OPENLAB

Virtual Reality (VR) training for emergencies

Page 4

EUROP

A European distinction for UTC Human Resources

Page 14

PEDAGOGY

A serious game in logistics

Page 14

utc Université de Technologie Compiègne

SORBONNE UNIVERSITES

JANUARY 2017 ### N° **42**

Interactions in French at **http://interactions.utc.fr**

Donnons un sens à l'innovation

Interactions

LES DOSSIERS

The Shanghai Campus is 12 years old, well done UTseuS !

page 5

FROM THE PRESIDENT'S DESK

A warm welcome to Prof. Philippe Courtier, the new President & Vice-Chancellor of UTC

On behalf of everyone at UTC, I am delighted to address a warm welcome to my successor, Prof. Philippe Courtier, with my express desire that the experience - as he leads, over the coming 5 years, the destiny of our alma mater, contributing to the reinforcement of the radiant future the University deserves - will bring him an intense joy and satisfaction.

In this issue, he will discover the richness of an innovative, creative and socially aware university of technology which - beyond the core academic missions of teaching, research, TT (technology transfer) and valorisation - also is committed to promoting innovation, strong territorial and international presence and collaboration, with high societal responsibility and a wide cultural vista.

We have created a new Chair for "Smart Mobility and Territorial Dynamics" and a Photovoltaic car-shelter at the UTC-GSU (Urban System Engineering) laboratory, we had two UTC undergraduates presenting their start-ups at the Las Vegas Consumer Electronics Show (CES), a European 'label' for our human resources, Utseus (the Sino-European University of Technology of the University of Shanghai, the largest French academic installation in China and the UTC students' noteworthy high performances in many sports … will all serve, as he reads through the articles, to illustrate just how diverse, how ambitious the University is, with its singular differences … in short, its special place on the French Higher Education and Research scene.

My personal wish is that, over these 5 years, Prof. Courtier will thoroughly enjoy a passionate adventure with UTC, with its staff and students, with the university's partners, collectively committed as they are to enhancing UTC sustainable notoriety. ■

Prof. Alain Storck,
President & Vice-Chancellor UTC

Appointment of the new Director for UTC

Prof. Philippe Courtier was appointed Director of UTC by the French Ministry for Higher Education and Research, as proposed by decision of the UTC Academic Board, December 22nd, 2016. He will take office on Feb.1st, 2017. ■

Two UTC start-ups at the 2017 CES, Las Vegas

Two start-ups created by UTC students, Equisense and Sensorwake, held stands at the 2017 Las Vegas CES (Consumer Electronics Show). Equisense - along with 27 other French start-ups selected by Business France to represent French technological innovation - has developed 'connected' objects for horse-riding. Sensorwake won a CES Innovation Award for its new product, Oria, improving sleep by diffusion of essential oils. ■

The 2016 edition of the 'Prix Roberval'

Saturday, December 10, 2016 saw the 29th ceremony of the 'Prix Roberval' at the Imperial Theatre, Compiegne. The prizes reward French language literature devoted to scientific and technological innovation. Emmanuel Lazard and Pierre Mounier-Kuhn received the General Public Prize, for their work entitled "Histoire illustrée de l'informatique" [An illustrated History of Computer Sciences], while Daniel Babot and Véronique Massardier-Jourdan were the laureates for Higher Education with their book on "La physique autour de nous - de l'observation à l'innovation" [Physics around us – from observation to innovation]. ■

The creation announced for a Franco-Tunisian Institute of Technology

During a visit to Tunisia, on the occasion of the Forum Campus France – Prof. Alain Storck, President & Vice-Chancellor UTC and HE the Ambassador of France to Tunisia, Olivier Poivre d'Arvor, jointly announced the future creation of the Institut Franco-Tunisien de(s) Technologie(s) (LIFTT). They discussed the reasons for this creation and objectives assigned, notably given UTC's excellent track-record and expertise in setting up technological platforms in China, in Chile and in Mexico. ■

OPENLAB

A photovoltaic parking lot canopy

When you visit the UTC Daniel Thomas Innovation Centre, you will notice some new photovoltaic panel (PV) canopies over the parking places. They represent a first stage set-up of the STELLA platform (Smart Transport and Energy Living Lab) of the UTC-AVENUES Laboratory, a project finically supported inter alia sources by the FEDER (EU regional fund) and by the French Hauts-de-France Region. The objective is to test solar-powered photovoltaic canopies for electric vehicle recharges.

Recharging a growing number of all-electric vehicles presents a challenge for the current national grid, i.e., to provide for this extra demand, especially at peak hours. To meet such intermittent increases in demand, we need today to bring thermal power stations on line, knowing that these are high CO_2 emitters. Widening the scope of possible energy sources therefore becomes a major priority and challenge. Generating PV-sourced electricity for local consumption can thus be an attractive solution for urban locations. Since 2010, Fabrice Locment, a UTC research scientist and lecturer in electrical engineering, head of the STELLA platform has been working with Manuela Sechilariu, Director of the UTC-AVENUES Laboratory on the topic of 'smart' micro-grids that can handle the electricity generated by PV canopies over parking lots. Thanks to smart algorithms coupled to power electronics devices, the system regulates generation to balance consumption. If no vehicle is being charged, or if there an excess production, the excess can be stored chemically in batteries (external to the vehicles) or can be used to complement electric consumption of nearby buildings. If, in contradistinction, the consumption exceeds generation, power can be taken from the national grid. STELLA exemplifies concrete experimentation of the concept. "The first PV canopy set-ups of this kind were installed and tested on parking lots outside supermarket shopping malls but with the aim only to sell back electricity to the grid authorities. But with STELLA, the production will be consumed on the spot and moreover in a direct (DC) use mode of current", details Fabrice Locment. Local "self-consumption" lowers the overload factor and risk of instability in the national grid and also allows operators to avoid power losses due to transmission and DC/AC conversion.

A full-scale experiment

The UTC-AVENUES Laboratory has among its objectives to entirely cover the hundred or so parking places in front of the UTC Daniel Thomas Innovation Centre. With a nominal total power of 30 kW, the canopy set-up today can already recharge a Renault ZOE very rapidly. This campus installation serves to reinforce the relevance of UTC having a fleet of electric vehicles to interconnect its 4 sites for logistic purposes as well as electric bikes (or other electric vehicles) for students and staff. Any excess production can be used in the Innovation Centre or forwarded to the national grid. UTC-AVENUES as an interdisciplinary laboratory will be led to studying numerous associate topics thanks to a smart micro-grid, such as battery ageing factors, automatic outlet hook-ups for driverless vehicles, architectural and urbanistic integration of the PV panels, regulations, social acceptability and behaviours of and with these new forms of equipment, in liaison with the UTC Costech Laboratory. Partnerships with several car-manufacturing companies are being finalized currently. Participation in the Institute for Carbon-free, Communicating vehicles and Mobility (VEDCOM) which already enjoys collaborations with UTC-Heudiasyc and UTC LEC Laboratories, would also represent an excellent opportunity. ■

OPENLAB TELEMEDICINE AND HEALTH

Prevention and detection of *senior citizens falling*

The 5th PARAchute Conference, organized November 23, 2016, heard status reports on various systems that serve to prevent and detect senior citizens falling. The UTC-e-BioMed Chair took part in the event, presenting its solutions and addressing possible future for this special field of medical research

50 research scientists and various industrial representatives took part in this event that focused on recent technological progress but also pinpointed some of the hurdles to the dissemination of innovations. "Research here has progressed enormously here over the past two decades in terms of fall detection but the most advanced solutions have still to be commercialized, because there is no viable economic model as yet" details Dan Istrate – the tenured holder of the e-Biomed Chair at the UTC-BMBI UMR 7338, Lab (Bio-Mechanics & Bio-Engineering) – who chaired a round table with a somewhat provocative title, viz., "Is it worthwhile investing in research on prevention and detection of people falling down?". As an actigraphics specialist, Prof Istrate underscores the fact that over and above the technological aspects, "there should be a thrust to engage research in a 'living lab' context open to user demands and expectations". Development of assistance services and enhanced relationships with the families are also highly necessary to make tools like these attractive for the public at large. Their acceptability by elderly persons was also one of the difficulties addressed during the talks. The requirement that these persons wear a sensor constantly is a constraint that is not well accepted. A company, Senior Alerte, presented its remote assistance solution calling for movement sensors positioned in the person's home.

