitiveness. It promotes exchanges between public research laboratories and private companies, both large and small.
What is CAD?

The University of Valenciennes and Hainaut Cambrésis is involved in international research programmes. Within the framework of the European programme Eurostars, the University is preparing new computer-assisted design tools.

CAD is everywhere: aeronautics, automobiles, the design of household objects, jewellery etc.

Researchers from the Universities of Valenciennes and Bologna are joining forces to improve CAD tools, both software and interfaces (pens, drawing arms etc.). In Valenciennes, two teams from the mathematics (LAMAV-CGAD) and automation (LAMIH-ASHM) laboratories are tackling this issue. The first team is developing user friendly software tools that represent and deform surfaces in a highly intuitive fashion. The second team is designing a haptic interface which supplies a detailed perception of the efforts exercised on the computer-designed object and is financially accessible. There is a strong industrial component to the project, through the input of the Italian company, SAFE, and it includes other partners, such as Golliat, a jewellery firm from Lyon, or Exel, which markets new interfaces in Italy.

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A haptic interface gives the user the impression of working in direct contact with the virtual environment. It allows the hand to feel the shaking, resistance and deformation of the virtual object.

Automatic, Mechanic and Human IT (LAMIH)
75 teacher researchers
Skills:
• Modelling, command and supervision of industrial and human-centred systems with an automated approach
• Modelling of procedures, structures and the behaviour of materials with a mechanical and impact biomechanics approach
• Cognitive psychology and ergonomy
• Design and simulation of distributed information systems, interactive decision-support systems and embedded systems with an IT approach

Mathematics and Related Applications (LAMAV)
39 teacher researchers
Skills:
• Algebra and the theory of numbers
• Partial differential equations
• Computer-assisted geometric design
• Geometry and global analysis
• Probability and statistics
• Algebraic topology

“Virtual reality interfaces are the future of industry.”
Researchers sharing their innovations with manufacturers

Publications are not the only way for the University to enhance the value of its research results. The laboratories also answer calls for projects and file patents. Here are two examples of innovations made available to manufacturers.

**Ultrasound waves to check the quality of coatings**

It is possible to understand how the covering of an aircraft ages or how thick the coat of paint on a car is. A research team from the Electronics, Microelectronics and Nanotechnology Institute (IEMN) has developed an ultrasound sensor which beams waves onto the surface of the materials. It will enable the detection of flaws in the coating, to understand how it will behave in the event of deformation and check its adhesion without damaging it. “Materials are evolving. The use of thin coatings and coats of paint is in increasing demand in the aeronautics, automotive and housing sectors in order to improve the durability of structures, their resistance to wear and stress etc. Manufacturers need inspection techniques capable of follow this evolutions,” explains Marc Duquennoy, head of the Transduction, Propagation and Acoustic Imagery (TPIA) research group. In addition to its adaptation to new materials, this technology can be implemented at a reduced cost and allows the harmonisation of wave frequencies so that one sensor can fulfil several different uses.

**Recovering the energy from vibrations**

We often hear about wind or solar power. Another source of free, renewable energy is currently being explored by University researchers: vibrational energy. A team from the Materials, Ceramics and Associated Processes Laboratory (LMCPA) has invented a new form of piezoelectric ceramic in a spiral form, which recovers electrical energy from vibrating structures: machinery, vehicles, human movement, drafts etc. “In energy terms, independent pieces of equipment are useful when you are far from the nearest energy source. They can also help avoid the use of batteries,” explains Mohamed Rguite, who coordinated the project. They can be found in many places: in mobile phones, automotive, railway and aeronautical control systems and even in sports equipment which display information about a sportsman’s health, based on the energy of his movements. Spending one means saving the others!

A new Supercalculator for Research!

The University has just upgraded its intensive calculation equipment by purchasing a next generation cluster.

