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Donnons un sens à l'innovation

Interactions

LES DOSSIERS

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You have the floor

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"FROM THE PRESIDENT'S DESK

Did I hear 'creativity and innovation'?

This 30th issue of Interactions makes for truly excellent reading, with the amazing diversity of areas, richness of ideas and their pervasiveness, in the numerous projects where UTC staff, PhDs, graduates and students, are clearly national and international front-line runners.

We can legitimately be delighted when we note the range of fields and areas of application, whether they are in big data processing and mining, flood protection models and experiments, expression of emotions in electronic music ambiences, giving expert advice and accompanying professionals in environmental health issues or bringing artists and potential clients together in trading tailor-made works of art.

Our readers can only be astonished when they see the range of tools available to accompany the projects: an IDEFI programme in the Government's "Investments for the Future" incentive, with the launching of a minor inter UT (universities of technology) credit course on Innovation and International development aspects of SMEs, the calls for proposal by the Picardie Regional authorities who are investing several tens of Meuros every year in research activities, the i-Lab competition initiated and supported by the Ministry for higher Education and Research to promote aids to enhance and enable enterprise creation and innovative technologies, the Tremplin Business Club or the IDEX cluster Sorbonne Universities.

UTC's Innovation Centre – to be officially inaugurated November 5, 2014 by Geneviève Fioraso, Minister for Higher Education and Research – will have special role to play in accompanying the emergence of the projects and novel ideas (new activities, processes, services, start-ups…) on the road towards implementation and success. Seen in this light, the Innovation Centre must be successful and it purpose instilled in every mission, project and unit of our institution.

Beyond its two fundamental missions, viz., training and research, UTC chose innovation and creativity as the third institutional priority and, in so doing, endowed our university with this original blend, based as it is on a co-construction of technologies and engineering sciences, social sciences and humanities and on the societal responsibility we fully accept given the challenges that face Society today.■

Alain Storck
President and Vice-Chancellor

UTC start of term 2014: Mankind at the heart of the UTC system

380 new undergraduates registered for the Common Core came to Compiegne Sept.2, 2014 for their start of term. The number of candidates who chose UTC as their "first choice" is again on the increase (compared with 2013), with a higher level of selection and an increase in the number of "cum laude" baccalaureates; the specialty Social Sciences, Humanities and Technology marked a clear success, with 800 candidates for 27 places offered, 7 coming from the Baccalaureates L (arts) and ES (economy and social sciences). ■

http://webtv.utc.fr/watch_video.php?v=14NG987NBNSU

Together for the City, second edition

Thursday, September 4, 2014, UTC's graduates and new undergraduates came together for a second edition "serving" citizens' needs in Compiegne and its surroundings. More "citizen" challenges were proposed this year: improving school play-grounds, cleaning up the Forest of Compiegne, installation smoke detectors at home … ■

http://webtv.utc.fr/watch_video.php?v=5UB3R6BOYR29

HE Edith Cresson gives her vision about Europe

Tuesday September 2, HE Edith Cresson, (French Prime Minister 1991-1992 and European Commissioner for Research, Sciences and Technology 1995 -1999) gave a lecture on how she sees Europe today to a Brazilian delegation visiting UTC, «MBA em Gestão Estratégica da Inovação». ■

http://webtv.utc.fr/watch_video.php?v=5UB3R6BOYR29

SAVE THE DATE

UTC's Innovation Centre inauguration Nov. 5, 2014 with Minister Geneviève Fioraso

UTC's Innovation Centre will be inaugurated officially November 5, 2014, in the presence of Geneviève Fioraso, Junior Minister for Higher Education and Research.

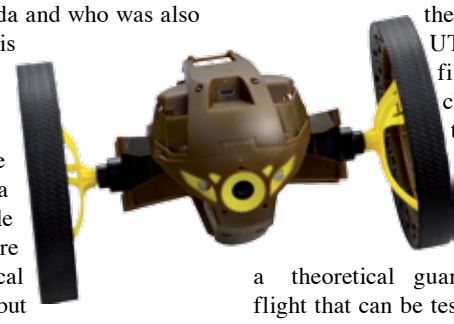
The ceremony will provide the opportunity to present some of the unique technical platforms already installed in the Centre: the movement acquisition room, the 'Fablab' with its 3D printers, the CVirtula Relaity facilities, the 'creativity rooms', the workshop dedicated to Cars of the Future and the Entrepreneurs' Area. ■

WORKSHOP

The future of robots predicted at UTC

Following suit to the Austrian University of Klagenfurt in 2013, UTC was happy to organize the second edition of the international workshop MUVS (acronym for Multi Unmanned Vehicles Systems). June 30-July 3, 2014, some 40 academic and industrial experts joined forces to make a status report on unmanned vehicles and identified several potential partnerships and follow-on research topics.

Communicating robots, drone control in fleet flying formations, uses in the event of natural catastrophes... the subjects were very varied and were introduced by three experts: Javier Civera, University of Zaragoza (Spain), a specialist in vision issues; Vijay Kumar, University of Pennsylvania, a specialist in control questions; and, lastly, Ivan Stojmenovic, University of Ottawa, a specialist in communications. "They are all world-class experts in their specialities", adds Enrico Natalizio, UTC Heudiasyc Laboratory who co-organised the Workshop with Isabelle Fantoni and Vincent Fremont. Vijay Kumar, for example, is well known for succeeding in having a swarm of drones play the James Bond Theme and that is a real and spectacular achievement. Vision, communication and control are key to tomorrow robots, as Angela Schoellig explains. Professor Schoellig is in charge of the Dynamic Systems Laboratory at the Institute for Aerospace Studies at the University of Toronto, Canada and who was also with the organization team for this UTC MUVS 2 Workshop. Her research is at the cross-roads of robotics, control and learning. "What we aim to do a create robots capable of moving in a self-reliant manner and a capable of carrying out tasks that are useful for humans. Mathematical programming is necessary but this is not sufficient. It implies that the robots have their own integrated vison plus the possibility to communicate among themselves and with humans too. The three specialty domains must co-operate if we want to have efficient self-dependent vehicles". Professor Schoellig's laboratory has an international reputation for robotic control and has already participated in a research project that began just after Workshop I, where Angela addressed the audience. That was where she met Enrico Natalizio, who proposed that she help organize the UTC Workshop 2. "I think we have enjoyed a successful event; the return messages have all been positive and the programme paved the way for contacts and exchanges among the persons present".



Setting up links between North America and Europe

The experts met at UTC in a convivial ambience, that Enrico Natalizio would like to see preserved. The workshop generated the wish, shared by a half-dozen research scientists, to upgrade the workshop into an international conference. Enrico Natalizio, Angela Shoellig, Javier Civera and others are undertaking the steps need to attain this objective. "We would like to build an international community with experts in three strategic domains, and a critical mass to accelerate innovation," explains Enrico Natalizio. The research scientists who came to the MUVS Workshop appreciated the mix of scientific specialties, underscores Enric Xargay, University of Illinois, whose research focuses on unmanned vehicle coordination. "We are concentrating our current efforts on controlling paths of MUV fleets, defining the associated algorithms. That was why it was very interesting to attend the UTC-MUVS Workshop. I learned a lot about robotic vision, communication and I might even be able to integrate this in my own work. There are few links between the USA and the EU in the field of robotics research. The UTC-MUCS Workshop partly fills the gap. We share certain challenges, and we shall be able to exchange much more when it comes to developed solutions". In his Illinois laboratory, the main challenges analysed relate to algorithms capable of providing a theoretical guarantee for a satisfactory (safe) flight that can be tested live in real flying conditions. "We are initiating a programme to cover the energy autonomy of drones when a battery is not sufficient as the source – we are looking at in-flight wind and solar potential inputs", adds Enric Xargay. During the Workshop, Enric (an American scientist) noted that there is a similar research programme under way at the CNRS and he plans to contact them to learn more about this.

How can (or how should) robots learn?

As Angela Schoellig sees it, agreeing with others, robots will be largely present in day-to-day lives tomorrow. Indeed their role will be far more important than today. For the moment, robots are restricted to executing precise tasks in pre-defined environments. But in the future they could have the possibility to face up to unforeseen contexts and could evolve as we would. Angela, who works at MIT developing a project for drone s capable of measuring water quality, adds - "The first commercial applications for

drones relate to monitoring and surveillance functions, notably to give farmers the possibility to manage their cops more accurately and contribute to a much cleaner environment". But a massive introduction and daily presence of robots will only take place if we are totally assured as to the safety factor of their use. With just one bad accident, the dream of unmanned cars would rapidly evaporate. "If, on the other hand, we do our job properly, the unmanned cars could turn out to be safer than those driven my humans. To attain this level of confidence, we must create links that control situations, with vision and communication between robots specific to the robots thereby providing for detection, situation analysis and comprehension, in short to be able to react to an unforeseen situation". This calls for research into robotic learning. How can robots learn from their experience to improve their reactivity faced with given situations? How can they share the experience gained and therefore go on to collective learning modes? To illustrate – a car travelling for the first time on a road will progress slowly, recording and analysing the information need to ensure a safe trip. Next time round, the car will be able to progress more swiftly and share information with other robotic vehicles following the same route. "UTC teams are working on systems of systems, representing one of the most important challenges today for the unmanned vehicle concept," adds Angela Schoellig. "And this is very interesting for our research programme". ■

plus d'infos ▶ Laboratoire Heudiasyc : **http://webtv.utc.fr** > Nos séries > Les laboratoires de recherche

COMPETITION

The i-Lab competition : *four laureates from UTC!*

The annual i-lab competition – formerly the national aid competition for creation of innovating start-ups rewards the most promising French 'starter' candidates. The prizes were distributed by the minister in charge of Higher Education and Research, during a ceremony July 1, 2014. Out of 221 laureates in the 2014 'class', 4 projects "made in UTC", described below.

Linkurious, simplicity in handling big data sources

Linkurious addresses the challenges that lie in handling and processing big data. "Our software enables business managers to analyse and use their data in a simple manner", says Sébastien Heymann, a UTC computer science graduate (2009). An example of application can be detection of fraudulous practice in the framework of bank loans. One of the techniques frequently used by certain Mafioso networks consist of 'building' so-called synthetic credible identities difficult to detect, a mix of true and false information so as to produce false or stolen identities. "After several months or even years, the thieves obtain loans from a wide range of accounts and then simply disappear with the money. Linkurious allows users to cross-check the data used for synthetic IDs and to detect suspicious assemblies". Beyond the banking and insurance sectors, Linkurious software can be used in a wider range of sectors, running from telecommunications to health, and including the software editors who may want to integrate the package into their own products and solutions.

150 customers, 90% business in the USA

Linkurious was established January 2013 and now has a portfolio with over 150 customers; 90% of the company business turnover the USA. "Our added value lies in the simplicity to use our software. Our competitors propose far more complex packages, or more specialized for a given application area. We are counting on a turnover of 200 000 € for year 2014" predicts Sébastien Heymann, associated with Jean Villedieu (graduate from Sciences Po Lyon) and Romain Yon, a UTC undergraduate finishing his studies at Spotify. The start-up was incubated at Telecomm Paris Tech but Sébastien Heymann had the idea of the company following his involvement in developing the Gephi open source visual analysis software for which was designed at UTC (cf. Interactions #24) used by LinkedIn and 500 000 other end-users. Between 2009 and 2013, Sébastien Heymann presented his thesis at University Paris 6 on analysis of dynamic graphs to detect events, and at the same time, he was developing the Linkurious software package. "After spending more than 6 months improving on Linkurious, using customer returns, we started selling the product a year ago. Today our customers are asking for an enterprise version, whereas the current package runs on a single work station. It was an R&D challenge, hence our participation in the i-Lab competition", recalls Sébastien Heymann and, since the start up was the winner in this category, it will receive grants to cover recruitment of an engineer and to accelerate the company's R&D, in the category creation-development. "Now that is great news for us! The grant in itself is a terrific sign of strong recognition, enabling us to gain precious development time and to set the company potential free", adds associate Villedieu. By year 2016, Linkurious aims at having a set-up in the USA, where companies are more aware (and sensitive to) of the stakes behind big data than we are in France.

Myartmakers, a digital partner for artists

Myartmakers fait ses débuts dans le monde de l'art. Myartmakers is beginning its business operations in the world of art, its platform being launched in March 2014 proposing to create links between artists and potential customers. So what is the underlying principle? Anyone who wishes to possess a personalized piece of art-work places an order via the site, using a form with the basic ideas, the size, the frame, supports, etc.: all these points are taken into consideration. Artists who consult the request can choose to follow suit, proposing an estimate. If the prospect is attracted by one of the offers, Myartmakers sets up the connection between artist an customer and ensures exchanges up to delivery, with a 15% commission (paid by the artist) which is a level less than in street galleries (50%) and also specialist Internet art sites (20-30%).