New pathways for prevention

Special emphasis was placed on an as yet little explored aspect, viz., fall prevention. But it clearly holds promise in terms of benefits for the users' health and well-being. One of the ideas was that to encourage elderly persons to walk continuously using virtual reality techniques can prove to be beneficial. For example, a talk was given on a European project "iStoppFalls" using a serious game with the help of a kinesiotherapist to make the movements game-like. The benefits of using this device were tested and found positive with some 200 persons throughout Europe. Another aspect dealt with how to detect prior signals that lead to prediction of an imminent fall. UTT (Troyes) presented a way to assess and predict loss of balance; two UTC projects described a sensor-free

way to monitor movement. The first project – in a partnership with the Paris Electronics Laboratory related to using a radar based movement detection, plus a measure of heart rates and breathing. The second project is a thermal sensor co-designed with the major electric equipment company Legrand to study sleep movements and hence deduce quality of sleep, the latter being a key factor when it comes to preventing falls. This equipment is installed on a wall to enable easy bed maintenance and already equips 3 dependent senior citizen homes – it will be on sale as of 2018. ■

CHAIR

A new academic chair for *Tomorrow's Transportation*

A new chair, entitled "Smart mobility & territorial dynamics" was instated Nov.2016 in the UTC-GSU (Urban engineering systems) Dept. Prof. Cristina Pronello of the Polytechnic University of Turin is an internationally well-known specialist of this topic who answered our questions about the scientific aims of this new research unit launched by the French Region Hauts-de-France with support also form the EU FEDER fund.

What brought you here to UTC, Compiegne, as a research scientist?
I saw an announcement made at EU level. I knew nothing about this Region of France. I decided to apply inasmuch as the subject matter is at the core of my personal research skills. I love taking on challenges. This Region, Hauts-de-France is much more rural than those I studied previously. The population density is far lower and car transportation is more intense. It is more difficult in this case than in major urban areas to improve on the offer for public transportation – hence my interest to accept the challenge. I go out regularly into the countryside to 'soak up' my new environment and to contact local elected officials and local inhabitants.

Can you recall for our readers the most recent research projects in which you participated?
In my home town of Turin, Italy, I contributed to the design of an application that helped better understand movements and expectations of people living near and travelling on the main routes between Turin and nearby Milan. The challenge here is of importance since the details of our investigation can be used to determine public spending and to rethink the organization of transportation routes over an area that includes some 350 townships. I also took part in the EU Opticities project, covering 6 major cities,

Usine Nouvelle : Trophies for Engineers of the Future

Prof. Alain Storck, President & Vice-Chancellor UTC handed over the Research Category "Engineer of the Future" Award to Sonia Belaid, cryptologist at Thales Communications & Security. ■
www.usinenouvelle.com

Final Review for the CoMoSeF European Project

Wednesday, December 14, 2016 saw the final review of the Cooperative Mobility for the Services of the Future (CoMoSeF), a European Project. A dozen UTC-Heudiasyc vehicles demonstrated on a closed track near UTC's Daniel Thomas Innovation Centre the high level of efficiency now attained using smart transport technologies enabling automated inter-vehicle communications and the broadcasting of rapid alert messages should a danger be detected on the road ahead. ■

http://webtv.utc.fr/watch_video.php?v=4YN99GW2WHHX

including Lyon and Turin, the objective of which is to set up and launch an "app" that would enable users to optimally plan their trips, no matter what mode of transportation they choose. Besides my scientific research, I am also the President of the Association for Piedmont Transportation.

What will be the main research thrusts of your UTC chair?

The idea behind the academic Chair I hold was to help transportation systems to improve by proposing a multi-scaled research investigation, touching on behaviours, networks and intermodal connections. Our aim will be to provide aids for decisions to propose the best-suited services to meet local needs. To do so, we shall firstly analyse the travel habits and passenger expectations and attitudes with respect to the concept of sustainable development over the 3 urban areas of Beauvais, Compiegne and Creil. We aim here to have a precise analysis of needs and user profiles.

Can you tell us what sort of methodology will be used?

Our work will be conducted in two stages – first of all, we shall send out a questionnaire to a representative panel of 100 persons in each of the three townships, followed by a wider-reaching citizen polling consultation via an "app" downloaded on Smartphones. This way we hope to be able to follow for 3 years the movements of 300 persons in the 3 towns. Millions of recorded data will be collected. The press, media and local authorities will also make my initiative better known to the local populations. We must try to have people understand that their answers will help improve their day-to-day travel. I have tested this methodology in my previous research programmes and I also shall be conducting an experiment along the same lines in Myanmar this year to compare travel modes in a very different cultural setting. ■

OPEN LAB

Virtual Reality (VR) training for emergencies

UTC's Heudiasyc Lab has been coordinating, since 2014, the VICTEAMS Project, involving for the design – with colleagues of the Computer Sciences & Applications Lab in Mechanical and Engineering Sciences (CEA-LIST), of the Armed Forces Biomed Lab and the private company Reviatech - of a training simulator for emergency medical service (EMS) teams. It is a tool assembled in a close collaboration with the professional doctors and staff at the French Army's major Val-de-Grace Hospital and with the Paris City Firefighting Brigades, also partners in this project.

The aim of VICTEAMS is to train medical practitioners who take charge of emergency situations in how to manage teams and communicate efficiently with numerous victims around and in such a way as not to require setting up systematic full-scale 'live' exercises, which are difficult to create properly. Wearing a VR helmet, the 'player' (alone) is positioned in an Advanced Op-Tent with a team of medics and, of course, an influx of wounded persons needing care. There is a lot of noise, missing material, logistics problems and misunderstandings … in short, all that is needed to reproduce an environment with a high level of operational stress. The vital parameters of the casualties evolve as a function of what the player decides and does. This software package imitating, as it can, various catastrophes and/or terrorist attacks, is original in that is brings in other self-standing virtual figures. Each member of the medical teams present have a given level of skills, a certain ease (or lack of) in communicating and a variable level of resistance to stressful conditions. Their individual stress levels are portrayed on their faces and in the accuracy of their moves and gestures. Lauriane Huguet-Morel, currently doing her PhD on self-standing virtual figures with the VICTEAMS research group, adds, "We also aim to reproduce errors, omissions, imprecisions committed by team-members, in order to create a situation even closer to 'reality' in the field of events. And to be able to computerize non optimal human behaviours is quite a challenge in its own right".

Simulating team operations

The UTC-Heudiasyc Lab has accumulated over 10 years' experience in VR environments specific to training purposes. Following the development of tools for aeronautical assembly operatives, for submarine maintenance crew members and for company staff involved in maintenance/dismantling of potential dangerous industrial sites, the VICTEAMS Project now introducing striking new features with relationships and human factors to its teamwork simulation packages. As Domitile Lourdeaux, scientific leader for this research programme, explains: "We had previously introduced stress factors in our simulations, but here with VICTEAMS, we reproduce group actions, and inter-related reactions of the figures at play". Inasmuch as the scenario is not pre-defined, the 'game' gains in its degree of interactivity. "In contradistinction with other software training backaches and video games, here we have no written script. The figures can change their individual behaviours as a function of what the main player decides and does". The level of complexity offered allows us to assess the quality/relevance of operational decisions but also to judge the way the player expresses himself (herself) and how h/she manages the team. The results from psychological cognition and computer modelling of professional environmental realities, VICTEAMS combines the skills and inputs of computer scientist, ergonomists and medical practitioners. A 'demo' version was made prepared by summer 2016; the finalized software package is planned for ready for release in 2018, providing for a complete VR emergency training setting, for up to 7 player/VR figures..■

The Shanghai Campus is 12 years old, *well done UTseuS !*

China is the heavyweight champion of the world's economy and, increasingly, a spear-head for technological innovation. It was seen as a strategically valuable country for the three French Universities of Technology: UTBM (Belfort-Montbeliard), UTC (Compiegne) and UTT (Troyes), who as early as 2005 joined forces with the University of Shanghai to create the Sino-European School of Technology of Shanghai University (UTseuS). We offer our readers a portrait of pioneering co-operation, which continues to grow steadily.

UTseuS
the first Franco-Chinese programme for engineering training

"Be a visionary, join us"

... is the UTseuS motto and already huge numbers have agreed to join: over 1 300 Chinese students and other nationals, which makes it the most important Sino-European engineering training programme. Not to mention the 50 or so industrial partners.

UTseuS was visionary from its inception. "At the outset of the years 2000, the challenge was to train Chinese engineers in the French manner, thereby complying with expectations of French companies who were starting to invest in China", recalls MonZen Tzen, the French Director of UTseuS. This objective was largely attained. Every year when the Gaokao – the competitive admissions examination for Chinese universities - is over, some 250 high level Chinese candidates are jointly selected by the Shanghai University and the French UTs and were registered for the Franco-Chinese programme.

160 new Chinese nationals matriculated for studies at the French UTs for 2016

In order to pave the way to success, UTseuS prepared an original core programme (1st Cycle) along the line of the French UT core programmes, but spread over 3 instead of 2 years, including intensive French language training. "Not only do they follow the French language courses (often assured by French teachers) but also by the end of year 1, they have classes in other subjects, in French", underlines Étienne Arnoult, UTC Director for Training and Pedagogy. Indeed, ¾ of the scientific and engineering courses are given by Chinese lecturers, while the remaining ¼ is covered by the usual UT lecturers. And, as is now the case in France, much of the class work is performed in group formation and on projects – this is not common practice in China where lectures

are mainly ex cathedra. When the courses are completed at UTseuS, the graduates receive a Bachelor's degree and for the best among them they are offered the possibility to pursue in one of the 3 French UTs or at another HE partner institution, to attain a French engineering diploma or a Master's degree recognized in both France and China. Every year, some 60% of the graduates come to France: over 160 students matriculated in 2016. In France as in China, the studies are financially assured via fees payed by their families. One they have been awarded their diploma/ degree, these graduates are recruited mostly by large international groups such as Renault, PSA, Airbus, General Electric, Saint-Gobain, Oracle, Schneider Electric, Archos, Altran or Alstom.