This equipment is in line with the mid-sized computing centres in the Nord - Pas de Calais Region, a key structural element in the development of the national intensive calculations for research network. It is financed within the framework of the “intensive calculation” section of the State/Region Noropale project, with support also provided by the ERDF. The types of treatment which require increasingly smaller models, especially in the field of transport, concern, for example, thermal, energy, mechanic and material approaches, crash simulations, forming and production processes, rupture modelling, the effect of fluids on solid deformation. By way of example, the fields of applications range from mechanics to fluids and from digital simulation of the human body in the event of collision to models of microscopic views of bones or the study of the physical and digital model of the human head for crime scene reconstructions. These calculation methods are open to all fields of applications which require increasingly longer treatment times or the handling of massive amounts of data.

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A strong link between the University of Valenciennes and Poland

For several years, the University of Valenciennes has been exchanging students and teachers with Polish universities. **Joint interview** with two professors teaching in Valenciennes and Poland.

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**The University of Valenciennes and Hainaut-Cambrésis has close ties with the Polish universities of Silesia and Katowice. What has been your experience of these partnerships?**

**Aleksandra Chrupala:** The University of Silesia signed a cooperation contract with the University of Valenciennes in 1999. It works very well, because our Polish students regularly go to Valenciennes and every year we receive French lecturers. We currently have a student in the Faculty of Letters, Languages, Arts and Humanities for a semester.

**Joseph Hanna:** A cooperation network has been developed over several years between the Faculty of law, economics and management at the University of Valenciennes and the University of Economics in Katowice. Every year, two or three French students head to Poland and a slightly smaller number of Polish students are welcomed by our economics department.

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**You are both professors who like to travel.**

**Aleksandra Chrupala:** I spent a week in Valenciennes in spring 2011 in the Faculty of Letters, Languages, Arts and Humanities. Like all the Polish students and lecturers who have spent time in this faculty, I was delighted by the warm welcome and returned home with a very positive impression.

**Joseph Hanna:** For the last 6 years, I have gone to Katowice every year to teach economics and hold discussions with my Polish colleagues. I have also made some interesting contacts in the research sector, especially the chair of regional economics and the chair of operational research, one of the university’s real strong points.

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**What have you learned from your visits?**

**Aleksandra Chrupala:** I was really struck by the differences in the educational systems. Students from Valenciennes are more independent and autonomous than students in Katowice. They choose their course and lectures; they must take responsibility.

**Joseph Hanna:** These experiences always provide you with valuable lessons. They remind us that there are other ways of doing things and that the way of understanding a subject may vary from one country to another.
What do you bring to the students you visit?

Aleksandra Chrupala: I teach French students a theory developed and used almost exclusively in Silesia. It is a description of language based on logic. This is an added value of our university, which French students cannot learn anywhere else, since, although this theory is known around the world, it is rarely included in university curricula. I am delighted to help them make use of it. I also give linguistics lessons in Quebec French; this is a ‘bonus’ which supplements their other studies and they really enjoy it.

Joseph Hanna: I choose my lectures with my Polish colleagues so they can be seamlessly fitted into the curriculum, while remaining original. Together, we have decided to focus on game theory and its economic applications which are little used in the mathematical models currently being studied in Poland. I am aware that the university has a wide geographical presence, thanks to the organisation of the University of Valenciennes et du Hainaut-Cambrésis, and therefore also give lectures in some of the decentralised university facilities in Poland so as to make the teaching accessible to students who may live a long way away.

Have you had to face the language barrier?

Aleksandra Chrupala: No, because I am lucky enough to speak fluent French, since it is the language I teach. As far as possible, I resist the tendency to anglicise all the lectures; there is no sense in explaining a French linguistic phenomenon in another language.

Joseph Hanna: If the subject is technical and the students have mastered the basics, the language barrier can be overcome and we understand one another without difficulty. However, I have chosen to give my lectures in English and produce a written document in order to make it easier to disseminate the contents.

How can you strengthen the exchanges between your universities?