Art moves into the lean start-up field

« Myartmakers is seeking to meet the artists' needs, inasmuch as the latter are reneging at seeing their work in a digital context and they do need help when it comes to selling art-work over the Internet. What we do is to position ourselves as a digital partner. Today the site has a pool of over 500 artists; 20 orders have been placed on line and 3 have already been finalized", says Adrien Saix, co-founder of Myartmakers. The platform was developed in compliance with the rules lean start-ups, and is continuously improved as a function of customer/prospect returns. "We now have an art gallery to propose art-works that have been finished, a system to assess the artists participating, a social network and we have other projects under way". Adrien Saix met his two associates, Dertrand Debrie and Yohann Doaré when he was doing a specialist Master's degree at HEC, after graduating as an engineer from UTC in 2012 with the Urban Systems Engineering specialty. The ambitions of the trio are simple and straightforward: to become the reference Internet platform for modern art. While awaiting this goal, year 2014 is to be seen as the one in which they will learn to 'read the market'; the Myartmakers project won

Guillaume Rolland

Guillaume Rolland, who came to UTC Sept.2 for Common Core courses, developed an 'perfumed' alarm clock where the wakening is accompanied by diffusion of scents of essential oils. He has already collected a number of awards and prizes for his invention: Gold medallist at French Concours Lépine, the Prix Euro for the Ortenau district Strasbourg at the European Concours Lépine, the WIPO Prize (World Intellectual Property Organization), as well as a Gold Medal and a WIPO Certificate for 'Best Inventor'. Guillaume was the only Frenchman out of 15 candidates at the Google Science Fair, but was not the laureate. "Well, at least I was in the 15 international finalists - you cannot win all the time !". Nevertheless, he enjoyed his stay at the Google Home Office where "we had all sorts of incredible demonstrations – Google Car, Google Glass …). My perfumed alarm clock was interested a number of US investors and that's a really encouraging signal for the future". ■

The UTC Business Club Tremplin Prize

For the third time this year, the Business Club Tremplin organised an evening event on the theme "Developing and financing a business", Monday Sept. 22 at the BPI. After an opening address by Prof. Alain Storck, President and Vice-Chancellor UTC and an address by Laure Reinhart, Director of Partnerships and Innovation at BPI Financement, the evening the held a honorary prize award ceremony. The company Novitact – who developed touch connected objects - was awarded the Innovation and Creativity Prize; Avis en Vert received a prize for Sociable and Sustainable Development, proposing consulting services in environmental health; Coldinnov – a startup specialized in producing cold from recuperated heat was awarded the Industrial Development Prize; the Surprise Prize went to Myartmakers, a software platform company where personalized artworks can be ordered on line. Last but not least, TEM Project who developed a computer based system to create high quality music in a very simple manner was awarded the Promising Project Prize. Marie Gayot, a UTC student in the Urban System Engineering specialty and Gold Medallist (Women's 4x400m) at the European athletics meeting in Zurich was guest speaker telling how she manages her life of high level athletics and engineering studies at UTC. ■

http://www.tremplin-utc.asso.fr

over the i-lab jury – the start-up finished selection in the top ten laureates in the category "Emerging projects". They received a 10 000 € check which is precisely the amount needed to rebuild the site, integrating the latest (as yet confidential) features. The company also came out very well indeed at the national competition for enterprise creation organised by the marketing consultants Netetudes, winning first prize out of 704 candidates.

Tem-project, digitized musical emotions

Sounds in electronic music, whether they are pre-recorded or CPU generated, can only be programmed and not really played. Musicians become technicians, since they cannot control their production in real-time. So, the question is how do they preserve their artistic freedom and find a pleasure in their music? "The market is looking for a solution to assure real-time control intuitively electronic music output. The TEM-Project (acronym in French for Musical Expression Touch-Key) provides the solution" says Alexandre Bellot- co-associate. Eric Simon, a UTC graduate and the TEM pioneer, when he was doing an internship at University Paris 7 (Pierre & Marie Curie) discovered a simple cheap way to reproduce Martenot waves (so-named after a French inventor of electronic music toward the late 1910s. His little known instrument was used by Edith Piaf, Jacques Brel, Gorillaz and today Daft Punk.

'Looking desperately' for production engineers

With his instruments duly patented, Eric Simon began to assemble the musical controller prototype, with simple tools and means to hand. Victor Grimaldi, also a UTC graduate, joined Eric and developed the software needed to handle the controller, somewhat similar to the key on a computer deck and fitted with a return effort factor. Joseph Orlinski accompanied them in their work. They then presented the TEM-Project to SATT Lutech (cf. Interactions #29) to seek support to accelerate development of their product. Indeed, the 'big-shots' of the music industries were also in the innovation race. "At the time, I was business analyst at SATT Lutech and I recall helping Victor and Eric to put their investment dossier together. They were selected in April 2013 and that allowed them to consolidate their team before I joined with them in this adventure", says Alexandre Bellot who had graduated from ICAM (catholic engineering school). "The strong point of the TEM project is to have been able to build a prototype rapidly using a 3 D printer so they could test the instrument with real musicians and thereby constantly improve on the product. Some 'big names' in music were contacted and they answered positively". Today the company is at the Paris "104" incubator and the TEM-project is now moving ahead from a R&D phase to full product development. Apart from the five recruited via support from the SATRT Lutech group, including Mathieu Talbot, both a UTC graduate and a musician, to pursue development of the software, the start-up is now looking for a marketing director and a qualified mechanical engineer to set up the production assembly line. TEM-Project was declared a laureate of i-Lab in the category PEPITE – Student Entrepreneurship prospects; they received a check of 5 000 euros to help prepare the launch period of the product, planned for early 2015. "What we have is a very demanding market place and we are proposing an inexpensive solution, somewhere between 150 and 350 € a unit, for an intuitive controller that will not unduly upset the musicians in their art and performance".

e-plays, electronic music under control

With its certification by UTC's Innovation Centre in early 2014, e-plays was declared laureate in the category 'emerging companies' in the i-Lab competition. Special feature: the project is managed by a UTC lecturer research scientist, Jean-Baptiste Guignard, who teaches linguistics in the daytime and is a professional musician at nights. " 'E-plays' stand for Electronic Pilot Launch Adaptable Yoke System, and uses a very simple principle: it is a real time sound file controller. With a simple remote hand movement, it changes the 'intentions' but not the tonalities". No more 'Big-8' ups and down of octaves as the music temp accelerates or slows down! The project has its origins in late 2012 and a crazy idea (with an opera company) using Lulu by Alan Berg, a dodecaphonic contemporary work difficult for a non-initiated public. In parallel, the electro-musical group StaticObserver with whom Jean-Baptiste is author-lead singer-composer was looking for a similar solution. "UTC's Innovation Centre paid for the development of a prototype of the solution Jean-Baptiste had imagined and this is currently being assembled. It is in line with the logic of UTC's Costech laboratory research: viz., answering the question: how can/does technology modify human relationships to the outside world and hence impact on creative activities? E-play allow<s anyone to become an orchestra conductor", explains Jean-Baptiste Guignard, who has already set up a credit course for music at UTC (UV IC07).

A threefold trade promotion

The prize obtained in the i-Lab competition allows Jean-Baptiste Guignard to launch a market assessment study. Three sales pitch policy options are now on the table: dance and music conservatories, general public music outlets and the show-world. "In the conservatories, e-plays would be a perfect 'accompagnateur' – you save one musician and to don't have to stop-start the music all the time! For the public at large, here we have a tool that enable the buyer to endlessly personify music items and it would also fulfil some of the needs of live shows", says Jean-Baptiste Guignard. So, when the stage size does not allow you to invite the StaticObserver string 'quartet' the singer can control the recording by hand and concentrate on his rendering of the more sensitive musical parts. E-plays works combining a Smartphone®, an infra-red movement sensor and an accelerometer carried on a finger. A European patent is pending. "Following the success at the i-Lab competition, we have received several proposals to incubate and mature the project", stresses jean-Baptiste Guignard. Several routes are envisaged and among these the UTC itself seems best bet and setting: we would use e-plays as a test-project to start a regional incubator that would be located in UTC's Innovation Centre. ■

Novel research projects

financially supported by the Picardie Regional authorities

The Picardie Region has invested some 20 Meuros/yr. since 2008 for research activities, as part of the regional programme for development of higher education and research. With the regional universities, UTC and UPJV (Picardie Jules Verne) as the key institutions, the programme is designed to bolster basic 'sky blue' research for the purpose of creating long term links between HE establishments and other regional economic actors.

There are 3 strategic guide-line axes in the programme: democratization of access to higher education, valorisation of the HE establishments in the Picardie Region and development of their training/educational offer, as well as structuring aid for research and inter-establishment synergy. There is an underlying philosophy to this policy: to create a growing reservoir of students in the Region to reinforce research in 6 domains defined with the local laboratories, with the HE establishments, with the technical centres and enterprises in the Region. "These 6 domains subdivide into 2 categories" details Nathalie Van Schoor, Regional Deputy Director General for Economic Development, Research and Innovation. "The transverse and structuring axes are agro-resources, on one hand and, on the other, intermodal and energy related issues in transportation. The 4 other axes are thematic: clean and safe materials and processes, health, public services/legal, social and economic systems as well as education, apprenticeships and technologies".

Special week for research and innovation

Since year 2006, the Picardie Region has been launching calls to proposals (for thematic and structuring projects) to bolster its research policy in 6 domains. Every year, in November, the Region organizes a "Special week for research and innovation", providing an opportunity to detail projects selected in the previous year and hear presentations by the laureates, so as the regional bases scientific and economic communities can keep up to date with their progress. This Special week will take place Nov. 25-28, with some 60 thematic and structuring projects - chosen out of 125 projects that received regional financial support – presented to the public at large. All told, since 2006, there have been 147 thematic and structuring projects financed by the Picardie Region to an amount of 30 Meuros. The projects, which undergo pre-selection by the region's higher education establishments, are then analysed by an external panel of experts. "Our expert directory is a source of envy, even at a national level", wittingly adds Virginie Delaporte, in charge of handling the call for proposal at the Regional Council's Research and Innovation Department. "This level of available expertise is one of our strong points: the experts bring to us their valuable, case-relevant vision as to the quality of the projects as a function of the latest progress in the domains considered". The analyses of the experts are communicated to the project managers – regardless of their being selected or not – and this gives them an external assessment as to their strengths and weaknesses of their applications. An application that is turned down one year can be improved and re-presented a year later, as was indeed the case for the CIMDE project (cf. intra p.6).

PhDs, local facilities and attractiveness

Other procedure have been set up to complement the calls for projects. This way, some 100 PhD bursaries and over 100 man-years of Postdoc work (103 bursaries for the 3 year PhDs and 106 years for the postdocs), were distributed among the applications selected during the calls for thematic and structuring projects. The calls for projects in the category "Industrilab" aim more specifically to technology transfers between laboratories – whether they are in Picardie or not – and the regional economic profile in the areas of mechanical engineering, robotics, braking systems(transportation), agro-materials … "It is the logical follow-on to our calls for proposals in basic resrecah. Once the research efforts are mature, the actors can then look at the possibilities for technology transfers to bring a higher level of scientific excellence to the region's enterprises", underscores Virginie Delaporte.
The Picardie region also contributes to Research Development & Innovation (RDI) projects presented by the competitivity clusters, financed partly by the Single Interministerial Fund (acronym in French FUI). This very recent (2014) financial instrument takes the form of calls for projects to host high level research scientists. It is a novel measure that financially supports research scientists who have been located in the Region for at least 18 months and who are recognized for the high quality of their research work. "The objective here is to improve the degree of attractiveness of the Picardie region and its Higher Education & Research establishments", underlines Virginie Delaporte. The first laureates (3), include Enrico Natalizio UTC-Heudiasyc for his project IMATISSE (cf. intra p. 9). The Picardie region also accompanies the growing impetus of

local laboratories, contributing financially to the acquirement of new equipment, such as, for instance UTC's new electron beam microscope (cf. intra p. 15).

Complementarity and mutual understanding

"Globally speaking the Picardie Region devotes 20 Meuros each year to research activities", sums up Nathalie Van Shoor. For over 10 years now, this financial support accompanies the structuring of the region's facilities and helps the build-up of our HE and research establishments, which are fairly young institutions in France. The success that the Region has registered in its calls to proposal for the Government incentive 'Investments for the Future' programme (cf. the coverage in Interactions issues #28 and #29) is one of the positive outcomes of our long term policy aims". Today, the axes chosen for the development plan for higher education and research in Picardie also constitute the base for the so-called "S3" strategy that aims at procuring territorial 'smart' specializations, as requested by the European Union for the FP period 2014-2020. "The research work carried out since 2006 is also beneficial for the Picardie Region via this S3 strategic thrust, more in phase with market needs and applications", underscores Nathalie Van Schoor. The other prospect lies in the calls to proposals for the 'Investments for the Future' programme related to "Science-Innovation-Territory-Initiatives" (acronym ISITE, cf. Interactions issue #28). The Picardie regional actors (UTC, UPJV, the clusters of competitivity, the Regional authorities are currently preparing a dossier that relies on regional strong points in a bio-economy. "Our local trump card is the complementarity among the regional HE & research establishments, our enterprises and the Region's institutions who have already enjoyed a long-standing, efficient collaboration", concludes Nathalie Van Schoor. ■

MOBILITY

Are tailor-made real-time *museum* visits coming soon?