130 French and non-French nationals registered at UTseuS last year

UTseuS partners also proved to be visionaries in 2012 when they set a new challenge – to train "bi-cultural" French engineers ready to face the Chinese market-place. China today occupies the second (maybe even first) rank among the world economies. "But above all, this huge country no longer wants to be just the global factory", underlines MonZen Tzen. "Its new aim is to become the N°1 pole for engineering and innovation. Shenzen and its surrounding region in China's South West provinces have become the new Silicon Valley and is attracting more and more foreign start-up entrepreneurs". "China is now THE place to be if you really want to understand what innovation means", adds Fabien Pfaender, a lecturer reseach scientist at UTseuS. "In Shanghai - where UTseuS is fortunate enough to be located, the "maker" culture is flourishing. There is no end of 'makerspaces', of places where you can learn to programme, to take part in hackathons, attend conferences about innovation, and see new start-ups appearing …". In order to ensure that the UT and the partner institution matriculated students gain a 'hands-on' experience, UTseuS set up three six-month mobility modules, allowing for some interesting pedagogical innovation (cf. p.11) . The first module, entitled 'Science and the Humanities in China" enables 2nd year French undergraduates at the UTs to spend their 4th semester in Shanghai. The two other modules are at Master's degree level and since the start of year 2016 are recognized as a university diploma. Entitled "International Engineers" this programme is designed to prepare future engineers for a managerial level career in international, business spheres. The other module: "Language, culture and innovation for entrepreneurship" proposes a unique approach. "The philosophy underlining the course is to transmit an

Students who embody the UTseuS motto

At UTseuS, most Master's degree level courses are given by professionals from the entrepreneurial world. Air Liquide is an industrial partner and, as such, hosts several students registered for the International Engineer DU diploma, every year, at one of its main engineering and manufacturing sites for industrial gas production equipment, viz., the Hangzhou site, some 200 km from Shanghai. The course contents focus on Handling and Control of Industrial Risks. "Training provided is part theory but above all practical", explains Fabien Artigou, Manufacturing Director at the Air Liquide, Hangzhou City, Zhejiang site and in charge of handling industrial risks – Air Liquide-Asia. "We show students how we apply safety concepts and share our field experience with them: the challenges encountered and our success in handling them, with a dual advantage here. On one hand, they learn that safety is a key priority for Air Liquide and indeed its first industrial responsibility. It is therefore in our interest also to train future engineers correctly in these matters. On the other hand, we host international students registered at UTseuS as interns and we have recruited two graduates. Innovation is of the pillars of Air Liquide. We use it to improve our level of productivity, to open the way to new market segments and we encourage and instil a strong entrepreneurial culture. The motto of UTseuS is "Be a visionary" (cf. http://utseus.com/en/) and its students certainly embody this approach and mentality – 'sky's the limit', we might say and one only needs to innovate to prove it. These students have an interesting profile. The very fact that they come from abroad demonstrates that they already have an open vista on the world. A few years back we recruited a young Chinese woman, a graduate from UTC. Her mastery of French and her close familiarity with French culture were tremendous assets for both her and my company".

entrepreneurial spirit to the students", explains MonZen Tzen. "Our aim is to give them the keys to create a business enterprise, become 'intrapreneurs', trained and able to steer and manage innovative projects in an already existing enterprise". Moreover, it is an interdisciplinary course open to engineering science, design, management social and humanities students, as well as for young professionals. The three courses have met with considerable and ever growing success. Since it was created 'Science and Humanities in China' has more than doubled up on its class-numbers: from 35 in 2013, to 81 in spring 20°178. Total for 2016, UTseuS has trained over 130 French and non-French students.

Five new research projects

UTseuS was also visionary when it created, in 2013, the first laboratory exclusively focused on the concept of smart cities – 'ComplexCity', an association of Chinese and European research scientists. This proved to be an initiative that brought an extra boost to the institution while strengthening the scientific base for the lecture courses. In its stride, ComplexCity launched 5 new project in 2016, on a set of varied themes, viz., then image of cities in digital literature, an analysis of the nutritional offer of restaurants in urban areas or 'odonymics' - a study of place-names in cities (streets, open spaces, squares, etc.). "Our research focuses both on cities and on new methods that allow us to better understand just how complex a city is", explains Fabien Pfaender, who coordinates the laboratory work schedule. "A large fraction of my works consists of developing methodologies for acquisition from multiple data sources: shared photos on Flickr®, information from restaurant Internet ranking sites, measurements from pollution sensors …. the underlying idea was to confront these vary varied data streams to seek sense and new knowledge or new applications" (cf. p10).

ComplexCity launched 5 new project in 2016, on a set of varied themes, viz., then image of cities in digital literature, an analysis of the nutritional offer of restaurants in urban areas or 'odonymics'

For the forthcoming 2017 academic opening, UTseuS will be inaugurating a brand-new building on the Shanghai University campus, much more spacious than its present premises … a signal that the institutions is about to welcome even more visionaries! ■

UTseuS and China … career boosters!

Raphaël Droissart, an undergraduate engineer at UTBM (Belfort-Montbeliard, when he was admitted to the 'international engineer' course at UTseuS in 2014, could hardly have imagined what was to follow … "After this first mobility, I took the 'Language, Culture and Innovation for Entrepreneurship' (LCIE) module. I did my 5th year internship in China. I was in charge of a market survey and making a business plan for a French training company 'Learning Tribes'* http://learning-tribes.com/en/ , who were thinking about setting up shop in China. Then, early 2016, this company asked me to establish their Chinese branch office and hired me on a permanent contract basis to help the new office begin business. Today, I am in charge of the company's R&I centre in China to continue development of digital solutions for their products and services. In parallel, in 2015, I created a start up in France with two associates: My Mooc**, a sort of Trip Advisor® for Mooc courses offered by the Grande Ecoles and Universities. Learning Tribes invested in this company, which I manage from abroad. The UTseuS 'mobility' courses I followed helped me enormously in these ventures, all the more so, given their variety. The 'International Engineer' module is very close to our core business. LCIE is more business, innovation and Chinese studies oriented, which turned out to be very useful when I established the Learning Tribes Chinese branch office. I was stunned by the sheer quality of the course 'lecturers', with both UT academics and professional experts. Both experience above enabled me to discover the dynamic nature of China, to meet lots of mangers in international groups, to visit lots of company premises and to assess what we can do with an engineering training background like me and all of which have been real career boosters".

4 Questions to Fabrice Rousseau,

Deputy Counsellor for Co-Operation and Cultural Actions at the French Embassy, Beijing

As you see it, what the key attractive factor of UTseuS?

What we have here is a magnificent flagship co-operation between France and China. With Ecole Centrale Paris, who initiated the model for Franco-Chinese institutes, i.e., a consortium of French establishments who associate with a Chinese University to set up "French style" engineering training in French, leading to, the award of a double diploma, in China and in France. There are currently 8 Franco-Chinese institutes. UTseuS differs from the others by the variety of the French-side establishments (French Universities of technology (UITs) and their partner institutions, by the number of students trained and it is the only one that has a resrecah laboratory this being highly important for the intrinsic quality of the courses given and a long range policy thrust

How do you explain this degree of success?

Certain Chinese universities multiply their agreements to co-operate rather than concentrate on a few chosen major projects. In contradistinction, the Shanghai University (SU) wants to valorise UTseuS by providing for material and manpower resource needs. The choice of SU as our partner was decisive. As was the very high level of commitment of the French team at UTseuS who provided new impetus when appropriate to develop the institute's programmes and development schemes.

What is the level of notoriety of UTseuS and French UTs in China?

French UTs are well known and respected institutions, in many instances even more so than our most famous engineering schools. Not only have they been established in China for a long time, but they recruit Chinese students for their undergraduates training via UTSeuS and up to and including a PhD degree. It is a course path that sidesteps the difficulties of the classic Chinese selective examinations: for Chinese families who finance their children's studies, the risk of a failure after 2 years' preparation simply cannot be envisaged. Moreover, and in general, the models proposed by the Franco-Chinese Institutes is drawing increasing interest in China itself inasmuch as it includes professional-trade oriented courses which in essence guarantee the employability of the graduates. The proof her is that the students registered for UTseuS and for Centrale Beijing are often hired before they compete their degree course.

What would you personally say about China to French students?

China represents a unique case of sustained growth rate in recent years, hence today's problems: pollution, transportation, energy procurement, housing, etc., which are potential market opportunities for French companies but the challenges in Asia are much more demanding than in the West and we do have quite different life styles, which definitely makes China the country where a few months' stay will prove most rewarding. Being able to observe these facts on a day-to-day basis is itself a clear added value on the job market.