Aleksandra Chrupala: We explain to our Polish students that Valenciennes is a good choice because there are language specialists, our regions are alike, the subjects on offer are closely linked and the welcome could not be warmer. We encourage French students, especially those studying applied foreign languages to come to Poland because the University of Silesia can give them access to a large number of foreign languages and applications.

Joseph Hanna: I try to convince other lecturers of the benefits of these trips. I brought one of my maths colleagues along on my last trip. I also encourage cooperation between our two universities on the subject of transport, because they are both home to highly-skilled experts.

The University has a partnership with six Polish establishments

Poland has been a partner country of the University for a long time. The international relations department has enabled fifty-eight French students and sixteen French lecturers to move to Poland. It has welcomed thirty-nine Polish students and fourteen Polish lecturers. The University departments have student and staff exchange agreements with six higher education establishments in Poland for the 2007-2013 period (ERASMUS programme). Students in engineering sciences and management will also carry out work placements or conduct research projects with Aistom in Chorzow and Elbag, General Motors Manufacturing in Gliwice, Faurecia in Legnica etc.

JUST THINK OF IT!
Teaching mobility is also open to the staff of a company invited by an establishment. For example, the HR department of a partner company can offer a staff management course overseas.

Contact: University international relations service international@univ-valenciennes.fr

These experiences remind us that there are other ways of doing things and that the way of understanding a subject may vary from one country to another.
An internationally renowned researcher at the University

The University of Valenciennes has attracted one of the world’s greatest specialists in the field of distributed systems. Vittal Prabhu, professor at the University of Pennsylvania (United States), spent two weeks at the TEMPO laboratory.

Most organisations are directed by a head or supervisor, but what happens when s/he is missing? How can you ensure that the structure is not weakened and that performance is maintained when the head is not there? This is the problem addressed by the distributed approach, which helps units of these organisations to make decisions locally without needing to refer them to the manager. It also makes organisations more responsive and smoother.

─ International recognition for the University
In this field, the American researcher, Vittal Prabhu, is considered a reference and regularly quoted in scientific articles. His visit to the TEMPO laboratory was both a surprise and a source of pride to Damien Trentesaux, head of the PSI (production, services, information) team. He tells the story: “Vittal Prabhu sent me an initial email two years ago after I organised a special edition of an international magazine devoted to our mutual research field. He asked if he could meet the TEMPO laboratory team. I was flattered, because it is rare for an American researcher to be interested in French research work”. In fact, TEMPO has been working for several years on autonomous and intelligent systems, particularly in industry.

─ A wealth of ideas
Vittal Prabhu came to the University of Valenciennes as a guest professor. He reacted to the research subjects of the teams in Valenciennes and coordinated the plenary session of a conference organised by the laboratory. He was happy to reveal how much he enjoyed his trip: “by working with the PhD students, I thought up new ideas such as the use of TEMPO’s control theory in a wider context or the use of mathematical models designed for industry in the healthcare field”. For the University, this visit is proof of the international recognition of its research work. It will also lead to the publication of a reference book, written with other guest professors and bringing together all the knowledge of the European and American research networks.
International students can feel at home

University students are active and dynamic in every field. A group of ten of them, under the auspices of the ‘ESN Valenciennes’ association (Erasmus Student Network), are responsible for welcoming and integrating their foreign counterparts.

The University of Valenciennes and Hainaut Cambrésis is a study destination for some fifty students every year. 900 are currently present in the various training units. In addition to the high-quality teaching, they have doubtless been attracted by the spirit of fun and solidarity fostered by the ‘ESN Valenciennes’ association. It was created in January 2010 to support students from the four corners of the world and has around ten active members.

First mission: to ensure students are welcomed as soon as they arrive in France

The association offers assistance to all foreign students to facilitate their settling in, use of UVHC services and meeting other young people. “We welcome students at the station, guide them to their room and help them fill in the administrative documentation. We have also made a habit of inviting them to have a drink with us in town so we can show them Valenciennes and save them from spending their first few hours alone in their room,” says Gauthier Verborgh, president of the association in 2012. The ESN also offers clever and handy services to students who have just arrived. For example, it can provide them with a SIM card, so that they can immediately access a telephone line, or sell them affordable kitchen utensils left by international students who have gone home.