Under the heading "Education and Learning" the thematic and structuring calls for proposals issued by the Picardie regional authorities, how about the CIME project? The objective of CIME, co-ordinated by Dominque Lenne from the UTC-Heudiasyc laboratory, is to create, tailor-made visits to museums, personalized as a function of your tastes, your museum route and your cultural expectations … all on a mobile phone "app

CIME is an acronym for Contextual Interactions for Mobility in Education. What Dominique Lenne finds of interest is to encourage and enhance learning while remaining mobile. Visiting a museum is one of these situations where mobility – the fact that you walk along corridors and round rooms, progressing from work to work – and learning cannot be dissociated. If there are a lot of solutions around, such as museum audio-guides, they are not adapted to the visitor as an individual, nor to his/her exact position in the museum, top the concordance between works observed, to the time a visitor may wish to spend looking at a given painting, etc. "Our aim is to enrich the visit thanks to information adapted to a particular context, for example, giving recommendations that can suggest a route from painting to painting, etc., as a function of those the visor has already viewed", explains Dominique Lenne. "The app can also propose 'animations' to help the visitor have a deeper understanding of the works on view.

Semantic representations and the museum visit

This CIME research project associates two UTC laboratories: Heudiasyc and Costech who work on 'incarnate cognition' and also the University of Picardie (Jules Verne)'s Modelling, Information and Systems Laboratory. The Imperial Palace Museum in Compiegne was immediately attracted by the possibility of CIME, opening up a modern alternative to viewing and appreciation art-work on display and also for the purpose of renewing/rejuvenating the public. The Heritage and Tourism of 'Greater Amiens' (Metropolitan area) is also associated with the CIME team, inasmuch as they wish to set up a centre devoted to interpreting architectural and heritage remains in the regional capital city of Amiens. CIME is financially supported by the Picardie Region, via a subsidy of 187 000€ and combines scientific research with expected socio-cultural spinoffs for the Region. "A territorial anchorage of the project justified that it be labelled as a 'regional' project. Our proposal was selected and approved pursuant to positive assessments by a jury of experts convened in 2013. We shall be presenting our progress this far at the Region's Special Week on Research and Innovation, organized for November, 2014 in the city of Laon. The Region will monitor the progress and accompany our work. When the programme comes to an end there will be a final report and a formal presentation of the research for PhD thesis that will enable release of the finance earmarked for us", adds Dominque Lenne, who had already participated in 2 regional projects before CIME. The special feature of CIME is that it is based on a semantic representation that enables the programmers to designate links between pieces of art when there common, shared characteristics, such as the artistic 'family' or 'school', the sites depicted, the artist, etc. "This semantic representation is based on cultural heritage ontology including the concepts of artist's names, styles, etc. Depending on the distance between these concepts and the context of the visit (localization, works in the near proximity, the visitors'' special interests their routes …), the tool can announce new route suggestions."

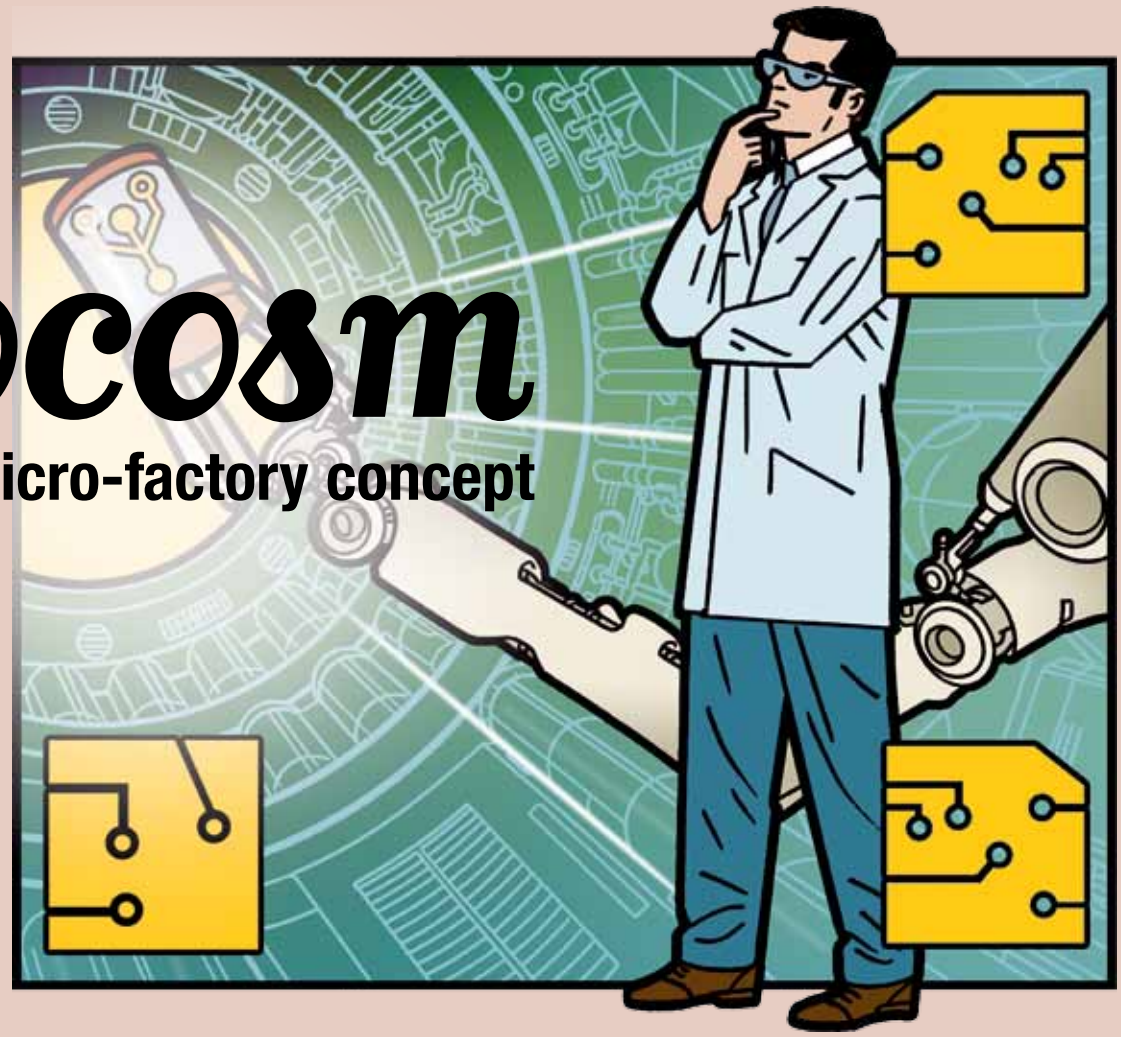
"Essential" calls for projects

This step may prove difficult. Beginning with the exact geo-location of the visitor in the museum itself. "This calls for technologies that go beyond the normal smartphone geo-localization parameters" underscores Dominique Lenne. "But we could then extend the process to visits outdoors, enabling visitors to discover the architectural heritage riches of a city and with a personalized route for the visit". The other difficulty lies in gaining an insight to the visitors' knowledge, in order to determine how the CIME system should frame the recommendations to best fit his needs and curiosity. "This is the problem known as a 'cold start': how does the programmer acquire some knowledge about the visitor before and at the beginning of the visit? One solution would be to make use of social network contents but that raises ethical issues", explains Dominique Lenne. The CIME research teams hope that after 3 years (2013-2016) they will be in a position to sell the "app". "We want to valorise the capacity of our tool to take into account the user's context, and this would bring a high degree of added value to the system, compared with the method of doing a simple transcription of internet site data", emphasizes Dominique L, for whom the regional calls for proposals are essential to ensure that new projects on new themes will emerge. ■

SUSTAINABLE DEVELOPMENT

Microcosm

one step nearer the micro-factory concept



How can you accurately measure the geometry of millimetre range mechanical parts? No machines today can perform the task really. For this reason, a UTC research team began the Microcosm project – an acronym for Contactless Micro Coordinate Measuring Machine. Christine Prelle, lecturer and research scientist at the UTC-Roberval laboratory brings us up to date ...

The aim is to design a micro-machines with the capacity to make contactless measurements in 3D. "Industrial sectors already use 3D machines with integrated sensors to analyse parts coming off mass production lines; however, when the dimensions involved decrease, and reach the millimetre range, it is the size of the sensors that prevents accurate measurements to be made. Through an association of several ongoing research programmes at the UTC-Roberval Laboratory, we managed to design a machine that met the millimetre scale requirements, viz., a machine perfectly in line with the parts to be measured", says Christine Prelle by way of an introduction. This tool for the future will not have the unwieldy size of current instruments, some of which measure beyond 1 cubic meter!

Patent claim registered

The Microcosm project, with a 166 000 euros budget over 3 years logically fits in with the laboratory's current research schedule towards a micro-factory concept, developing and implementing miniature part production. Such micro-factories (or desk top factories) are both mobile and consumes little energy, and they would comply with new requirements as to flexibility and sustainable development. For example they could be used to produce millimetre scaled watch parts. "We are working in parallel with a parts conveyer system adapted to the micro-factory environment in which the microcosm measuring instrument could easily be integrated at the line end or in the middle", stresses Christine Prelle. Microcosm will benefit to a large extent form the high level expertise already existing in the lab in the area of micro-mechatronics. "We are not just designing miniature systems; we are also integrating the sensors and actuators in order to attain more compact results, to develop and propose new solutions and thereby aim at higher levels of efficiency", says Christine Prelle. Thus, the measurement heads of the future micro-machine will integrate a specific mechatronics actuator system, currently registered in a patent claim.

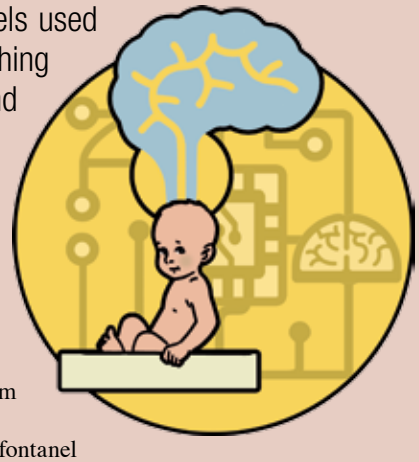
Stronger links with the University of Braunschweig, Germany

In order to attain better efficiency for the proposed micro-machine, the UTC-Roberval Laboratory is collaborating actively with two institutes of the German University of Braunschweig: firstly, the Institut für Mikrotechnik and in parallel the production environment metrology Institut für Produktionmesstechnik. This partnership is one of the more unique features of the Picardie region programme (which also integrates the CETIM); the Microcosm project is also part of the framework agreement of the joint Institute for Mechatronics (UTC and CETIM), as well as with the UTC electronics service. "Neither of these two institutes has received any finance from the Regional authorities, but in an exchange process, we registered a project on the basis of their work in an international call for proposals ANR-DFG", details Christine Prelle, head of the double diploma option between UTC and the University of Braunschweig. "Their micro technology institute is developing an alternative technology that involves micro-sensors assembled in white room conditions. We will be in a position to compare the performance levels of out two approaches. The Post-doc recruited for the Microcosm project has successfully done a PhD under dual supervision. He will spend several months in Germany to design a new version of the micro-machine thanks to access to the Institute's white rooms". The final stage will consist of developing metrology and reconstruction algorithms, involving well recognized knowledge acquired at the production environment metrology Institut für Produktionmesstechnik. ■

MODELLING

Understanding *a new-born human brain*

In order to have a better understanding of brain pathologies in new-born babies, several digital models can be used – an as yet a little explored path of investigation complicated by the presence of the baby's soft-spot fontanel. A new-born's skull structure is not yet homogeneous and interferes with the expected accuracy of models used with adult patients. To meet the needs expressed by Dr. Fabrice Wallais'* team at Inserm-CHU teaching hospital at Amiens, the MIFAC project (a mnemonic for Fontanel modelling to localize normal and pathological brain activities in new-borns was launched last year.