Cultural Mixing and Project Work

Pedagogical innovation is one of the strong leitmotivs of UTseuS. This articles focuses on 2 initiatives designed to reinforce the institute's international vista and the credit course (CC) practicalities at first degree and Master's degree level.

French nationality second year students taking the "Science and Humanities in China" module attend in the same classrooms as Chinese third year students. This original approach was adopted and initiated when the exchange semester was designed. It allows French students to discover Chinses culture and also to prepare their Chinese counterparts for their own stay in France.

Franco-Chinese work groups

In 2016, UTseuS took another stride forward in its 'mixity'. The credit course (CC) Project Management (advanced) was revamped. For a ten week period, the students who registered worked together on an innovation-intensive project. The objective consisted of imaging new services for agriculture, using drones and then to produce a video presenting their work and proposals, the degree of technical, commercial and financial feasibility. As said, they worked in groups each partly French, partly Chinese. This was a pedagogical "first ever". "The aim here", explains emeritus Professor Jean-Pierre Caliste, in charge of this CC, "is to make the students capable of managing a project in a multicultural environment, hence the advantage of setting up the mixed groups. Eve, though they have all followed similar courses, French and Chinese students react differently in the same situations. The French are more self-reliant and organize their work among themselves, whereas the Chinese students expect more assistance form their professor. Nonetheless, the experience was profitable to all. The mixed factor facilitated their exchanges and indeed each side helped the other, especially from a language stand-point and they also learned a lot about team management theory and practice."

From simulation to real, entrepreneurial projects

Yet another innovation, this time at the Master's degree level. After a course test run in 2015, UTseuS offered a new CC for both French and non-French student in the International Engineer University Diploma (DU) programme, entitled "QA (quality assessment) and operational excellence". The course

A vade mecum to prepare for mobility and a stay in France

Haozhou Zhang is one of the young Chinese women who last year attended the CC "Project Management (Advanced)" and experimented mixed work groups. "In my group, there were 2 Chinese and 4 French students and we proposed an "app" that would enable rural farmers to see where and what work is needed in their fields, using drones that takes photos of the site. The French are very efficient when it comes to finding information on the Internet and also in project scheduling plans. In working with them I discovered new methods and above all I progressed in French. That helped me to adapt quite easily when I came to Compiegne and less timid when I have to work in a binomial with a French student – which is often the case here". Since the start of the academic tear 2016, Haozhou was admitted to the UTC elective major "Computer sciences and applications". "I in fact chose to go to UTseuS because it was a university level programme that offered the possibility of moving to a French UT, which is highly reputed in France with high level extensive theoretical aspects but not neglecting practical training. We have two 6 month internships with an enterprise, during which time we do not attend classes and this is quite rare in China. As I see it, and my parents agree with me, this practical, 'hands-on' training programme will prove to be a very important facet for my future career".

firstly has a limited theoretical content, followed systematically by serious game situations – the students are proposed scenarios in which it is practically impossible to make a 'good product' an/or a satisfactory manufacturing process; their job is to determine how to gain time, quality, etc. But – and importantly so – they are confronted with a real case study. "A partner company opens its doors so that the students can make an audit of the products and processes and propose improvements", says Jean-Pierre Caliste. "In order to study possible paths forward, the students work in groups, each addressing one or several subjects. But their proposals must be coherent and comply with the company's global strategy". In 2016, this partner was Mankati, a Chinese company that designs and manufactures 3D printers sold around the world. And the experiment proved positive … to the extent that the company CEO implemented to students recommendations faster than was imagined! For year 2015, this CC will be organized yet again, with another partner company. ■

A Hackathon to replace Exams

In order to train students who register for the 'International Engineer' mobility programme, UTseuS... innovates.

The UTseuS ComplexCity Laboratory provides an excellent observation position for all new innovative processes, all the better that it now occupies premises in a Shanghai Makerspace and also participates in hackathons. In December 2016, this corresponded exactly to the format chosen by Fabien Pfaender, posted to ComplexCity and by Philippe Xu, lecturer and research scientist at the UTC Heudiasyc Laboratory, for the credit course (CC) exam in 'Data Sciences' under the International Engineer university diploma DU programme, viz., an ~ 30h hackathon, using urban data collected by ComplexCity teams.
After a short briefing session by the lecturers, the students were given 6h to put together their ideas for innovative applications or "apps". Each student, individually, presented the pitch of his/her "app". Three using social media (a site to assess restaurant services and food, equivalent to Twitter® …) were selected: one was designed to help entrepreneurs to identify the best places to open a restaurant in Shanghai with decisive criteria in terms of customer satisfaction; the second "app" proposed variable mode transportation solutions for Shanghai inhabitants depending on their profile (keen shoppers, art-lovers …); the third "app" brought together people looking for partners for a given sport. The students were organized in 3 groups, each supporting one of the ideas. Each group then had to demonstrate the commercial feasibility of their "app", and then to provide a proof of concept: analysis of raw data, and to draw useful information from the data for their "app" … and finally to put together a first prototype. As Philippe Xu notes, "None of these students came from a Computing science major and were therefore unfamiliar with programming techniques. But we provided the necessary, basic information and know-how for this CC and we helped out, where needed, during the examination. But above all other considerations, the students proved themselves highly motivated. Each group managed to demonstrate at least one relevant finding at the end of the hackathon, and this was the primary objective set by the examiners. The students were able to realize that data sciences constituted an accessible area of knowledge and know-how but that the most important factor, is to demonstrate imagination in possible "apps". And this is exactly where young people today who are growing up surrounded by computing devices and techniques excel." ■

UTseuS, a member of the netexplo network

L'UTseuS, in compliance with its collaborative pedagogical models that stimulate entrepreneurship especially when it is digital-intensive, is involved, with its students, in NETEXPLO.

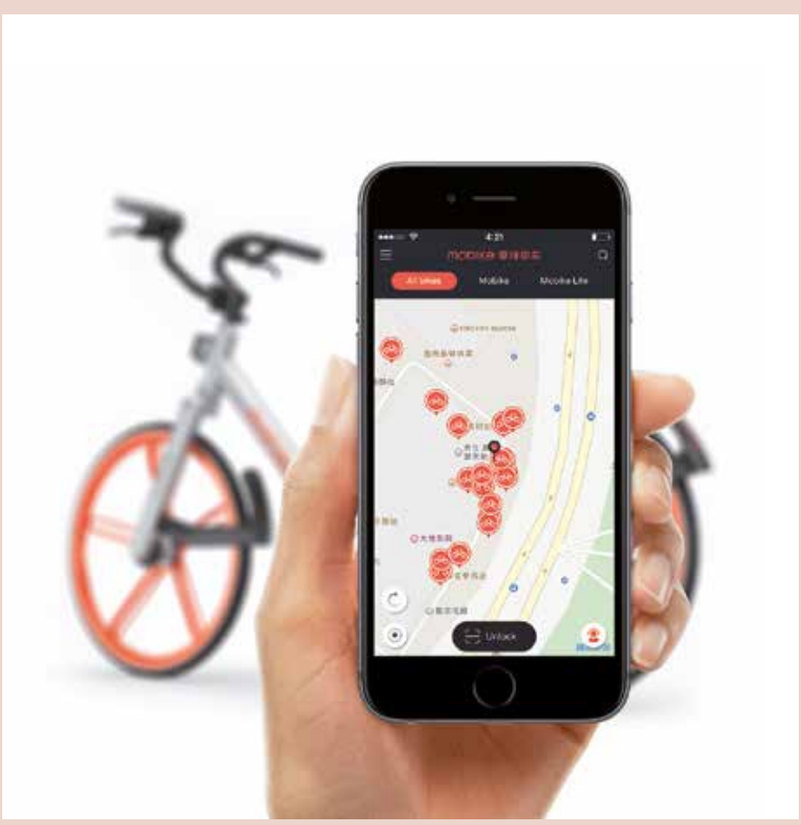
Netexplo is an independent observatory, created in 2007 by the French to study the impact of the digital revolution on Society and the entrepreneurial world at large. Every year it publishes a ranking list of the 100 most promising innovations observed in the digital world. Its 'head-hunting scouts' include representatives from some 20 major university in the USA, in Asia in Africa and Europe, among which we can cite, alongside UTseuS, the MIT Media Lab, Stanford University, Ca or Oxford University, UK.

Each member of the network acts as an advanced look-out post, where the students are invited to detect the most original and the most useful digital innovations. In the case of UTseuS, it is the students registered under the CC "Language, Culture and Innovation for Entrepreneurship" who are invited to get involved in this task. Their research and monitoring focus mainly on China and Asia. To identify possible gold 'nuggets', they essentially surf the Internet and assess developments they encounter in wo-working spaces and sessions, in start-ups and other "innovative" places that they visit during their semester in China. This constitute another way that UTseuS give its students a valuable head-start to possible careers.