Raise the awareness of French people to foreign languages

The association also tries to bring cultures together and promote a desire among French people to travel and learn foreign languages. Thus, throughout the year, it takes part in international events at the University, such as the European Day of Languages and the Day of the Student. In late 2011, it organised the first edition of its international Christmas market. Foreign communities were able to present festive food and typical dances from their countries. The organisation of the event was a real success, but the association also derived genuine benefits with regard to its desire for greater openness. “We have made contact with students from Vietnam, China and even Wallis and Futuna, who are often harder to get in touch with than European students involved in an exchange programme,” Gauthier explains.

“\nWe benefit from a powerful international network, with over 350 sections spread across 34 countries. Whatever the region where we take our students, we can help them meet other students from all over the world.\n”
DREAM, the “audiovisual and multimedia” department

The future stars of the image, sound and digital world

For over 35 years, the University of Valenciennes has been training image, sound and digital professionals at bac + 3, bac + 5 and even bac + 8 levels. They can be found everywhere, often in important positions, on French and overseas television channels, in production or post-production companies, web designers, technical service providers etc.

Training that is both original and unique in France
By creating its technique-oriented audiovisual department in 1977, the University caught all the other French training courses by surprise. “We ensure that our students master the techniques, we don’t talk to them of art, but of programme industries,” says Sylvie Merviel, head of Audiovisual and Multimedia Development, Research and Teaching (DREAM) and scientific advisor to the Ministry of Higher Education and Research. Most other audiovisual training courses, however, are delivered by art or cinema institutes or university departments and are more focused on the aesthetic and creative aspects.

In the digital age, the technical is essential
Fortune favours the brave. Firstly, our students have always forged a successful professional career. It must be stressed that television produces many more programmes than cinematographic works and that these film sets employ two hundred technicians, compared with three actors. In addition, technological developments have vindicated the University’s decision: in the digital age, it is absolutely essential that sound and image professionals master digital tools, IT, signal processing etc.

Big stars
The DREAM department has trained 1,300 graduates over 35 years. They can be found in key posts in every French television channel: technical director at TF1 or Canal Plus, centre managers for France 3, Grand Lille TV and Wéo. They are also technical service providers, web designers, constructors (Sony, Harrys and Grass Valley for example), employed in a wide range of private production and post-production companies. Their training is mainly “in the field” with their cameras perched on their shoulders. “Rather than a theoretical course on framing, we prefer to give our students a camera so that they can compare their images with those of others. It is from their mistakes that they derive the true benefits of the teaching,” Sylvie Merviel points out. Lecturers who are actually employed in the industry deliver 70% of the classes at Master 2 level.

Cutting edge technical facilities
DREAM has broadcasting equipment that very few other French universities possess: infographics rooms, video studio, virtual editing station, sound editing and mixing studios and stations, digital cameras etc. The department can also use the University’s heavy equipment, such as the motion capture system.

The “audiovisual and multimedia” training offered by the University’s Institute of Sciences and Techniques (ISTV) focuses on the practical and working in “real” conditions. Highly-qualified professionals are there to support our students from Bachelor level and above, with impressive technical facilities.
Professionals training future “pros”

There is only one Bachelor’s degree in Information Sciences, Broadcasting Technology and Digital Media in France: that offered by the ISTV in Valenciennes. In three years, this foundation training course provides all the students with a scientific, technical and technological approach, combined with a dash of cultural sensitivity and humanity.