This work is in fact part of a wider Inserm research programme, centred on pathological brain activities in new-born babies. Particularly with premature births, neonatal suffering can induce cerebral dysfunctions such as epilepsy, mental retard or difficulties to acquire signals and learning. So, at what moment in time do we decide to operate a new-born suffering from epilepsy strokes that resist medicinal treatments? By way of an introduction Professor Abdellatif El Badia, research scientist at the UTC-LMAC (Applied Mathematics Laboratory, Compiegne), says "The MIFAC project is unique from two points of view: on one hand it attempts to answer of timing via mathematics and digital modelling and on the other by creating a multi-modal tool combining EEC measurements (electro-encephalogram) and near infrared spectrometry".

An as yet unexplored problem

The MIFAC project has been awarded a 154 00 euro 3 years budget allowance over and combines the talents the Inserm team at the teaching hospital (CHU) at Amiens, the UTC-LMAC laboratory, the basic and applied maths lab called LAMFA (Laboratoire Amiénois de Mathématiques Fondamentales et Appliquées) at the University of Picardie Jules Verne (UPJKV) and the Maths Lab at the University Reims Champagne-Ardenne. "If you wish to design a decision aid tool to be used in the surgery of new-borns, you need to associate the modelling skills and scientific calculations of these 3 laboratories" underlines Abdellatif El Badia. You must also take into account the electric and hemodynamic characteristics of new-born babies. "How can we use resolution protocols that account of the inhomogeneous 'specifications of new born skulls? The Inserm team has shown that the soft spot fontanel has an impact on localization of pathological areas in the brain, and this is the scientific hurdle we have to overcome in the project" concludes Prof. El Badia. The soft-spot fontanel modifies the electric and hemodynamic properties of the skull and brain of new-borns – and represents a difficulty that has not been solved to date. Progress in the MIFAC project will be presented in November during the Picardie Region's special week on research and innovation. ■

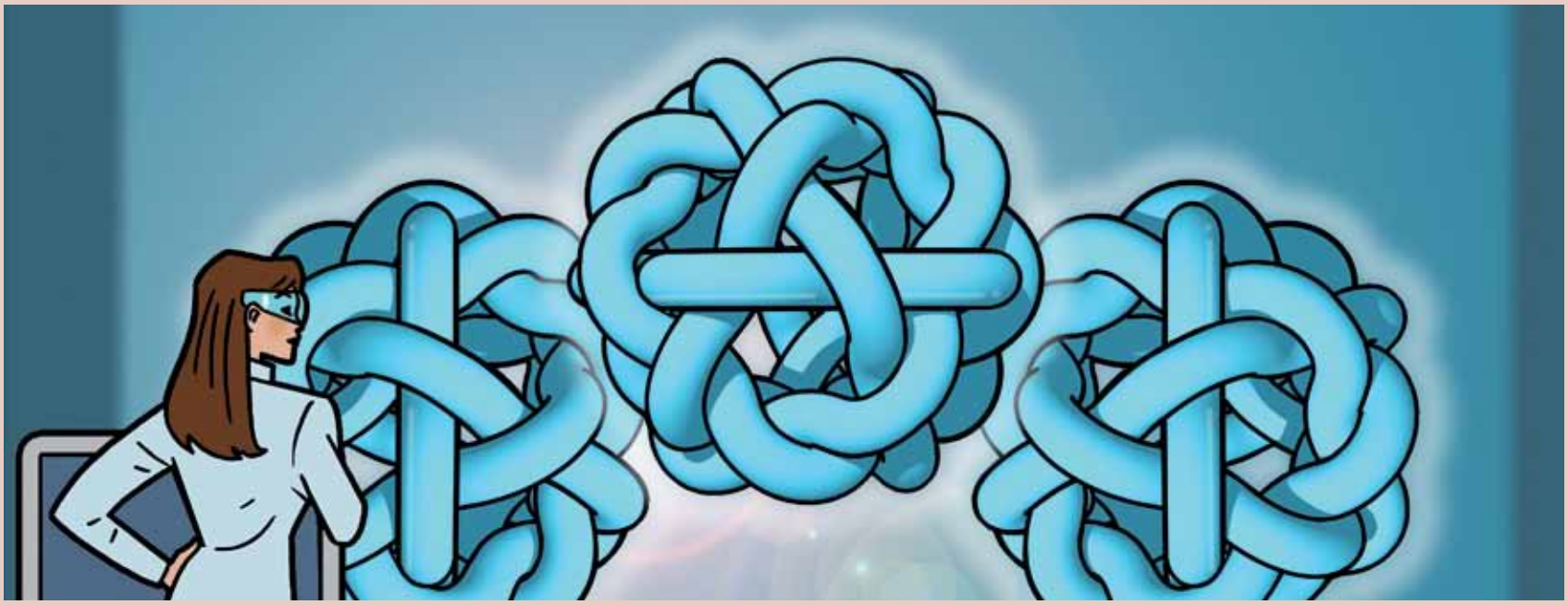
* Director of the GRAMFC Laboratory, research scientist University of Picardie Jules Verne.

TISSUE AND CELL ENGINEERING

Bone tissue culture at the heart of Picardie's research strategies

The Ingetissos project, so-named for Bone Tissue Engineering is an intimate ingredient of the Institute Faire Face (IFF) and the cross-connections initiated by Professor Bernard Devauchelle between UTC, the University of Picardie Jules Verne and the teaching hospital (CHU) at Amiens in the field of tissue and stem cell engineering. The project was declared laureate in the Health category of the call for thematic and structuring proposals issued by the Picardie Regional authorities; its main aim is the culture of bio hybrid bone tissues to be used in facial re-construction surgery.

"In September 2012, we had already been awarded a research grant by the Collegium, co-financed by the CNRS and the Picardie Region, enabling us to recruit a PhD student Timothée Baudequin who largely contributed to preparatory work for the Ingetissos Project, which actually began one year later", recalls Cecile Legallais, research scientist at the UTC-BMBI Laboratory. For this project, the Picardie Region financially supported the recruiting of a Post-doc scientist, to whose salary there was, over a 2 year period, an additional 110 000€ needed to purchase the lab equipment (which benefitted also UTC and UPJV). "The post-doc recruited by UPJV came in fact from our UTC-BMBI lab., which facilitated collaboration between the two establishments. For her, it was also an opportunity to add new high value skills in the field of stem cell engineering", underlines Cécile Legallais. For the first time this year, in November, the Ingetissos research teams will be presenting their work and progress at the Picardie Region's special week on Research and Innovation. "It will provide the opportunity to present our work to a wider audience, to set up new contacts and to listen to advice from experts who will be monitoring our project research", adds Cécile Legallais.



Promising progress recorded

Things are progressing well for the Ingetissos project: the UTC-BMBI laboratory is now growing stem cells, collected by the cell therapy unit (Professor Marolleau), on artificial matrices to form bone tissue slivers. Could these layered slivers be substitutes for bones? To check this point, the biological and mechanical functions have been characterized in the UTC-Roberval research facilities by Fahmi Bedoui, thanks to equipment acquired in the framework of the programme Equipex Figures (cf. Interactions #28). « We shall certainly acquire some very relevant data », says Cécile Legallais enthusiastically. “For the moment, the tissue sample we are making prove to be too fragile and out next target is to reinforce them”.

A flagship venture in Picardie

Ingetissos is in line with the Region’s ambitions to position itself in the area of tissue engineering and reconstruction surgery, a sectors with growing importance. In this light, the Institute Faire Face was a pioneer and one of the flagship projects in Picardie. As Cécile Legallais says “My main concern is that Region might not favour exploratory work, but rather encourage projects with short-term potential socio-economic fallout; this way they would miss out on the scientific resrecah dimension, I fear. We still have a lot of basic research to do and to improve when the Ingetisssos period terminates. Other projects will follow, of course, and we shall register these for aids at regional, national and European levels. Among the many European level stem cell research projects, Ingetissos is still unique inasmuch as it relies on bio-engineering techniques”, underlines Cécile Legallais, a Member of ESAO (European Society for Artificial Organs). “A large-scale European project in the EC’s FP (Framework Programme) Horizon 20-20 would enable us to bring our work closer to a real clinical application”. ■

SENSORS AND DRONES

A ‘high level research scientist’ *aims to prevent floods*

This is a world ‘first’: Enrico Natalizio, a research scientist at the UTC-Heudiasyc Laboratory was selected this year in the framework of the new regional protocol to host “high level research scientists”. His project consists of using drones and sharing photos/videos for flood prevention monitoring.

Attract and keep the best research scientists: this is the aim of the regional protocol “Welcome to high level research scientists” inaugurated this year in Picardie. The candidates must have arrived in the Region no more than 18 months ago, must have their PhD and testify to 5 years research activities and, if possible, to enjoy a solid international reputation. “Prof. Ali Charara, Director of the UTC-Heudiasyc laboratory suggested that I could present a dossier in this regional framework; for this, you need to have a project that represents a positive interest for the Region. We are talking about a time when my wife and I were looking for a flat in Compiegne and we learned that there was a definite risk of flooding in Picardie. In the region I came from, in Italy, flooding also represented a high risk. This conjunction made me decide to present an application on the theme: how can we use a multi-robot system to detect and manage flood conditions?” queries Enrico Natalizio.

Real-time information to assure efficient emergency services

That was how the IMATISSE project (acronym for ‘Inundation Monitoring and Alarm Technology In a System of SystEms’ came to be. It relies on two sub-systems, in line with the research logic of the Labex MS2T (Controlling Technological Systems of Systems; cf. Interactions #29). The first sub-system is composed of a network of sensors positioned on the water surfaces, to monitor height continuously and also drones that collect the data from these sensors. The second sub-system called “mobile crowd sensing” gathers together all the information provided by witnesses of floods (people who photographed, filmed or simply recorded the events). “Anyone today can use a smartphone or an i-pad to photograph or film events. Sharing the information in a specialized “app”. could prove useful when a natural catastrophe occurs”, underlines Enrico Natalizio. “What we have here is citizen data that we combine with the sensor recordings that inform us about river flow speeds, pluviometric levels, etc., that can issue alert messages. In such cases, the drones would provide real time data to be used to manage the floods as best as possible and favour rapid and efficient emergency service interventions”. The estimate for the overall cost of the project is 450 000 euros, to which the Picardie Region will contribute 130 000 euros, over a 3 year period, to finance two 18 month post-doc grants, associate equipment (for the data transmission needs). After 3 years’ research, IMATISSE will be required to implemental and present a working prototype system.■

INNOVATION

Can social sciences & humanities act as innovation vectors?

In the curricula proposed in French engineering schools, what is the contribution of social sciences and humanities? The Homtech project (acronym for Man in a Technological Environment); selected in the framework of calls for thematic and structuring projects launched by the Picardie region, addresses this question (among many others) which is very much in line with the UTC's unique philosophy- co-construction of social sciences, humanities and technologies.

Pierre Steiner, a research scientist at the UTC-Costech laboratory introduces the topic: "How can social sciences, humanities overtake the false alternative in which they are retrained in French engineering schools, being either 'instrumentalised' or isolated? Less than 1/3 of these elite schools do any resrecah in social sciences and humanities and less than ¼ if we consider research outside management training courses. There therefore is a degree of urgency to consider that such research can prove original in respect to changing practice in research itself and also to changes in engineering training per se". All lecturer research scientists are concerned by the interdisciplinarity between social sciences and engineering sciences. It is a theme which lies at the core of the curricula in the French universities of technology (UTs), where the pedagogical model at least partly relies on a constant exchange process between these two HE and research universes, and which is also implemented in some HE institutions such as the Institute Polytechnique Lasalle Beauvais. It therefore does not seem surprising to find UTC-Costech and the Picar-T Laboratory at Lasalle Beauvais as partners in the Homtech projects. "Our 2 establishments are also co-founders of the scientific group UTYSH (standing for Technological and Social Sciences Unit) set up a year ago with the UTs located in Troyes and Montbeliard-Belfort. Research conducted in the Homtech context will feed into research and analysis in the UTSH environment", explains Pierre Steiner.

What are the connections between innovation, social sciences and humanities?

The Homtech project, re-proposed in 2014 will receive financial support amounting to 142 000€ over 2 years, including recruitment of a post-doc research scientist. The project is original from several points of view, beginning with its anthropological dimensions. "One of our 3 priorities consists of conducting an anthropological study in laboratories of the other 2 UTs, in order to describe concretely how day-to-day research in social sciences and humanities" underlines Pierre Steiner. "The other 2 priorities are an epistemological study on how technologies evolve, seen as a science lying part-way between social sciences, humanities and technical skills and tools, and also the development of hypotheses on the possible links, between social sciences, humanities and innovation. "For example, when social scientists are carrying out their investigation, they can develop models, data acquisition tools or experimental set-ups than can lead on specifically to innovations that can be value-added in other sectors", underlines Pierre Steiner. "This third priority is of special interest to the Picardie region, with possible applications in the 2 competitivity clusters, i-Trans and IAR. For example, how can citizen questions about sustainable development effect orientations for research and the cluster activities? The aim here is to provide advice for the Region to help attain a better definition of social potentials when the authorities are seeking innovation". ■

MOVEMENT ANALYSIS

Acquiring writing skills, a truly transverse research topic

How are we supposed to accompany children learning to write? The Regional Project DESCRIPT associates UTC and ESAD (HE school for art and design, Amiens) aims a producing a tool to explore this dynamic topic, combining the contribution of cognitive sciences and biomechanical engineering sciences, design and psychology. Olivier Gapenne, research scientist and lecturer at UTC tells us more about DESCRIPT (acronym for Designing a Learning Environment and Aids to Handwriting skills).