In a partnership with Unesco, NETEXPLO organizes its Forum every year in Paris, and on this occasion, ten exceptional innovations are earmarked as outstanding (out of a one hundred-strong initial selection). This selection is carried out by a Jury comprising representatives of the various universities members of the network. In, year 2008, a certain 'Twitter' innovation was among the laureates... ■

Riding smart bikes in 'Smart Cities'

Research undertaken by the ComplexCity Lab can lead to innovative projects that involve an industrial partner and UTseuS students. Here is a concrete example …



100 000

self-service bikes were deployed round Shanghai's streets between April and end 2016, i.e., 5 times more than the total number of 'Vélibs' in Paris … but then again, this is China ! And more than this it is the performance mad by a young Chinese company, Mobike*. So, what is the underlying concept ? The bikes on hire are connected objects, each fitted with a GPS, so there is no need to create a network of parking pillars or bike stands – this makes life easier for cyclists. You just need a smartphone to locate a free bike and pay the rental and unlock it. When you have finished your trip, you can simply leave the Mobike anywhere.

Why not equip the bikes with pollution sensors?

For the UTseuS ComplexCity Lab, these bikes that crisscross Shanghai city constantly could also, provide another service : to use on-board pollution sensors to measure the concentration of < 2.5

micron particles, or again, the noise level or light pollution level in the streets of this huge city. "Last year", explains Fabien Pfaender, a lecturer research scientist posted to the ComplexCity Lab, "we designed an algorithm that enabled us to predict whether a given street is calm or not. We analysed areas that were supposedly calm according to photos published via Flickr and/or Twitter tweets: are these places lined with trees, what kind of restaurants are in the vicinity, etc.? When then 'taught' the algorithm to recognize a calm street and created an "app" in parallel that enables the pedestrian/rider to choose the calmest route from point A to point B. Then we enriched the base with the physical data such as pollution levels. Unfortunately Shanghai only has a few environment measurement stations. Hence the idea to develop a simple, inexpensive prototype sensors that could be installed on the Mobikes. The measurements we could make in regard to the <2.5 micron particles would be less accurate than those with a sophisticated station, but at least the City of Shanghai could receive real-time data with a street by street precision. With the city authorities and the joint laboratory research staff we could design and implement an "app" that indicates the least polluted urban streets".

Four UTseuS students investigate the concept

This project was rapidly accepted by Mobike who wished to participate. In September 2016, 4 UTseuS students in the "Language, Culture and Innovation for Entrepreneurship" university diploma (DU) module start a feasibility study. "For the time being", says Florian Bohnert, Executive director for international development at Mobike, "the project is only in its initial phase. The students have met with Mobike staff and the engineering manager who provided the technical data needed and a tutor has been designated to supervise their work and progress. If the feasibility report is positive, we v=could then move to a concrete phase and tested scale-one with a few bikes; This is going to be a partnership that will last some time and other students will take over from where the previous group left out. It is a very interesting project for us. We can have lots of data on the bikes – are they booked, where are they precisely, etc.? If we superimpose environmental measurements we can produce and offer real-time pollution level maps of the city, street by street. Today this is not our main business, and our added value

depends primarily on mobility factors. But in the future, we see object Internet with the highest potential for added value. If our connected bikes can offer more data, we could develop even more price projects in collaboration with the City of Shanghai". ■

Discovering "Made in China" entrepreneurship

Since May 2015, the UTseuS module LCIE (Language, culture and innovation for entrepreneurship) has enabled French students to plunge into Chinese culture for a semester and to appreciate its vitality and the country's economics. There is course work and projects offered and assured by working professionals plus a personal entrepreneurship project that the students undertake with the assistance of a tutor to reinforce their entrepreneurial spirit and their knowledge of an innovative ecosystem.

"The 'gap semester' devoted to Chinese language and culture at UTseuS was transformed into a specific course focusing not only on civilization but also as a primer top discover local, innovative enterprises and to meet the entrepreneurs", summarises Jessica Kohler, who heads the LCIE programme for UTseuS public relations. The LCIE course serves as a bridge for students who envisage a professional career in China, but also provides an opportunity for all sorts of international innovation-intensive careers. One young female student is now received an appointment in Africa with a group working with Chinese customers. Another chose to stay in China top create his own company in the field of education "apps" and to pursue his own studies of the Chinese language. Inasmuch as the LCIE course leads to a university diploma, it is open to salaried candidates registered in continuous education schemes who wish to continue widening their intellectual horizon. For the most recent session, an executive manager from L'Oréal was among the course attendees.

Discovering the Chinese innovation ecosystem

The Greater Shanghai area, with its 24 M inhabitants, represents an ideal learning field for digital sector and tertiary service sector entrepreneurs. Several times a week, the entrepreneurship lectures are "delocalized" to places where entrepreneurs gather, to incubator-nursey structures, to co-working premises, in order to facilitate the contacts between students and professionals. Key figures from the business world act as invited lecturers regularly. For example, the founder of WeChat – who organize special lecture sessions in the WeChat ecosystem - came down especially from Beijing a few weeks ago. The VP in charge of International Development of Mobike, Florian Bohnert, are regular guest speakers. In December 2016, a 5-day study trip to Shenzhen and Guangzhou allowed students and several of their lecturers to visit the 'Chinese Silicon Valley', where most of the electronic components needed for the world's markets are produced. Following one day devoted to a visit of the Hua Qiang Bei precinct, a huge market area specialized in same of electronic components, the visitors met with start-up creator entrepreneurs in the French Tech Hub Shenzen. "Over the past 3-4 years, literally hundreds of

Makerspaces and Fab'Labs have been set up in the city, with infrastructures financed by the Government and also numerous private initiatives from abroad, such as the HAX accelerator (from Silicon Valley) or the Trouble-Maker, an accelerator platform created by a Dutch national", explains Jessica Kohler. Another day was spent with students registered at the Department of French Language at the University of Guangzhou and led to rich and lively exchanges with the young local students.

Project-intensive pedagogy

The semester course is focused on field work and practice. One day each week is spent on an enterprise's premises; Partnerships with large groups such as Suez Environment, Faurecia and Decathlon, but also with start-ups and Chinese companies such as ZTE, a telecomm group present round the world, who offer the students numerous internship opportunities. Moreover, the students are required to carry out several projects, either individually or in groups, depending on their choice of course modules. Inasmuch as it is emblematic, the entrepreneurship project brings together groups of 3 to 5 students who progress from brains-storming, designing … up to and including securing financial support. At the end of the semester, the work accomplished is presented to a Jury composed of UTseuS lecturers and academics but also personalities from the start-up circles: investors, entrepreneurs, experts and public institutions. The prototyping workshop, created in 2016, allows the groups to convert their ideas into a MVP (minimum viable product), which serves as a necessary demonstrator when it comes to convincing future investors to support the project. Two 3D printers have been supplied by a local partner company Mankati. In December 2016, the Chinese students registered for the Master's degree at the Department of Computer Sciences and Applications of Shanghai University and their lecturers who joined in the workshop, with their added-value in programming and electronics. In just 6 days of intense work, the 4 teams progressed from ideas to working objects. The aim assigned was to come up with projects that corresponded to real needs. Samuel Gomes, director du Department of Mechanical Engineering at-UTBM (Belfort-Montbeliard) and head of the Prototyping workshop relates: "I was knocked down by an all-electric scooter just before a course began, and that gave me the idea of devising a projects in relation to road safety, which is relevant to Shanghai with its numerous small-scale road accidents. So we had a team work on a safety helmet for bikers that could signal changes in direction by following the rider's head movements and warning him/her of local dangers with a geolocalization process". Another example is a connected bracelet for couples that sends textos and messages by vibration and sounds, adapted to the needs of blind/deaf persons. In the preceding semester the students had thought about pollution issues, proposing notably a system to filter-clean ambient air for babies in their prams and an "app" to find the more pleasant street routes to use on a bike trip in the city.