Four specialisations
At the end of the second year of their Bachelor’s degree, students can choose a vocational Bachelor’s: the “Sound and Image Journalist/Editor” vocational Bachelor’s. Other specialisations can be chosen at Master’s level. The most technical of the three courses concerns “Sound and Image Systems Engineering”. This is a very popular course, the only one of its kind in France. Graduates from this training course work, for example, on the integration of interactive digital audiovisual systems into the plans for the Dubai museum, drawn up by the architect, Jean Nouvel. The Master’s in “Audiovisual Communication Management” produces versatile graduates, capable of intervening at all stages of a drama series, documentary or institutional film with a great deal of autonomy. “Television channels and production companies recruit them because they are capable of shooting scenes or completing the editing, while also being responsible for production,” explains Michel Pommeray, the director of studies. The third specialisation, “Digital Images and Sound Effects Designer”, attracts around twenty students every year. The field? Sound and image post-production, as well as digital special effects with the mixing of natural and synthetic images.

Focus on employment prospects
Almost all the graduates from the audiovisual department at the ISTV find work within a year of the end of their studies. Those who do not generally have very specific plans which require a little more time to be realised. They are well prepared for the job market. Catherine Viviez-Place, associate lecturer responsible for employment, helps young people at the end of their studies to ‘express’ their passion and career preferences. She trained as a lawyer, but is also a consultant/trainer/coach in HR and Management. Since the start of the 2012-2013 academic year, she has given individually coaching to around fifty Master 2 students. Results: 65% of them received two, three or even four work placement offers. They can also rely on an active and supportive network of 1,300 alumni, some of whom hold important positions in the media around the world.

What jobs are there?
- Information: audiovisual journalism
- Engineering: system design and sound/image broadcasting
- Post-production: editing films and programmes
- Production: production, programming and broadcasting management

“Each class works like a school. We limit the number of students in the first year of a Bachelor’s degree to fifty to ensure the coherence of the group and a pass rate of over 90%.”

Not to forget continuous professional training
Those who are already working, employed or seeking employment can also benefit from lectures from the DREAM department. The JORIS Vocational Bachelor’s degree can, for example, be offered over two years to fit in with professional life. Students train to become sound and image journalists/editors. It is also possible to obtain Bachelor’s and Master’s vocational degrees through the validation of experience (VAE): the experience acquired in the field is used as a degree, with or without extra lectures.
Take the high road to Japanese

University students have been studying Japanese since 2011.

Through curiosity or with a professional goal
"I want to work in video games and Japanese is the second language in used in this field, after English," reveals Johan, a student in the audiovisual and multimedia (DREAM) department. For young people, who have chosen to learn this seemingly difficult language at the UVHC, the culture and the dream of spending time in Japan are also often main sources of motivation.

Twenty-hour introduction
The University has organised this year into two-hour blocks on Thursday afternoons, providing a 20-hour introduction to Japanese. The work focuses mainly on oral expression. With no conjugations, obvious pronunciation and few declensions, Japanese is a relatively easy language to speak. Writing is a different story!

A “practising” professor
The professor, Alexandre Gil, also learned Japanese during his studies and practices it regularly in his company, Toyota. “The Japanese trainers who visit the production sites often ask me to interpret for them. I have also helped Japanese ex-patriots in Valenciennes with the administrative procedures required to enrol at the children’s school or with bills,” he explains. “Speaking Japanese should help me make progress in the company. I am currently working on production, but I hope to soon join a project team which works in conjunction with Japan on the development of future models”. With Toyota, its subsidiaries and subcontractors in Valenciennes, but also lots of other Japanese companies located in France and Europe in the automotive, design or high-tech industries. Students who wish to do the same will also have a good chance of working with Japan.

Keen to learn Japanese, the students give up their free time on Thursday afternoon. They come from every University department.