This project, code-named DESCRIPT, has three potential application areas", says Olivier Gapenne (UTC-BMBI), to introduce his work. Firstly it aims at assembling a learning instrument specifically to learn writing skills and is used in the framework of training students at ESAD, who have as one of their specialties typographic design. In ergo-therapy, the instruments can also be used to accompany children with dyscalligraphic disorders and for this application we are already collaborating with an ergo-therapy practitioner. The final area is to design an alphabet and a form of writing for sign language skills. Today, there is no writing equivalent for signs because of the specific difficulties to transfer the semiology content of the 3D movements in a sign, the control of body language or a look to a 2 dimensional plane".

Recording body language movements

In order for the projects to bear fruit, you have to bring together actors with varied, complementary skills focusing on an analysis of the hand-writing gesture, in a global

manner. “Today, only the trace marks, or the hand movements (including the arm) are taken into account when analysing writing; what we need is a far richer description of the processes”, underlines Olivier Gapenne. The UTC research teams launched a first campaign of measurement using the movement analysis platform installed at the UTC Innovation Centre, which has the capacity to record in real-time the ‘total’ writing gesture. Indeed, the body is involved completely in the writing gesture: a child will only be able to learn to write if he/she can control the head/upper body axis therefore freeing the arms and the hands (on the writing side). Eye movements are also recorded as is the position of the writer’s centre of gravity. But this ‘complete (acquisition of body activities during a writing sequence is not sufficient to obtain a full description of the process.

Attention and experience intensive registers

We shall also analyse the ‘attention’ of the writer, i.e., the things to which you must pay attention when you are writing, things like the hand? the writing trace? the body position? This question of ‘attention’ is studies by one of the 3 PhD students attached the Project, Patrick Doan, lecturer and research scientist at ESAD”, details Olivier Gapenne. The third priority axis is called the user-experience phase, during which the writer is filmed and watches the recording to tell the investigators what mental experience he/she retains from the earlier writing phase. This is the field of research explored by the second PhD student, Claire Danet. “Descriptions of a writing phase by the writer is a unique feature in the DESCRIPT Project which had not been explored before and comes as complementary to the other two phases”, underlines Olivier Gapenne. “Once we have identified the main ingredients of the writing process, we shall engage a design phase for the instrument itself, integrating a ‘lighter’ system for the recording body and eye (look) movements”. Real-time acquisition and analysis of movement using the future instrument will enable writing on a tactile pad, sending back data to the user to accompany the succession of gestures and the writing learning process. This overall set of functions will call for design of a self-adapting decision engine which will be designed and prototyped by Rémy Frénoy, the third PhD attached to the DESCRIPT Project.

Exploring handwriting using digital techniques

The DESCRIPT project is an important ingredient in the debate on writing and the need to learn thus skill. “Some people hold the opinion that type-writing (exclusively on a keyboard) can replace hand-writing. But all typographic representations including those fonts we can choose in computerized word-processing come originally from a hand-gesture. DESCRIPT combines both aspects and makes use of the latest technologies available to explore and record writing movements”. DESCRIPT, one of the projects selected the 2013 Region’s call for thematic and structuring proposals, became operational in November 2013 and will terminate in March 2017 – the project carries a budget of 182 000 euros. At UTC, this question of gestures interests the Costech Laboratory (for the cognitive aspects), BMBI (for the bio-mechanical aspects) and Heudiasyc (for applications in virtual environments). The DESCRIPT Project clearly marks the relationships between UTC and ESAD, who now offer a joint Master’s degree called “User Experience Design”. “The studies of gestures, which relates health issues, also triggered closer relationships with the University of Paris (Pierre & Marie Curie) in the framework of the Sorbonne Universities Cluster”, adds Olivier Gapenne. “We are engaged in discussions with UPMC and their ISIR Robotics Centre”. ■

FLAX AND LINSEED OIL RESEARCH

Modelling the plant realm, a new UTC platform

Flax is a plant with a unique blue flower, well known in the Picardie crops. It is important for the Region: two of the three main producers are installed in Picardie. Plant research is seeking to enlarge already wide-reaching applications and benefits from financial support from the Region’s authorities who also financed a hybrid (cross-fertilisation) and modelling unit at UTC.

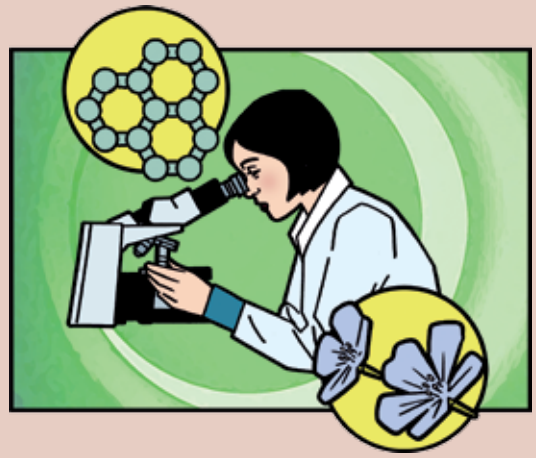
This modelling unit is used by molecular biology research teams to collect data related to functions and regulation of plant genes under variable crop conditions, including stress, infections or other pathogenic situations. The research allows the scientists to understand, for example, how the plant reacts when their a hydric stress (water shortage), to identify the genes responsible for the production of omega-3 fats or the crop conditions that enhance seed, oil, fibre contents, etc. For example, if flax undergoes a water shortage at the beginning of its flowering phase, it will produce less seed and consequently an oil containing less omega-3. The unit has the size of a domestic micro-wave oven, and enables scientists to monitor genes that will express themselves in different manners at different phases of plant development, from germination to full maturity. “An important phase is when the plant flowers, viz., a time when numerous changes affect the seed contents. Using this lab unit, we shall be in a position to identify genes that stop expressing themselves (or the contrary), following a stress situation. We shall then be able to better understand the plant’s own regulation processes, comparing them under specific in situ cases, compared with reference benchmarking conditions”, details Brigitte Thomasset, a CNRS research scientist who works at UTC.

48 021 gene sequences in a flax plant

Oligo-nucleotide micro-chips (with plant DNA fragments) used in the platform, represent the plant’s genetic heritage. In the case of the flax plant, the micro-chip carries 48 021 genes. It was designed using RNA samples taken at various growth stages (before, during and after flowering, for example), giving an overall vision of plant development and regulations. The genes present on the micro-chip are then crossed with the plant we wish to analyse and in this way we can identify the genes that express or do not express a given characteristic. “There are signals that show what is happening in the plant under analysis. The data obtained is especially useful when it comes to envisaging some attractive industrial applications, such as ways to obtain a given omega-3/omega-6 ratio which is an objective that would meet the agro-food sector’s requirements”, underlines Brigitte Thomasset.

Improving genetic plant selection

Linseed oil, also known as flaxseed oil, obtained from the dried, ripened seeds of the flax plant (Linum usitatissimum, Linaceae) is well-known



for its omega-3 content, a fatty acid not present in sufficient quantity in our daily food intake, compared with omega-6. How can we increase the production of omega-3 via the flax plant? What additional nutrients (fertilizers, etc.) to improve and stabilise omega-3 production and at what time optimally should they be brought to the plants? “We are working currently with the foodstuffs company Lesieur on this topic, in the framework of the GRANOLIN project (the FUI-Pole at the IAR (Industry and Agro-Resources), competitivity cluster). With the oil company TOTAL we are investigating agro-sourced industrial lubricants and we are also collaborating

with the cosmetics sector. In the long term, we can envisage genetically modifying the flax plant in such a way that it will produce more high added value molecules", predicts Brigitte Thomasset. It is a tool that will also serve to obtain molecular markers to select those plants with interesting genetic features (via traditional cross-fertilisation) more rapidly.

Molecules that can replace petrochemical products

"This platform, which was commissioned in December 2013, represents an investment of 250 000€ financed via the State-Region subsidies. The equipment can serve the needs of a large number of research teams working on yeasts, mushrooms, algae and other plants. One only need to acquire the oligo-nucleotide micro-chips that correspond to the sample characteristics". What we have here is a research area opening up today: "We are looking for molecules that can serve as substitutes for petro-chemical products in living organisms, where richness and diversity have not yet been thoroughly investigated. "Our research platform will be in a position to contribute to this research, by identifying those genes that are if interest". For example, Brigitte Thomasset's research team are looking at an alternate plant, camelina sativa (gold-of-pleasure or false flax) with an interesting level of omega-3. UTC is working on these topics with the University of Picardie Jules Verne (UPJV) who possess a molecular biology platform facility. "Our tools and expertise are complementary". The UTC laboratories, Roberval and LMAC have also been called in to interpret that analytical data collected and to retranscribe the metabolic functions in mathematical terms. To give an order of magnitude, producing omega-3 calls for more than 200 analytical steps!

Understanding and make use of plant metabolisms

A proper understanding of plant metabolism also represents a first step in the direction of 'greener chemistry: "Plants themselves are efficient chemical factories that operate at ambient temperatures, at normal atmospheric pressure and with no energy input other than sunlight and carbon dioxide. In contradistinction, the petro-chemical sector uses fossil fuels that are becoming depleted; the reactions and transformations take place at special pressure and temperature conditions and this uses more energy, etc. What we must do is understand plant metabolism and make good use of it". Understanding, for example, how plants absorb nitrogen, nitrates and phosphates could allow us to develop an efficient, reasoned form of agriculture, providing the plant with exactly the quantity of ingredients it needs at any given time. "Faced with population growth, agricultural production efficiency must grow while respecting the environmental equilibrium constraints. An excellent understanding of plant metabolisms opens the way to increasing production without necessarily increasing the quantity of fertilizers". Applications here go well beyond flax crops. ■

WASTE VALORISATION

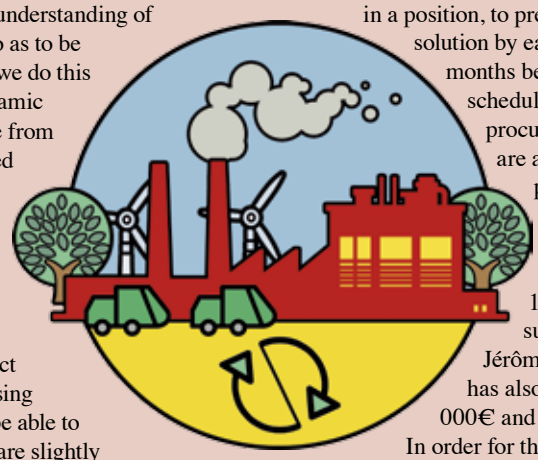
Extending *incinerator operational life expectancy*

Given the growing challenges in valorising wastes and fining alternative energy sources, we are now paying more and renewed attention to incinerators. One of the challenges is to extend the life span of the equipment, i.e., the effective operational life expectancy. UTC's Roberval laboratory and the Centre for Mechanical Industries (CETIM) are contributing to this study by launching PROCCI an acronym for 'protection incinerators' from heat corrosion', financially supported by the Picardie Region.

Jérôme Favergeon, director of UTC's Mechanical Engineering Department, who heads the PROCCI Project describes the work ahead: "In order to comply with the European waste valorisation objectives, we have to increase the incinerator temperatures, but in doing so we run the risk of higher corrosion in the heat exchanger units". The latter (exchange units) are sets of metal tubes located over the waste furnace, and the waste burning heats water vapour passed through the tubes. The steam is then used to feed a turbine-generator and the electricity produced is fed into local collective building heating networks.

Resisting ashes, oxygen, chlorine and sulphur

Incinerating wastes also produces ashes, oxygen, sulphur and chlorine. "The ashes adhere to (and build up on) the tube inner surface, which are also attacked by the acid gases. This sequence of events requires regular inspection tours and costly pipe changes during which down-time the plant cannot be used. What we are seeking is better tube protection and at the same time retaining the initial heat transfer capacity to the water vapour", explains Jérôme Faugergeon. Our aim is to gain better understanding of the corrosion processes so as to be able to counter them and we do this by adding 3-4 micron ceramic coatings. The latter derive from a sol-gel process developed by CETIM and analysed by the UTC Roberval Laboratory but the dual question remains – how and how long will they resist corrosion agents? How will the coatings react as the tubes dilate with rising temperatures? Will they be able to resist if the inner surface are slightly pitted?