Learning with the entrepreneurs

Rachel Daydou, a young female graduate in International Management from Paris Sorbonne Nouvelle, who worked for several years in Beijing and Shanghai and who now is the coordinator for the entrepreneurial aspects of the LCIE course module and who also has a rich professional experience in China in fields as varied as foodstuffs, fashion, digital publicity and who co-established the start-up GiftVibes https://www.facebook.com/Giftvibes/ – sees things this way: "Shanghai now hosts one of the most numerous French communities in South-East Asia, with some 1 000 entrepreneurs registered with the French Tech network and represents an ideal stomping ground if you want to start a business enterprise in China" . For her, the LCIE programme with it operational focus is a unique chance for French students. "The external guest lecturers are all entrepreneurs, whether they be French, non-French and Chinese each a specialist in his/her respective fields and this helps the students themselves to become generators and proposers of ideas. Over one and a half years, 3 start-ups have been (or are about to be) set up by LCIE students", she adds. As does Ayman Khattar, a student matriculated at the University of Paris 6 (Pierre & Marie Curie), one of the young start-up creator entrepreneurs, saying "Shanghai is one of the key, dynamic platforms for new entrepreneurship ventures in the world, where we can meet potential partners and sources of finance, quite easily". With 4 other students, one from UTC-Compiegne and one from UTBM -Belfort-Montbeliard majoring in computing sciences and applications, his project HeartCare was singled out by a Jury in June. It is a device connected to a smartphone that allows you to record highly relevant, remote ECGs to detect cardiac anomalies. When he came back to France, Ayman envisaged creating a start-up to put the device on the market-place. His dual experience, viz., with the LCIE course module and the visit to the Chinese Silicon Valley encouraged him to pursue his career in China. Currently, he is readying himself for an internship in Shenzhen with the French start-up Whyd**, incubated by the Californian Y Combinator***, a reference support that has Airbn'b and DropBox among its success stories. ■

Shanghai now hosts one of the most numerous French communities in South-East Asia, with some 1 000 entrepreneurs registered with the French Tech network and represents an ideal stomping ground if you want to start a business enterprise in China

www.utseus.com

A new look at Offshore campuses in Mexico

HE Maryse Bossière, French Ambassador to Mexico, who carried forward several developing UTC 'offshore' campuses* in Mexico, with her strong personal commitment and conviction, answered three key questions for Interactions' readers.

To what extent are the French and Mexican national authorities and enterprises involved in this project?

The decision to set up of a "Franco-Mexican University Cluster" specifically aimed at sciences and technology was reached during the State visit of the President of Mexico to France in July 2015, following a proposal by the Franco-Mexican Strategic Council that brings together representatives of 'civvy street' and enterprise from both countries. Starting with a high school "prep. class"** in September 2015 located at the French lycée in Mexico City, the ultimate aim is to train (in a collaboration with UTC Compiegne and the existing Mexican engineering colleges) the future technical managers for both French and Mexican enterprises based in Mexico. The Mexican ministry in charge of Education and Higher Education will financially support the Mexica nationals selected, while the French and International Development Foreign Office will recruit the Project Executive Manager.

What foreign policy ambitions does France entertain that would justify this form of partnership?

At the heart of France's foreign policy objectives, support for the international actions of our enterprises and participation of the country in training schemes that address potential foreign elites are seen as major aims. In the case of Mexico, our "economic diplomacy" implements fully this thrust with our enterprises, promoting their know-how and commercial presence in Mexico, facilitating training and recruitment of bilingual, bicultural, human resources. The presence of Mexican professionals who are perfectly aware of French specifics and our enterprises, and also their Mexican counterparts, represent an essential asset. That is why, in parallel to our major student mobility programmes for engineering science students (Mexfitec and Mexprotec), we have already negotiated and created skilled technician training Centres in aeronautics and PLM (product lifecycle management) in Mexican Institutes of technology and for the benefit of French companies installed in industrial sectors in Mexico. The UTC project is remarkable in terms of its contents, its locations and through the choice of partners and is a positive addition to the overall targets, via its engineering specializes.

> Due to the excellence of the training courses we offer in HE markets and with an increasing number of players in the game, it is now necessary that our universities in France organize themselves and propose to the potential foreign students increasingly innovative training specialties, open to be able to host international exchange agreements

In your opinion, Ambassador, is it interesting (or even necessary?) to see French HE institutions getting involved, for the purpose of developing international partnerships?

More than ever before, education and academic mobility have become the object of intense competition among nations. France is one of the key players of this global competition and the image of our university system is excellent in Mexico, both for arts and social sciences and also for hard sciences and technology. This advantage and associate privileges is of course due to the excellence of the training courses we offer in HE markets and with an increasing number of players in the game, it is now necessary that our universities in France organize themselves and propose to the potential foreign students increasingly innovative training specialties, open to be able to host international exchange agreements. ■

** UTC, with the CNRS, set up the first international research unit (UMI) in Mexico.*

*** 'preparatory' to sitting the competitive entrance exams to French Grandes Ecoles (engineering colleges).*

DID YOU KNOW THAT ?

15th economy in the world

12th economy in Latin America

Mexico's industrial sectors represent 37% GDP

500 French companies are located in Mexico (Suez, Michelin, Safran...).

The objective, set in year 2015 was to double trade exchanges by year 2017.

HUMAN RESOURCES

A European distinction for UTC

Human Resources

UTC adopted the policy as of 2008 to comply with the principles of the European Charter for Researchers established by the European Commission. Since December 2016, UTC is the only French engineering college to have received the "Human resources Excellence in Research" label in this framework. This distinction denotes the high level of compliance with ethical and deontological principles, in terms of recruitment and quality of its scientific work environment and will bring with it an increased international notoriety useful to attract non-French research scientists and engineers from abroad. When we consider that some 30% of the lecturers and scientists recruited each year to UTC are non-French, this orientation takes on a strategic connotation.

Since 2015, considerable data inputs have been collected and numerous associate working documents have been drafted. This first stage consisted of analysing our needs and defining possible action paths. "In a single year, we carried out a large amount of consultations and self-diagnosis" says Sabine Braule, Director for Human Resources (UTC-DRH). To ensure efficient monitoring functions, a project team was set up with Lydia Vignolle-Dupré, Deputy Director at UTC-DRH, Marion Kaczkowski, Head of Administration of the PhD and academic Poles at UTC and also Stéphanie Rossard, in charge of European and International Projects. Consultations were organized with a group of research scientists and certain university governing staff were also approached and questioned. This collective approach had as its objective to record various points of view in regard to potential improvements to help our level of compliance with the Charter values. "The idea was to propose paths to generate continuous improvement of our practices in order to maintain and bolster an "excellence" policy thrust at UTC, positioning the university in the European Research Area (ERA) and to contribute to the university's notoriety on the international scene", says Anne-Virginie Salsac, a CNRS research scientist who has worked for the past 10 years at UTC-BMBI (Bio-Mechanics & Bio-Engineering) after spending 20 years professionally in the USA and in Britain. She is in charge of a CNRS-UTC team of 20 persons and is very happy with the arrangements that enhance job proposals, underlying the high level of attractiveness of the positions offered. "It is paramount that we internationalize our hunt for candidates, improve the visibility of our research units, Internet being just one medium and to ensure an "excellent" research environment. Deontology, ethics, personal merits and transparency are the key words here".

It is paramount that we internationalize our hunt for candidates, improve the visibility of our research units, Internet being just one medium and to ensure an "excellent" research environment. Deontology, ethics, personal merits and transparency are the key words here

Encouraging mobility of European research workers

Among the 33 actions selected, one important feature has been enhanced transparency of recruiting protocols. For numerous years now, UTC has developed an equitable "equal chances" recruitment policy, setting up wider selection committees present at the recruitment interviews. In the new framework of the European label of HR "excellence" distinction, the university now wishes to push even further ahead. The project calls for a post-interview synthesis to be provided for all candidates that will enable them to progress and turn a possibly negative interview, viz., ending in a refusal, into a positive step. All research positions opened for recruitment will be notified in the EURAXESS base, which hopefully will draw more non-French candidates. This continuous improvement arrangement will gradually be completed by other new measures, with the aim to progressively comply with all 40 objectives set out in the Charter*. Progress in our priority thematics here will be assessed end-2018 by the UTC Project team. In 4 years' time, the work will be evaluated by external examiners from the 15 other European institutions who have benefited from this label and distinction. ■

** https://euraxess.ec.europa.eu/jobs/charter*

PEDAGOGY

A serious game in logistics

A serious game, modelling a 6 months logistic supply chain, saw 150 participants together at the Sports Hall, Jan. 5, 2017. This was a marked exercise that enabled an operational assessment of 28 students registered in the UTC Mechanical Engineering course (UTC-GM), elective specialty Integrated Production & Logistics (GM-PIL).

"With my lectures at UTC, I use several serious games in the course of the year, but this is the first one that took a semester to prepare and a full day to play out", explains Joanna Daaboul, lecturer at the UTC Roberval Laboratory, and whose initiative this game was. Three written exercises in the semester were devoted to preparing the game. With a printed market description, including sales records over 3 fiscal years, the students were required to predict the demand over the coming 6 months and elaborate a contract policy

strategy with the suppliers, also including with stock management, production lines, distribution networks, price setting, transportation and human resources needs, number of production sites and store outlets. The location of the factories and storehouses was determined on a floor map of the sports hall, reproducing transportation issues, to scale. "Normally the resolution of these kinds of problem call for algorithmic work and calculations often seen as tedious and even difficult, but in this game environment, the students showed astonishing motivation and interest despite the vast amount of work needed", adds our lecturer, a specialist in industrial engineering.