Classic and ‘rare’ languages at the University
In addition to four commonly taught languages – English, German, Spanish and Italian –, UVHC offers every student the chance to discover a ‘rare’ language. Japanese, Polish or Chinese for example. In 2012, seventeen students thus discovered Japanese and seven Portuguese. On the curriculum: a twenty-hour introduction in a small group, followed by self-study at the Language Resource Centre. In addition, the University of Valenciennes has been accredited by the Ministry for National Education to issue the Higher Education Language Skills Certificate (CLES) in the four languages taught. It is thus able to assess the oral comprehension, written comprehension, written production, oral production and oral interaction of its students. The UVHC has also signed a convention with the Lille 3 University to issue certificates to students of Russian, Arabic, Polish and Portuguese.
FOCUS ON
Training for success

The University of Valenciennes has already launched almost fifty vocational training contract courses, from Bac+2 to Bac+5 level. It also offers young people the chance to work while obtaining a vocational qualification. Focus on one of these courses.

Vocational Bachelor’s degree in information systems and software

The guardians of our IT security

“Hackers are everywhere. They are developing a new form of industrial espionage,” explains Franck Ebel, head of teaching for the Cooperation for IT Defence and Intrusion Prevention (CDAISI) Vocational Bachelor’s degree. The theft of confidential data and passwords or digital identities. There are a whole range of crimes, but in each case the victims are guilty of a lack of vigilance. Only one Vocational Bachelor’s degree in Europe teaches techniques which enable students to protect information systems and resist attacks from hackers. It takes place in Maubeuge.

► The only training course of its kind in Europe
Companies aware of IT risks and failings have developed new professions, such as head of IT security or “pen tester”. Some of these professionals graduated with a CDAISI vocational Bachelor’s degree from the University of Valenciennes. Launched in 2008, almost 130 young people have already followed the initial training course or vocational training contract courses. They come from all over France and overseas: Mexico, Réunion, Casablanca etc.

► Breaking into the world of the hacker
How can lecturers teach the techniques of hackers, which are, by their very nature, kept secret? “70% of our lecturers are professionals from the corporate world and face real cases every day,” explains Robert Crocfer, a study engineer at the University. The members of the teaching staff are also keen contributors to forums and in contact with other hackers.

► Teaching ethics as well as techniques
In addition to IT techniques, students receive lessons in law and psychology. “Professional ethics are at least just as important as techniques,” stresses Robert Crocfer. When they discover a flaw in the system, young people must be sufficiently mature to keep a cool head and “shut the door without meddling with what is on the other side”. This is part of the moral contract they sign when starting their training. Once they finish this year of studies, they find jobs very quickly. Some are currently employed by British Telecom, Banque Accord, auditing and IT security companies.

FACTS AND FIGURES

• 80% of IT attacks on companies are internal.
• Since a decree issued on 24 August 2011, companies are obliged to inform the CNIL and all interested parties of any security flaw which may have led to the “loss, alteration or unauthorised access of data of a personal nature”.

Every year, they organise a “hacking challenge” in Maubeuge, which enables them to meet other big names in the field and introduce their students to Internet security professionals.

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The provision of technological hubs

Professional conditions for technological training

Students from the University receive vocational training in professional conditions. Technological hubs are available to them in the fields of automation, industrial information technology, mechanics and industrial automation.

Learning skills in professional conditions

“The hubs, which organise the University’s skills and resources in technological fields, have a pedagogical goal: it is only through practice and experience that students will develop the skills needed when working for a company,” explains Jean-Pierre Rouzé, head of the IUT. The 2,200 students at the IUT have five workshops available: mechanical design, electronics-IT, advanced materials techniques, materials and physical measures and logistics chains and quality. “The IUT invests in the same equipment as used by the most advanced companies. But this is not the key point,” stresses the director. “The skills of the technical and teaching staff and researchers are the real value of our hubs”. To such an extent that every year around ten Valenciennes SMEs use the IUT hubs for technology transfers. The mechanical workshop, for example, is the only site in Valenciennes with a plasma cutting machine linked to a hydraulic power press brake, a piece of equipment used particularly in the automotive industry.