Increasing tube life expectancy by at least 20%

After facing several difficulties to produce the sol-gel coatings a continuous flow, the first characterization tests in incineration environmental conditions will begin in Autumn 2014 at the UTC-Roberval laboratory. "We can bear in mind that the PROCCI Project began in October 2012 and we shall surely be in a position, to present an attractive solution by early 2015, a few months before the project schedule terminates; energy procurement and uses are among the Region's priorities in terms of research topics, and the Region has awarded a 150 000€ financial support", adds Jérôme Favergeon. UTC has also contributed 150 000€ and CETIM the rest. In order for the solution to be economically worthwhile, we must be able to increase life expectancy of the tubes by at least 20%. "For the time being, we note that there only a few studies on the problem and it will become more acute as the need to identify and use alternate energy sources grows. Veolia Environment have shown interest in the project. If the coatings we are developing turn out to be scientifically and economically attractive, their use could be extended beyond the field of industrial incinerators", underscores Jérôme Favergeon. ■

YOU HAVE THE FLOOR
Mr PROVOST

Vincent Price, Provost of the University of Pennsylvania, USA

Prof. Vincent Price was appointed Provost at U.Penn in 2009 and supervises the teaching, learning, research, academic affairs and student life on all U Penn campuses. He is also Professor of Political Science specialist in public opinion questions, on the social influence and political communication. Today he is investigating the growing role of digital technologies in building knowledge base and public opinion. He is a member of a group of 14 heads of American HE establishments with the mission to assess new education models in the «Presidential innovation Lab».

What is the aim of the Presidential Innovation Lab?

The Lab was established by the American Council on Education – with generous support from the Bill and Melinda Gates Foundation – to examine the future of higher education in the next decade, especially as it may be informed by new technologies. It emerged from the recognition that a confluence of economic, social, and technological factors have reshaped student populations, altered employment markets, and given rise to a variety of new educational practices alongside more traditional forms of instruction. Some recent developments – for instance, the advent of MOOCs (massive online open courses) – have the potential to disrupt conventional educational practice, while also increasing access to higher education to historically underserved populations around the world.

As Provost of the University of Pennsylvania, what is your contribution to the Lab?

I have participated along with thirteen other leaders of colleges and universities to examine collaboratively the potential challenges and opportunities posed by new forms of learning and publish white papers based on our research and recommendations. We represent a range of institutions – from research-intensive universities to community colleges, including both public and private institutions -- to focus on such areas as: the potential of new forms of education to engage new kinds of students, especially those from historically underserved populations; the new financial and educational models that might emerge from the rise of new educational methods and technologies; and the use of such technologies to rethink teaching and learning on our own campuses.

What is your analysis of the way pedagogy is changing?

The opportunities are quite exciting, and they rest not only in the potential to increase access to higher education outside our campuses, but also in using new media and new ways of thinking about education to transform teaching and learning within the traditional university. This potential is especially strong at the moment in helping us to find more engaging and interactive forms of learning that go beyond the traditional classroom lecture, and to gather the data needed to test the value and effectiveness of these new methods. For example, here at Penn, we are engaged in an initiative in what we call Structured, Active, In-class Learning (SAIL). These courses "flip the classroom" by engaging students in hands-on activities in class, often in groups, with the professor acting more as a coach than a conventional lecturer. Traditional lecture material can then occur outside class time, whether online or through other media, so that SAIL courses can be taught by faculty who are actively engaged in online open learning and also by those who are not. We received a grant from the Association of American Universities to pilot-test these methods in STEM (science, technology, engineering, and math) classes, and we are also now offering resources and grants to faculty members who would like to develop them for humanities classes.

> It suggests that changes in our students over the next decade will be driven by overlapping changes across demographics, technologies, and learning styles.

Who is the student of the future? How will universities have to innovate to adapt in the next decade?

This is in fact the topic of one of the Lab's first white papers. It suggests that changes in our students over the next decade will be driven by overlapping changes across demographics, technologies, and learning styles. Over this period, forecasts suggest that higher education will draw a higher number of non-White students, especially from Asian and Hispanic populations, as well as older students, lower-income students, and more first-generation students. The widespread and growing adoption of smart phones and social media, even in poor countries, will continue to alter assumptions about the availability of knowledge. In particular, these new technologies accustom our new students to being highly interconnected and highly participatory, active, and creative. As such new forms of learning proliferate, the university has a perhaps paradoxical set of twin responsibilities. On the one hand, we will need to incorporate and learn from what is best about these new forms; while on the other, we must continue to be a steward of forms of knowledge that are older, more deliberative, more contemplative and complex. ■

DID YOU KNOW THIS ?

The 'Presidential innovation lab' has published 4 White Papers on the business model for US higher education, the role of changing universities, future student profiles and major changes in higher education.

The Papers can be downloaded at http://www.acenet.edu/news-room/Pages/Presidential-Innovation-Papers.aspx

UTC and U.Penn set up their first joint double degree in 1975 (cf. portrait p.20)

SEMINAR

Capsule and vesicle dynamics :
a world 'first' at UTC

A world 'first' event took place at UTC in July. Some 60 experts in capsule and vesicle dynamics and of body fluid cell transport met July 15-19 to discuss their approaches and identify potential research topics for the future.

"For the first time, we had experts from round the world in both capsules and vesicles (with their different mechanical and physical properties) meet together to present their research work and mutually improve pour knowledge of the dynamics involved", say Anne-Virginie Salsac and Dominique Barthès-Biesel form UTC's BMBI Laboratory. With Dr Mark Blyth, from the School Of Mathematics at the University of East Anglia (UK), these ladies organized this international event, with the support of the IUTAM (International Union of Theoretical and Applied Mechanics) and Euromech (European Mechanics Society). "The two-fold support here constitutes a 'first'", says Anne-Virginie Salsac, "to whom we should add the Picardie regional authorities and the French Association for Mechanical Engineering (AME)". The experts gathered at Compiegne, came from China, Japan, India, North America and of course Europe and France in particular. "When I heard about the organisation of this conference, about two years back, it seemed obvious for me to come", underlines Simon Mendez, research scientist at the University of Montpellier who has been digitally modelling the dynamics of capsules and red blood cells for the past 4 years. He presented his research results at the conference, mainly focused on inertial effects that impact capsule movements when transported at relatively high speed.

A conference with remarkably high quality scientific content

UTC pioneered encapsulating processes and applications. The participants were therefore curious to visit our laboratory and meet our teams. This leads to high scientific visibility for our work at UTC, for UTC itself and for Compiegne", underscores Dominique Barthès-Biesel. "Work at UTC in this field is recognized round the world and this fully justified holding the conference at Compiegne", underlines Mark Blyth. "The scientific level of the conference was really high, which was not surprising given the excellent level of the organizers themselves!" adds Simon Mendez with a smile. Each conference presentation led to a great number of questions from the floor and several research teams moved closer together in terms of their investigations. Three requests to collaborate were noted, one from the UK, one from Japan and one from Germany. The thematic sessions were organized so as to cover the issues in the conference, from makings capsules to digital modelling of capsule behaviour and research into their properties, their characterization (mechanical engineering, physics, chemistry …). "We discussed all these topics in depth, from very practical applications to the digital tools used to carry out digital simulations with models", explains Anne-Virginie Salsac. "One of the strong aims for the conference was to build links and to strike a balance between experimentation and modelling", underlines Simon Mendez. As Mark Blyth puts it "The conference was successful in making a synthesis of the various scientific angles. A large majority of the participants stayed to the end of the conference, which itself was a proof of its success and of the splendid ambience". By consensual demand of all, the next meeting will be organized in the coming 2 to 3 years. "Edition #2 is on the drawing-board", says Dominique Barthès-Biesel, smiling. ■

http://webtv.utc.fr

HOMMAGES

In remembrance of a great man, Daniel Thomas.

Titular Professor, his career is intimately linked with the success of UTC to which he contributed in an outstanding manner. UTC has lost one of its most significant figureheads whose international reputation in the field of biotechnologies – at his personal initiative – and his human qualities will forever be engraved in our minds and hearts.

"A most ingenious man"

Daniel and I had been very close friends for years and years. We met in 1978 at the firs conference on micro-algae and since that date we never in fact lost sight of each other. This long-standing friendship led Daniel to write the preface to my most recent book "A natural history of micro-algae". We were, both of us, the first scientific advisors for the company Fermentalg, which has just been admitted to the Stock Exchange. This company produces microorganisms and micro-algae to be used in cosmetics, in pharmaceutical preparations and for food.

Claude Gudin, Regent of the College of Pataphysics

In the 1980s, we together created the Association for Solar Bioenergy Research (ARBS) at the French atomic energy site CEA-Cadarache, which became a major laboratory where I worked. Daniel at that time was with UTC and we enjoyed regular exchanges. For example, I often used to recruit students he had trained. When one of us could not attend a conference, the others stood in as the 'ghost-guest' speaker. In fact Daniel Thomas was everywhere it mattered in biotechnologies, in public, para-public and private spheres. Without his impetus and energy, the field of biotechnologies would certainly not be as important as they are today. He was an inventor and a pioneer and the very first to come up with the most ingenious idea of dismantling a living cell to extract components and turn them ingot little factories for the good of mankind.

The work-load of this renowned scientist was not just limited to the lab. or to basic research: Daniel was forever questioning the usefulness of his research for the benefit of all. The major companies who today use the enzyme functions of plants owe him a lot. Indeed, Daniel Thomas was not only a brilliant speaker, but someone who knew how to bring together the means needed to implement his ideas. He was a born 'creative' who trained many research scientists in the field of biotechnologies. With support from the French atomic energy agency (CEA), I set up the company Thillia Pharmaceuticals to cultivate micro-algae to be used in cosmetology, in food sector and in pharmaceuticals. Daniel advised me and together we discovered an anti-oxidant ISD (Isocell Superoxide Dismutase) which has quite a success: Luc Montaigner, Prix Nobel for his work on Aids could no longer have access to blood transfusions for his research because of the 'mad cow' (BSE) crisis and he had to avail of a new source of ISDs. We were able to provide this anti-oxidant that we extracted from micro-algae.

Our complicity went far beyond scientific issues: we shared a passion for the Uzest Musical jazz festival created by Bernard Lubat. I even decorated Daniel with the insignia of the Order of the Grande Gidouille, on the occasion of the Congress of the Hair, convened at the Palais de Tokyo, Paris, in 2007 to mark the publication of my book "A natural history of a hair". He has a great sense of humour and one game we use to play when delivering serious lectures was to give each other a set of carefully chosen words, which had to be slipped into the lecture … Daniel was very good at this game! His work also contributed indirectly to the work of the 'plastician' artist Ernest Pignon Ernest who saw the results of Daniel Thomas' research when he visited my laboratory, viz., the components he was able to extract from cells to analyse their functions. In doing this, Daniel had fixed some chloroplasts – the support ingredients for photosynthesis – on polyurethane boards. Ernest Pignon Ernest asked if it was possible to make photosynthesized statues – Daniel's positive answer led to the creation of the famous "Arbrorigens", image of which – like Daniel's brilliant ideas – circled the world.■

Claude Gudin

EQUIPMENT

UTC's electron beam microscope (latest model)

UTC's acquisition of an electron beam microscope was supported financially by the Picardie Regional authorities under the heading of "structuring equipment" in the State-Region Investment Programme (CPER) 2007-2013. François Oudet, head of co-respondent for equipment purchases under the CPER provisions, tells us more about this 1.3 Meuro instrument.

What are the characteristics of this electron beam microscope?

This model is a TEM/STEM type (Transmission Electron Microscope – Scanning Transmission Electron Microscope) with a field generating cannon. Nominal acceleration is 200 kV. Ultimate resolution is 0.1 nm (in the TEM mode) and 0.2 nm (STEM). It is fitted with a series of devices: two cameras to observe the electron beam (one is a wide angle camera, use mainly to observe living cells and a high resolution camera to observe crystal structures; an electron detector under clear air transmission conditions; an annular electron detector for dark field transmission conditions to observe atomic number contrast levels; and also an X-ray spectrometer to carry out chemical analyses and produce element mappings of the sample components.

And what does an instrument like this contribute to UTC research?

The microscope is used to characterize matter down to sub-nanometric scale, both from a structural (matter organization) and chemical (composition) point of view. The electron beam microscope has now become a classic tool to characterize and to observe material samples, whether they are metals, ceramic or composites. Thus, all and any ITC research team with investigations of this nature can benefit from the microscope, with the proviso of correctly preparing the samples. Typical applications are characterization of plant tissues, biomimic membranes, divided and nano-materials, agents that interact externally with biological milieus and cell/surface interactions (bio-materials), characterization of catalysts, of materials for surgery (and the health sector in general), nano-metric bone, cell and material structures (biocompatibilities of prosthetic implants, etc.).