From the suppliers to the customers

All the steps, running from raw material procurement through to sales of the finished products to end customers are represented. The product here is simple – a flower set in a candle, where each team tries to lower costs and delivery dates while proposing a range of colours for potential customers' product choices. Moving baskets represents the transportation phases. The role of the suppliers is occupied by the 'opposite team', which tends to make the negotiations harder. Then, a total 90 UTC students, academic, 'admin' and support staff came in to act as clients (for free). They each picked a card from a deck, indicating various levels of expectation in terms of aspect, speed or order handling … to reproduce the variety and evolution of demand side. At regular intervals the students' performances were assessed leading to a real-time evaluation of a month's activities. To finish, we concluded that the first edition of this game was a friendly and pedagogically successful event. The 'winners' were awarded the mark of 18/20, well in excess of the professor's expectations. "We definitely want to do this again, in December 2017, with a serious game on Xmas decorations, thus combining the seriousness of the work with a seasonal pleasure", adds Joanna Daaboul. ■

START UP

from the UTC Daniel Thomas Innovation Centre
to the French vineyards

Students' associations at UTC are always highly rewarding places, if you want to do sports, dance, use a Fab'Lab, join the Junior Enterprise, you name it …. Students are encouraged to sign up with one of the numerous associations on campus. Now, here is a choice that turned out to be less anodyne than you can imagine. Cédric Bache, a member of the UTCoupe Robotics Club when he came to UTC has created his own robotics-intensive start-up, viz., Vitibot.

Cédric Bache, graduated from UTC in 2015, majoring in Computer sciences & Applications and his discovery of the UTCoupe association unleashed a real passion for robots. The idea of creating a start-up came naturally: "Both my parents are winegrowers and so I started thinking about the possibility of applying robotics to this area, by automating a vehicle that is already used in the vineyard".

Cédric began developing his project while still at UTC, with another Computer science student, Virgile Wozny, choosing the most relevant CCs (credit courses). "In a particular CC on virtual reality (VR), we modelled the vines, plus the robot and its sensors and we also registered in a CC on driverless vehicles. Today we are making really good use of the things we learned in these CCs, notably in respect to sensors, control and automated guidance systems".

On paper, the underlying principles are very simple to understand: suppose you have a vehicle already used by winegrowers. You then make this vehicle driverless with remote controls connected to a computer. The 'robot vehicle' is then fitted with laser and ultrasonic sensors, and on-board GPS station and 2 cameras to have a perfect vision of the robot's environment. There are also special chips to connect with a mobile network.

Automating the vehicle this way offers numerous advantages which Cédric details: "Firstly, the vehicle can be multi-purpose: phytosanitary spray campaigns, mechanical weeding … secondly the winegrower can avoid serious accidents due the vehicle overturning on steep slopes and likewise can avoid getting sprayed with chemicals. Thirdly, the robot can work at night and thereby use less spray chemicals profiting from absence of sunlight (less evaporation), low winds, less rain. And the fact that the robot is connected to and controlled via a computer means that monitoring operations can be real-time with assistance instantly provided if a doubt arises in respect to the robot's environment".

Our two entrepreneurs in the launch phase of their start-up and business propose the robot as a commercial service to winegrowers. "We deliver the vehicle to the site chosen and programme it accordingly. This way we have been able to operate two prototypes to the full satisfaction of the winegrowers who accepted". To complete the team, a third UTC graduate, Thomas Recouvreux, has joined Cédric and Virgile. Thomas will offer his know-how and experience as a developer-entrepreneur (he was a co-founder of Nemoplay, bought out in December 2015 by Weezevent, a specialist in on line ticketing ad registration).

In the long term, Vitibot envisions designing and building its own vehicles which our young engineers see as "very compact because of the on-board automation, all-electric which will allow the machine to retrieve and use converted potential energy generated by going downhill in the vineyards. We hope to have a first prototype ready for testing by late 2017". ■

www.vitibot.fr

AGENDA

interactions.utc.fr • www.utc.fr

Cré@apic "Sport & Nutrition"
March 2, 2017 Innovation Centre, UTC
UTC and PéPite Picardie (the Picard Students' Cluster for Innovation, Technology Transfer and Entrepreneurship) will be organizing the 3rd edition of Cré@apic, a special day devoted to creativity and entrepreneurship for students in Hauts-de-France. The students will have 6h to expose and propose ideas on the following theme: Sports & Nutrition – how can we improve our wellbeing and health tomorrow?

Summer schools at Innovation Centre, UTC
www.utc.fr/international/ecoles-internationales-institutionnelles-eei.html

Creative Interaction for Dance, Music, Painting
June 26 -July 9, 2017
This summer school is a virtual reality (VR) approach to dancing, to music and art painting. Students will have the opportunity to better understand and immerse themselves in virtual environments, via their VR helmets, a special VR room and systems for movement sensing. The objective of this Summer School is to explore and design various creative, innovating interactions in virtual and augmented reality environments.

Culinary Science for Tastier, Healthier Food'
July 17-28, 2017
UTC will, once again, be proposing a Summer School on the theme "Culinary Science for Tastier, Healthier Food". The School will enable its participants to become familiar with basic notions related to foodstuffs in agro food preparations, e.g., texture enhancement and other additives. Two days will be set aside specially for French culinary specialties.

A science-intensive play 'Ultimes Cérémonies'
March 11-21, 2017
The theatre company Les sens des mots imagined and produced Binôme, a series of theatre plays written after a meeting between an author and a scientist. Anne-Virginie Salsac, lecturer and research scientist at UTC, participated in the project with a play 'Ultimes Cérémonies', following suit to her meeting with a prolific writer, Catherine Zambon. The play will be performed during the Forum Arts Sciences Technologies Education, March 11 to 21, 2017 at « La Faïencerie » de Creil.

A William Andrew Goddard seminar
March 16 2017
Dr Famhi Bedoui, lecturer and research scientist at UTC Robetval Laboratory and adjunct researcher at the Materials and Process Simulation Center, California Institute of Technology (CALTECH), has invited Prof William Andrew Goddard, Professor of Chemistry and Applied Physics, and Director, Materials and Process Simulation Center at the California Institute of Technology to deliver a seminal talk at UTC March 16, 2017.

6th edition of the JETSAN Conference (special remote healthcare day TéléSANté)
May 31 -June 1st, 2017
The University of Orleans will be hosting the 6th edition of the JETSAN Conference (special remote healthcare day TéléSANté), co-organized with the UTC-BMBI Laboratory (Bio-Mechanics & Bio-Engineering) on the theme "Connected healthcare". The aim of this special day is to provide a state-of-the-art update on the technologies, the methodologies and the applications used in remote health care projects.

AIR & COSMOS'/USAIRE COMPETITION

A digital revolution in aeronautics

Two UTC undergraduates were awarded 5th Prize in the 'Air & Cosmos'/Usaire competition, Nov. 25, 2016 for their work in aeronautical innovations made possible by using digital applications. Every year this event, sponsored by major European and American private sector and military companies reward the work of future engineers about some key problems that remain in this field. Year 2015 had as its central theme the environment while 2016 was devoted to digitalization of the aircraft industries.

This A&C/Usaire Award is seen as an encouragement for young engineers who already have a well6engrained aeronautical vocation. Arthur Bouchaud – currently doing a double degree course between UTC/Cranfield University, England – recalls "while in my first year at UTC, I took part in a Caudron C430* reconstruction project with the Circle of Flying Machines association, based at Margny-lès-Compiègne". The C.430 goes back to, the 1930s. After a year working with SAFRAN, his class-mate Clément Chevalier is now working with THALES. Meeting some of the aircraft engine and airframe members of the Award Jury served to reinforced his list of contacts.

Imagining the future of aeronautics

Our two UTC aeronautics fans gathered a huge amount of documentation, addressed numerous questions to professionals and to UTC Prof. Yann Moulier-Boutang (a specialist of digital economies) to try to have a glimpse of the opportunities for digital technologies and connected objects in these air-space companies and for users. Given the scope of the subject matter, they chose to focus on aircraft maintenance issues, sharing of aircraft among the companies and pilot-less aircraft. In order to improve safety measures via preventive maintenance programmes and to lower overall costs, they imagined a series of sensors that would ensure real-time aircraft in-flight monitoring or a scanner device integrated to a portable pad PC to check all the components involved without requiring dismantling of units. This continuous monitoring of aircraft allows you to envisage more aircraft sharing among companies. As Arthur explains "The number of air transportation passengers is expected to double up in the coming 20-25 years but the operators no longer have the financial capacity to purchase new aircraft. What we imagined was something on the same line of car-sharing and we proposed a share scenario". The advent of pilotless aircraft is also among the hypotheses examined. "Technically speaking, this is possible, but socially it is not yet deemed acceptable. We would still have to prove mathematically that this mode is safer." asserts our UTC-GM (mechanical engineering) student. The hypothesis provides a status report on available technologies and also on the legal and/or human factors that are at play when innovations arrive. ■

** The Caudron C430 Rafale, a two-seat, monoplane made its maiden flight on May 22, 1934. Jean Mermoz and René Fonck, famed pilots of their time were trained at the Ecole Caudron in the Hauts-de-France. Hundreds of civilian or military planes were produced by Caudron in the last century but only two models of the C430 Rafale. The "Cercle" in a collaboration with UTC, agreed to rebuild the mythical C430 and the Latécoère 28 on which Jean Mermoz was the first to cross the South Atlantic, May 12, 1930.*

LA TECHNOLOGIE VUE D'AILLEURS

Innovation under pressure

Olivier Delcroix, who graduated in 2008 from UTC with the major 'Computer sciences and applications', decided to create Compellia, a start-up in France, after enriching experiences in both the Argentine and Spain. As Olivier sees it, differences in innovation between countries stem from differing demand formats enforced by their market-places.