A 1,500 m² hub

The UVHC departments also have access to shared technical and scientific resources at the AIP Priméca hub for automation, mechanical engineering, rapid prototyping, metrology (three-dimensional measuring machine). The AIP is part of a national network with considerable expertise and resources. Its equipment, which represents an investment of 4 to 5 million Euros, is spread across a 1,500 m² site. In particular, a flexible industrial automation cell, worthy of a high-tech firm, is absolutely state of the art. “This flexible cell is the size of a small production company. Students work in teams of fourteen to sixteen people, which enables them to reproduce the conditions of an actual company,” states Mohammed Asmani, head of the AIP Priméca hub at Valenciennes.

Thanks to the research activity developed by the UVHC laboratories at the AIP, certain innovations have anticipated the professions and tools of tomorrow: rapid prototyping, intelligent products and tests on virtual products. Another new feature: the remote-maintenance room makes it possible to simulate faults in a production unit and correct them remotely via the Internet network. There are currently only three such cells in existence in France.

The students work on an industrial scale with considerable resources.
My drawing really took off at the University

“I am an artist and mainly concentrate on drawing. In 2010, I had the opportunity of taking part in the Dynasty exposition, comprising 40 young artists, held at the Palais de Tokyo and Musée d’Art Moderne in Paris. A Master’s 2 graduate in plastic arts, I studied at the Faculty of Letters, Languages, Arts and Humanities in Valenciennes (FLASH). This training was key for my life as an artist. Firstly, it helped me find my path: drawing. I focused on this medium, gradually leaving behind the other disciplines I had begun, such as painting, photography or video-performance. Drawing then became my specific field of research. Meetings within the University with great artists were also crucial: discovering the universe of the Austrian, Erwin Wurm, the French painter, Marc Desgrandchamps, and the German, Franz Erhard Walther. These artists showed me that, through hard work, there were other possible and feasible career paths: not just training to be a higher education lecturer or teaching plastic arts. Today, I live in Paris, right at the heart of artistic life. I am lucky enough to see my drawings published in specialised magazines, such as Cahier Dessiné, The Drawer and soon Bilan Provisoire, and they are starting to be exhibited in galleries and institutions. My drawing started at university, has continued since then and is constantly evolving.”

Mélanie Delattre-Vogt
www.delattrevogt.com

The views of former students

An engineer in New York

Jérémy Rochot, a recently qualified “ENSIAME engineer”, works for the American software publisher CD Adapco which specialises in the digital modelling of physical phenomena. And so it is that this Parisian, who studied in Valenciennes for three years, now lives in Brooklyn in the State of New York.

Improving the aerodynamic performances of a racing car, analysing the heat produced by a geothermal source, simulating the performance of a wind turbine… Here are just a few of the possibilities that engineers like Jérémy Rochot in “Structural Analysis and Simulation”, make feasible. Jérémy is a young graduate of ENSIAME, a school that trains 180 engineers each year in computer and systems management, mechanical and energy engineering and mechatronics.

Two six-month internships abroad
Jérémy explains how his studies opened doors into the world: “ENSIAME requires its students to perform at least one six-month internship abroad, though many do two. I worked for Stabilus GmbH in Koblenzin Germany, a company that produces gas springs for car boots and office chairs, then for Daimler AG in Germany.” This second experience was decisive in launching his career: “At Daimler, I worked with the software of the American company Cd Adapco, it therefore seemed natural for me to apply for a job there when I finished studying.”

Interest in the environmental sector
Jérémy’s second asset is that he has acquired a hands-on speciality in alternative forms of energy. He explains: “I’m working on a project to develop a battery for a hybrid car. I began to take an interest in environmental issues at ENSIAME via a student project to construct a wind turbine. This sector has great potential. Even if Americans still have a bad record, with their big cars and poorly-insulated homes, their university research projects are definitely among the best.” Jérémy plans to return to France in three to five years’ time, once he has gained full benefit from this original experience:

“I’m still making lots of progress, by using the information I’ve acquired as well as learning about programming, physical sciences, English, etc. I’m building on my specialities. I sometimes feel like I’m studying for a PhD within a company!”. Later, he hopes to progress to managerial posts. Working abroad certainly has advantages…”

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