What investigations are scheduled today at the electron microscope facility?

Currently we are examining mainly polymer nano-encapsulated particles for use in biological applications as fluorescent markers. A scientific article has already been published on these results: Versatile Synthetic Strategy for Coating Upconverting Nanoparticles with Polymer Shells through Localized Photopolymerization, Using the Particles as Internal Light Sources (Selim Beyazit, Serena Ambrosini, Nataliya Marchyk, Emilia Palo, Vishal Kale, Tero Soukka, Bernadette Tse Sum Bui and Karsten Haupt, Angew. Chem. Int. Ed. 2014, 53, 1 – 6). In this context, the investigation looked at both the morphology of the objects (shape, size, phase distribution) and crystallization. Another theme associates process engineering and looks at the characterization of complex natural oxides in acicular materials. In this case, we observe notably the electron diffractions and use X-ray spectrometry to complement direct observation of the crystal structures.

How and why do the Picardie Regional authorities support this piece of equipment?

Picardie indeed has strongly supported the projects conforming its high level of commitment in the "structural equipment" category of the CPER 2007-2013, with 1.25 Meuros out of 1.3 Meuros (before tax), plus 50 000 euros from the FEDER (European Regional development Fund). The project presentation qualified the microscope as a priority, transversal acquisition to be used in UTC themes that contribute to the Picardie Region's competitivity (agro-resources, health and material sciences and engineering) and which tie in closely with research conducted by 4 of UTC's research units (GEC, Roberval BMBI and TIMR). The UTC Research Directorate present the acquisition project to the CPER ministerial authorities and to the FEDER offices in Brussels, and above all to the Picardie Region, insisting on the scientific importance of possessing such a facility and the need for having such a microscope in terms of regional thematics, and sharing of its use among the various UTC research units. The latter point was highly appreciated by the CEPER specialists. Continuous exchanges with Virginie Delaporte (in the Picardie Region Research and Innovation Services) enables us to implement our procurement policy for high level modern analytical tools destined to be shared among laboratories and others. Given the price tag the microscope has become the 'emblematic' tool but there are also other highly important equipment units such as the atomic force microscope, a confocal laser microscope, an NMR spectrometer and soon, a rehabilitated 'environmental' electron microscope. ■

d'infos plus GEC, BMBI, Roberval & TIMR laboratories : **http://webtv.utc.fr** > Nos séries > Les laboratoires de recherche

HEALTH TECHNOLOGIES

Renaissance of nuclear medicine in Compiègne

Two gamma ray cameras and a positron scanner are now installed in the CIMA (Medical Imaging Centre), Compiegne and UTC has access to new premises, to house the laboratory headed by Professor François Langevin (UTC research scientist). These two pieces of equipment signal a renaissance for the team.

The two new facilities also mark the re-start of nuclear medicine activities of CIMA, which come sunder the administrative responsibility of the Saint Côme Polyclinic and the Compiegne city hospital. The inauguration took place on Sept.5, with Philippe Marini, Senator Mayor of Compiegne, Prof. Alain Storck and the representatives of the Regional Health Agency (ARS). This equipment is used in nuclear medicine to diagnose and monitor patients with cancer, in cardiology, endocrinology and in neurology. Overall, they will also be made available to the research team seconded from UTC, specialized in neuro-vascular problems and well as for students and PhD students doing their theses there. As François Langevin details "They learn to use an NMR machine, a scanner and we can note that 14 PhD theses have been successfully defended since our laboratory was set up in 1990. Professor Langevin holds the Chair of Health Management Technologies at UTC, in a partnership with the Ecole des Hautes Etudes en Santé Publique (EHESP) at Rouen, and he is responsible for the training of about 15 professional equipment managers/operators/engineers each year. This year marks the 41st class of this specialized Master's degree, well recognised in the health sector ■

L'AGENDA

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Start-up weekend at the UTC Innovation Centre
October 17-19
The Start-up Weekend – adapted from a similar event in the USA – will bring together 120 participants (UTC undergraduates and external guests). The teams will have 54 hours to prepare a project including a working prototype, a business plan, etc. On Sunday, the teams will present their work before a jury composed of professionals and research scientists from UTC.

Seminar on «Lean development serving excellence in R&D»
Tuesday, October 21
This seminar is designed to enable participants to exchange on the best ways to improve R&D processes and practice, research team management, processes and products.

The Comutec Forum
Thursday, October 23
The Comutec Forum brings together some 100 companies every year and gives students the opportunity to discover numerous companies recruiting personnel; the 2014 event will take place at the Pôle Événementiel, Margny-Lès-Compiègne, le Tigre.

Innovation Week in China
Week starting October 27
UTseuS (The Sino-European University of Technology of the University of Shanghai) and the French UT Group will be organizing the France-China Innovation Week 50 on the thematic "Innovative cities in a sustainable, digital era". It will take place in the framework of launching the Master's degree 'ComplexCity, data processing and complex systems for a 'smart" sustainable city.

27th edition of the Roberval Prize
Saturday, November 15
The annual international Roberval Prize rewards literary, audiovisual and multimedia French language productions focusing on explaining technologies. Several categories exist – "general public", "higher education", "younger readers", "television".

The 2014 Graduation Ceremony
Saturday, November 22
The annual UTC engineers' Graduation Ceremony will take place at Compiegne's Espace Jean Legendre and at the Imperial Theatre, Compiegne, in the presence of Louis Schweitzer, Commissioner General for Investment, President of Initiative de France and CEO of Renault automobile Group, 1992-2005.

UTC hosts the International Summit on Innovation
November 27-28
Under the thematic heading «Metamorphosis of innovative territories », UTC will this year be organizing and hosting the International Summit on Innovation at the UTC Innovation Centre. This event enables international players in the field of innovation to exchange and debate about recent initiatives covering innovative territories round the world.

PUBLICATION

Who makes luxury goods?

In her book, "Fabriquer du Luxe"[Making Luxury Goods"], Editions Presses des Mines, Paris, Nathalie Darène, a lecturer research scientist at UTC's Costech Laboratory says that she undertook "an empirical survey in the worlds of watchmaking and perfumes" in both France and Switzerland for the purpose if understanding the re-organization induced by a new capitalistic set-up of the luxury goods sector.

The book is a follow-on from her PhD thesis work and led Nathalie Darène to meet over 100 sub-contractors in the perfume trades in France and watch-makers in Switzerland. These sub-contractors – becoming more and more numerous – have to comply with demands from the luxury companies in terms of quality, delivery dates, ingenious solutions … But they are 'hidden entities' of the major sector companies who communicate more on "luxurious dreams" than on their production lines. Nathalie Darène invites the readers to meet the sub-contractors she herself met during her work functions at Yves Saint Laurent Parfums. It was through this professional experience and her arriving in the luxury watch sector with the help of a "recognized collector" that "greatly facilitated a mutual understanding and the most representative description possible of the reality in 4 localities": the Bresles and Plastic Valleys in France, and the Joux Valley and the Swiss Jura canton. The introduction to her book is a panorama of the luxury goods sectors, where change depend on international expansion of trade, where the response us multi-trademark groups and rationalized management. Sub-contractors and suppliers are at the heart of paradoxical logics, "between the demands of the artistic directors (…), forever looking for perfection and the demands of the industrial and financial spheres who become more and more stringent and unmovable in terms of assuring short-time profits", between remaining faithful to a traditional heritage and a race to innovate and constantly propose new products. Nathalie focused on three issues: territories where the SMEs are grouped close to a prime contractor, inter-trade union organization relationships and how they are evolving towards more networking and, lastly, human and social capital factors "a true merchant value". In 6 chapters, Nathalie Darène then concentrates on the packaging sub-contracts for luxury perfumes in France and sub-contracting on luxury watch-making in Switzerland. Readers learn, for example, how the Bresles Valley, specialized in luxury bottles for perfumes … has adapted to environmental constraints, while meeting the trade-mark demands and developing co-design of their glassware products: in this new context, the suppliers are proposing "global service offers" and are becoming more and more reactive face with the market. Nathalie Darène has identified "the strengthening of networks which had hitherto been informal" among the sub-contractors and she sees this as one of the keys to surviving and continuing their business activities. In short, the use of networks can serve to optimize the co-operation and ability to adapt rapidly to new situations. There are however two threats here: firstly, a substitution of "Made in xxx" by "Designed in xxx" opening the way to delocalization policy decisions and secondly, a lesser attractiveness of traditional 'luxury' jobs for the younger generations. ■

RECENT UTC-COSTECH PUBLICATIONS

« La valeur heuristique de la littérature numérique »
Serge Bouchardon
Hermann, collection cultures numériques, Paris - 2014

« Chercher en silence avec Maurice Blanchot »
Hugues Choplin
Éditions L'HARMATTAN - 2013

A présent « l'ingénieur contemporain, le philosophe et le scientifique»
Hugues Choplin
Éditions Les belles lettres - 2013

A présent « Qu'est ce que la technoscience ? »
François Sebbah
Éditions Les belles lettres - 2013

« Management de l'innovation 3e édition »
Sandrine Fernez Walch et François Romon
Éditions Vuibert - 2013

« Normative Expérience in Internet Politics »
François Massit- Folléa, Cecile Meadel et laurence Monnoyer Smith
Éditions Presses des Mines Paris Tech - 2012

« De la presse à Internet la parité en questions »
Virginie Julliard
Éditions Hermes Lavoisier - 2012

« La abeja y el economista »
Yann Moulier Boutang
Éditions MAPAS - 2012

COMPETITION

Rhetoric : a competition at the Sorbonne Universities cluster

UTC undergraduates can register this year for the first time for the Rhetoric Competition already open to all Sorbonne Universities students. Professor Jean-Baptiste Guignard, Linguistics and Cognitive Sciences at UTC, is one of the 2014-2015 co-organizers.

The rhetoric completion continues to enjoy its success. Last year the venue was the lecture hall of the National Library (BNF) and it was full. "The competition pursues a Sorbonne tradition of excellence in rhetoric and public speaking. Since it was re-organized in 2012, the competition is open to all establishments forming the Sorbonne Universities Cluster," explains Prof Guignard. Not only are the competitors judged on the excellence of their oratory eloquence, but also in the way they organizes their thoughts and arguments, with the subject matter being pre-set. Two weeks' training is offered as a preparation to the public competition. For the first time, it will also be held at UTC before the festivities start. UTC's participants will be aided financially for their travel and accommodation in Paris, where the three sessions will take place. The first round, March 28 will lead to selection of some 15 students out of around 40 registered, on the basis of 10 minute argument-pleas, prepared by 15 days' training. The second round, where the public can attend, will take place April 9 at the Sorbonne and only a few selected competitors will continue – after an afternoon training session and 10 minutes rhetoric without aid from a microphone! The final round will take place May 6 in the BNF auditorium, followed by an 'evening out' at Beaubourg. "Students allowed forward to round 2 will thereby gain a higher education credits in rhetoric and the art of speech" (S120), add Jean-Baptiste Guignard. To illustrate the success and attractiveness of the event, here is a short list of the 2013 sessions. 'Is reason sexual?', Should we search for lost time?', 'Can there still be heroes today?', 'Can we live disconnected?' …. not forgetting 'Was Dart Vader a good father?' Registration of competitors will be opened as of January 2015. ■

NEW COURSES

New for 2014-2015 : *an Inter-UT Minor (InnovE-UT)*

Something really new for the start of the academic year 2014-2015: student engineers matriculated at any of the three UTs (French Universities of Technology) can follows classes on innovation and international policy in the technical-industrial context of the country's SMEs/ SMIs. This Minor course stems from important pedagogical innovation. It is presented to readers of Interactions by Marion Mézerai, Deputy Executive Director of IFDEFI InnovENT-E (cf. Interactions N°28).

Students who choose this Minor will be required to register for 3 UVs out of 9 proposed by the 3 UTs. In the UTC (Compiegne) offer, economic intelligence covering enterprise strategies, procures and tools (EI04), Management and tools enhancing creativity and innovation (GE38), Analysis of consumer goods (DI06); likewise for UTT (Troyes), with Technology and Management studies, Innovation management, International trade and exchanges and lastly, for UTBM (Belfort Montbéliard), with Methods and tools to solve technical problems, Financial management of international investments, and Economic globalization. The only requisite here is that 2 of the 3 chosen courses must be followed 'at a distance'. As Marion Mézerai explains "This is the first year of the scale one experimentation, even if some of the 'distant modules' have been tested over the past 6 months". The other procedures required include participation in an 'event' focused on creativity '"48h to bring your ideas alive – InnovENT-E" and implementation of a project in relation to innovation and international SME activities. This cursus was designed in compliance with guide-lines set by IDEFI InnovENT-E in response to a wide survey among SME/SMIs and expert opinions and advice. "These are unique reference guidelines", adds Marion Mézerai. "The inter-UT minor aims at acquisition of certain skills deemed necessary in terms of innovation and internationalization of an SME/SMI's activities. It is not an isolated course: the objective is to train students in the skills values d by SMEs, including polyvalence, responsibility, self-training … "

The project results from input and exchanges by the teaching staff and pedagogical units of the 3 UTs

Marion Mézerai underscores the relevance of a project like this for the students: the SME/SMIs in France represent the majority of job creation area, but they are still largely unattractive. The SME image must therefore be improved and students must be offered training to be able to work in this milieu. One of the aptitudes required and taught here is project work or networking. This led to the key idea of allowing students to follow part of the Minor courses remotely. "There is a dual advantage here: building up cohesion and synergy among the 3 UTs, to defend pour values and our teaching of innovation and to acquire skills for working in networks", explains Marion Mézerai. "The pedagogical units of the 3 UTs have been largely involved in drafting this Minor course, as were the lecturers without whom it would have been an impossible quest and the course would not exist". New tools have been developed to aid the remote module practicalities that call for new ways to teach and learn.