Tell our readers why and how your experience in Argentina was enriching after your university years.

I chose to come to UTC for its international vista and outreach. Then, following a semester at the University Del Salvador, Buenos Aires, I decided to stay in the Argentine to work for a company Globant. Here we had a set of pioneering creators who were strongly inspired by what they observed in the Silicon Valley America, work styles and methods. That enabled me to access the very best in called computer science and applications developments before they reached Europe. I learned what are agile techniques, which allow you to come with computer science solutions very quickly. Customers are regularly associated with project progress so that the final product, delivered very rapidly, corresponded exactly to their expectations. In just a few months, we completed a job that normally would have taken a year using classic consultations, finalized prototypes … Not only is this approach long, but the chances are one to ten that the solution finally proposed is found satisfactory by the customer! To attain this sort of efficiency level, we hold project progress get-togethers every morning. These scrum-meetings are very short – twenty minutes approx. max – but they allow everyone to have their say. The participants do so standing up this alone incites each person to be "to the point" in his/her expose …

What were your impressions when you returned to Europe?

My impression was that of travelling back in time. The work-place techniques I had learned in the Argentine were not yet in use here. My return also taught me to think about the way national markets operate with respect to innovation dissemination. I realized that the solutions available varied a lot from one country to another. In Spain, for example, texting is not unlimited as in France but is a pay-service. To get round this hurdle, the Spanish were quick to adopt WhatsApp® (USA) several years before the French. Another example, in Rome, Italy, there are very few public transports means, so the Italians develop the car-sharing app Enjoy

which allows you to geolocalise cars free for hire and to leave this car almost anywhere when the trip is finished. In Paris, there are numerous Metro-lines and stations, so your car-share Autolib relies on just a few stations for its service outlets.

So, why did you choose France to locate Compellia?

In fact, it was the opportunity I had to get a job with a start-up that encouraged me to set up shop in the Paris area. The French digital scene, Paris particularly so, is a hive of activity. There are some excellent incubator-nurseries there. A French Tech subsidy helped us develop the data analysis brick that we at Compellia propose. In e-trade and digital marketing where we are quite active, several leaders such as Criteo are French. There is also a Greater Paris market-place for e-trade site monitoring that we also propose at Compellia.

I had learned in the Argentine were not yet in use here. My return also taught me to think about the way national markets operate with respect to innovation dissemination. I realized that the solutions available varied a lot from one country to another.

In your opinion, what country appears the most attractive for a digital entrepreneur?

In Portugal, Lisbon has made considerable efforts to attract start-ups. The most recent Web Summit registered some 40 000 persons from all over the world. Many cities are vying with each other in the digital market, such as Berlin, Tel Aviv, London or Paris. The choices are wide open! Nonetheless, the USA still remains a leader and a standard-setter. The new e-marketing trends come from the USA. Personalised site presentations and contents for sites are tailor-made to fit the customers and now are among the latest innovations from across the Atlantic. ■

INTERNATIONAL RESEARCH

Artificial organs and stem cells

Eric Leclerc, senior CNRS research scientist posted to UTC-BMBI (Bio-Mechanics & Bio-Engineering) is currently seconded to the Integrated Micro-Mechatronics Systems (LIMMS), a mixed international unit reporting to both the CNRS, France and the University of Tokyo, Japan. Eric Leclerc is co-director with his Japanese counterpart, Professor H. Kawakatsu. Apart from his responsibilities in directing the LIMMS, Eric Leclerc is pursuing his resrecah activities on micro-systems (organs on chips), in particular, cultivating induced pluripotential stem cells.

Prof. Cécile Legallais, deputy director of UTC-BMBI was invited to take part in a Workshop on the theme: 'Innovation and new technology bridging academics and societal demands' and on this occasion she visited the Laboratory. She was favourably impressed by the quantity of state-of the art equipment at their disposal and by the high commitment of industrial partners involved in the laboratory's activities, underscoring the rich interactions between industrialists and research workers. ■

In the framework of the national Days on Health Issues held January 27-28, 2017 at the Cité des Sciences et de l'industrie, Paris, Cécile Legallais gave a talk and participated in the Round Table on the theme "Living with Artificial Organs", organized with UTC-BMBI and LIMMS, Tokyo.

https://laradio.cnrs.fr/broadcast/1228-Vivre-avec-des-organes-artificiels

UTC 'Sports Elite' Women

Pistol

Fanny Batier
Undergraduate majoring in mechanical system engineering (UTC-GSM)

French Women's Champion de France –Pistol 25m (2013)

7th at the European Championships (2013)

Athletics

Marie Gayot • UTC graduate – majored in Urban System Engineering (UTC-GSU) • Currently Management Consultant for Innovative Projects at ONEPOINT

Semi-finalist Women's 400m aux World Championship (2013)
Double champion at the France Indoor Championships Women's 400m (2012-2013)

Quad Cross

Justine Lesselingue • UTC graduate majoring in Mechanical Engineering (UTC-GM) • Currently research and services engineers at the CETIM

French Champion at the 'Quad sur Sable' (Sand Race) (2013)
French Champion de France Quad Cross-Country

Discovering the first letter of the new
A to Z, in Innovation

Synthetic Antibodies

Jeanne Bernadette Tse Sum Bui presents our readers with one aspect of her research work at the UTC-GEC Laboratory (Enzyme & Cell Engineering) -FRE UTC CNRS 3580.

utc Université de Technologie Compiègne
SORBONNE UNIVERSITES

Interactions
interactions.utc.fr

Director of publication
Alain Storck
Editor-in-chief
Nadine Luft
Editors
Marilyne Berthaud
Bénédicte Haquin
Jonathan Menerat
Olivier Moulergues
Design/Realization
L'agence
& Dorothée Tombini-Prot
Assistant
Corinne Delair
Photos p. 3, 18, 19, 20
Eric Nocher
Translation by
Alan Rodney, BABEL TWO
Printing
Imprimerie Lesaffre

UTC-CS 60319
60203 Compiègne Cedex
www.utc.fr

Imprimé sur papier certifié
ISSN 2267-9995

Avec le soutien de

PEFC-Certifié
Ce produit est issu de forêts gérées durablement et de sources contrôlées.
PEFC/07-31-184 www.pefc.org

Synthetic antibodies are biomimetic materials in the form of minute polymer particles moulded round a target molecule in such a way that they preserve its "print". Hence their specific property, viz., capable of recognizing and neutralizing this target exactly as an antibody does with a pathogenic agent.

"We call these synthetic antibodies molecularly imprinted polymers (MIPs) and they have been known for some time now", ", explains Jeanne Bernadette Tse Sum Bui, research scientist at the UTC GEC Lab (Enzyme and Cellular engineering). "However at UTC-GEC we are working on new applications. With the company L'Oréal, for example, we demonstrated that the MIPs could act as active ingredients in deodorants, inasmuch as they can capture and sequestrate molecules that lead to transpiration odours before the bacteria present on our skin degrade them into volatile, foul-smelling compounds". The advantage here is to forego use of certain ingredients in classic deodorants, e.g., aluminium salts that are potentially toxic and carcinogenic and/or antibacterial products while in the long term can disturb seriously the skin flora that naturally combat pathogenic agents and hence encourage the arrival of resistant bacterial strains. MIPs do not alter skin flora at all. And, even though they are microscopic, they are still too large to penetrate the skin barrier.

"Synthetic antibodies are also proving to be promising in biomedical applications", underscores Jeanne Bernadette Tse Sum Bui. "Today, we are seeking other possible uses as bio-markers for various ailments – for example, sialic acid the presence of which in large quantities may indicate a case of cancer. Here the idea is to develop MIPs that target the sialic acid molecule and integrate a fluorescent monomer which displays a colour when excited by a light-source. By observing a cell biopsy with these MIPs under a fluorescent sensitive microscope, we see the colour marks each of which designated a sialic acid molecule captured by an MIP. This should prove an efficient way to quantify the sialic content accurately and to determine whether the cells in question are really cancerous or not".

Better still – MIPs could also serve as medicinal vectors for certain ailments, releasing their active ingredients on site (viz., delivered to the ill tissues without procuring any unwanted side-effects on healthy tissues. This is a research area that UTC-GEC intends to explore soon. ■

BIO EXPRESS

Background

- Masters in Chemical Engineering, UTC
- PhD in Biochemical Technology, UTC
- Habilitation 'Biotin synthase and iron-sulfur clusters chemistry', Université Pierre et Marie Curie, Paris

Research Topics

Development of molecularly imprinted polymers and their applications in sensor technology, separation techniques and drug delivery

Keywords

Molecularly imprinted polymers (MIPS), nanosensors, array chips, bioanalysis, affinity separation