On route for a 'new University'

It took one year to design the new pedagogical outlines and tools. "Some people are afraid of the impact of digital techniques, which seem to point to a new university without lecturers. What is happening is exactly the opposite! The academic teaching staff is present not only to deliver the courses; their added value also consists of 'animating" and moderating he exchanges among students and teachers", details Marion Mézerai. The 'new university' will be based on deeper reaching relationships between students and lecturers. This InnovE UT Minor represents a novel pedagogical path worth analysis and follow-through.

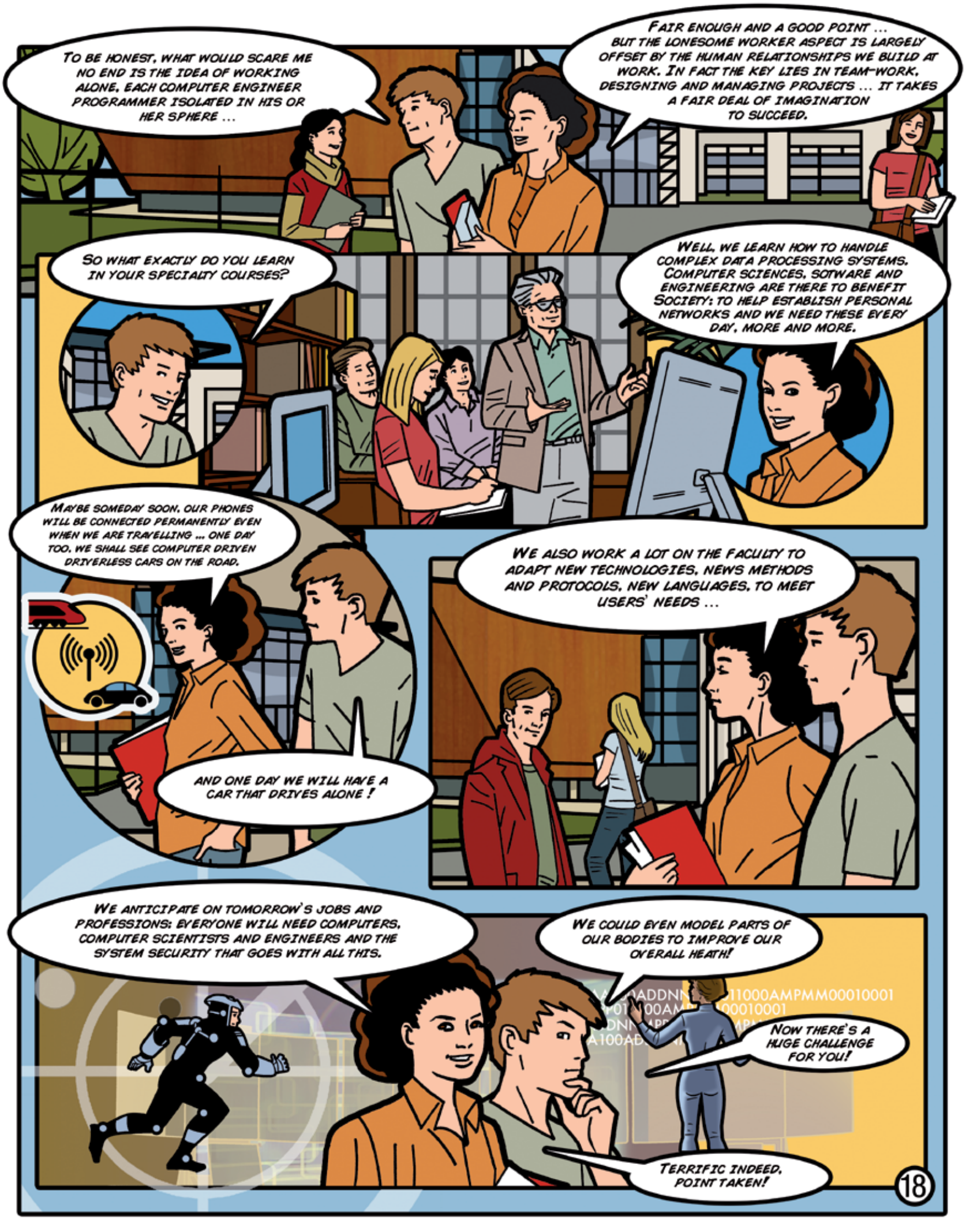
InnovENT-E
PME | Innovation | Export

Wide-spread recognition of the diploma

This is a specialist cursus, which in time will become a Master's Degree that can be offered in continuous education programmes, as a bolt-on qualification to the traditional engineering diploma. It will be certified by the IDEFI-InnovENT-E and has already been recognized on merit (beyond the 3 participating UTs) by the other IDEFI members, viz., the INSAs, the CESI and the University of Lorraine, as well as by some 40 partners in the economic spheres. "We hope that this qualification will enhance the relationships among students at the 3UTs and that the projects implemented will close the gap between the students and the SME/SMIs". The objective for 2014-2015 is ≈30 registered students. Registration for semester 1 remains open up to end September 2014. ! ■

Discover the InnovENT-E course and distant learning modules on the pedagogical platform:
http://formation-moodle.cap.utc.fr/course/index.php?categoryid=3

On its 40th anniversary, UTC rewrites its history, in comic strip style : **In the heart of the Future**


TO BE HONEST, WHAT WOULD SCARE ME NO END IS THE IDEA OF WORKING ALONE. EACH COMPUTER ENGINEER PROGRAMMER ISOLATED IN HIS OR HER SPHERE ...
FAIR ENOUGH AND A GOOD POINT ... BUT THE LONESOME WORKER ASPECT IS LARGELY OFFSET BY THE HUMAN RELATIONSHIPS WE BUILD AT WORK. IN FACT THE KEY LIES IN TEAM-WORK. DESIGNING AND MANAGING PROJECTS ... IT TAKES A FAIR DEAL OF IMAGINATION TO SUCCEED.
SO WHAT EXACTLY DO YOU LEARN IN YOUR SPECIALITY COURSES?
WELL, WE LEARN HOW TO HANDLE COMPLEX DATA PROCESSING SYSTEMS. COMPUTER SCIENCES, SOTWARE AND ENGINEERING ARE THERE TO BENEFIT SOCIETY: TO HELP ESTABLISH PERSONAL NETWORKS AND WE NEED THESE EVERY DAY, MORE AND MORE.
MAYBE SOMEDAY SOON. OUR PHONES WILL BE CONNECTED PERMANENTLY EVEN WHEN WE ARE TRAVELLING ... ONE DAY TOO. WE SHALL SEE COMPUTER DRIVEN DRIVERLESS CARS ON THE ROAD.
AND ONE DAY WE WILL HAVE A CAR THAT DRIVES ALONE !
WE ALSO WORK A LOT ON THE FACULTY TO ADAPT NEW TECHNOLOGIES, NEWS METHODS AND PROTOCOLS, NEW LANGUAGES, TO MEET USERS' NEEDS ...
WE ANTICIPATE ON TOMORROW'S JOBS AND PROFESSIONS: EVERYONE WILL NEED COMPUTERS, COMPUTER SCIENTISTS AND ENGINEERS AND THE SYSTEM SECURITY THAT GOES WITH ALL THIS.
WE COULD EVEN MODEL PARTS OF OUR BODIES TO IMPROVE OUR OVERALL HEATH!
NOW THERE'S A HUGE CHALLENGE FOR YOU!
TERRIFIC INDEED, POINT TAKEN!
18

Combining good luck and resolve

Today Frédéric Lavigne is the Director for Education at the Image Forum, a place of memory and news about the cinema in Paris. He had managed the UTC Cine-Club when he was a student here.

With his UTC engineering degree with the specialty Biological Engineering, Frédéric Lavigne began his career in the industrial dairy sector. "I had carried out a CIFRE thesis on the physico-chemical properties of the fatty contents of milk. I did this work in a CNRS Laboratory at the Pharmaceutical Faculty, Châtenay-Malabry, just South of Paris, on behalf of the association that co-ordinates research work deemed of interest for the dairy produce sector", recalls Frédéric Lavigne, by way of an introduction. "After that I worked for 5 years at Danone's International Research Centre. And at that point, I decided to follow a different career path, taking me to the world of cinema".

The risk-taking volunteer

At the time, Frédéric Lavigne asked his employer to move from full time to 4/5 part-time so he could get involved in the programming of the Premiers Plan film festival at Angers, and event he had discovered a year before but as a simple spectator. "That experience went so well that the team proposed I could accept the job as programmer. I gave up a 'CDI' (unlimited) job position for a CDD (limited in duration), a salary divided by two and I then joined the cinema world", says our 7th art fan. Frédéric went on to assure programming this festival for the next five years and then moved to London, duly appointed audio-visual attaché at the French Embassy in Great Britain. His main function there was to promote French cinema works in the United Kingdom accompanying the film distributors to a festival and projections held in the Embassy premises …. The next move was back to Paris, where Frédéric was signed up by the Image Forum and he took on the position of Director for Education – he also directs the international festival called Series Mania, specialized in TV series.

One trump card: project management in the cultural domains

"By chance and by will-power, I did manage to move into the world of cinema whereas in France, in most instances, the diploma defines the career path and making shifts complicated. Bridges from sector to sector are few and far between and rarely self-evident. I could never have found a job opening in the cinema if I had not first of all done my voluntary worker spell. To succeed I accepted to reduce my work schedule to 4/5 full time which left me some spare time to devote myself to the cinema. It was truly exhilarating!" he recalls. The five years' studies at UTC were "terrific" and did not dampen his belief that horizons can be wider than you imagine, especially if you decide to succeed. General culture acquired in the Common Core programme, the Image semiology course (which alone convinced Frédéric Lavigne that his personal path lay here), the course on the world of cinema followed by an exchange internship at the University of Pennsylvania, the rich local association life-style and its cine-club … were the building blocks for his choice of career. "What I mainly recall is the very open minded attitude in UTC training courses, with the project management modules that have proved very useful to me. In the cultural sector, all other things being equal, having a project management talent is a definite trump card when it comes to organising, for example a festival event", underscores Frédéric, who now has a team of 10, managing the budgets, the schedules, the manpower needs and assignments …

Analysing and deciphering images

The Image Forum, created in 1988, now has 80 staff working on it, with its film 'cycles', 2 000 showings and a dozen festivals every year. It also houses a collection of 6 500 films that can be viewed individually, or used in exchanges, meeting and lectures: it is a cinematographic focal point, covering both the latest releases and going back to the famous 'classics'. "What I have observed is a certain amnesia today. For the younger generations, the history of the cinema starts in year 2000 and there is heavy layer of fog on anything before that date", analyses Frédéric. "My job consist of enabling children and their parents to discover films that are our heritage. To be successful here we must release mental brakes, such as impatience and define a suitable sequence of programmes". As Frédéric Lavigne sees it, education in images is a useful public service at a time when images are indeed predominant. "When I was following the UTC course on Image semiology, we analysed the meaning of a picture frame, and we learned how to analyse images so as to keep control and not be totally under their influence. This is what I and my team doing today. If we use the cinema vector, we can learn to read images of all the videos we see on the Internet, in advertising, etc. But adolescents and teenagers do not come spontaneously to the Image Forum, except outside the school periods and the sessions we programme for their teachers!" ■

BIO-NOTES

From 2006 to date
Director for Education at the Forum des Images, Paris

2004-2006
Audio-visual Attaché in charge of the Ciné Lumière at the Institut Français, London

1999-2004
Event programmer at the Festival Premiers Plans, Angers

1995-1999
Project manager at the Danone International Research Centre

1992-1995
Junior research officer at ARILAIT Research

1992-1993
PhD in foodstuffs (ENSIA, Paris 7 Diderot and Paris 11 Sud)

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UTC engineering diploma in Biological engineering (GB)

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