RESEARCH

Electric power generation and local “smart” grids

Page 2

DIGITAL

What future is there for jobs and salaried work?

Page 3

A NEW LOOK AT

Could entomophagy be a solution for 2050?

Page 13

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SORBONNE UNIVERSITES

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

Donnons un sens à l’innovation

Interactions

FROM THE PRESIDENT’S DESK

Did you say UTC ? Let us defend and promote the model

UTC’s 3rd position ranking in the recent survey by the magazine Usine Nouvelle, reflects notably on the level of performance attained by our University and its students (ranked 1st in terms of their start-up creativity (cf. several testimonies in this issue)), the sheer explosion in numbers and quality of students who apply for admission to the French Universities of Technology (UTs), notably to enter the Hutech (Technology and Humanities) core programme (where there are over 50 candidates for each university seat offered), the excellent position of our graduate engineers (in terms of first salaries and the time to secure their first professional appointment) all constitute reasons for us to be satisfied and together embody the unambiguous relevance of our “model”, judged by both the students and the real (and potential) employers.

Over and above noting the success stories we must, however, remain mobilised and never lose sight of several challenges and points that call for constant scrutiny:

• How do we go about defending and promoting at the same time a model the originality of which (in terms of pedagogical organisation - viz., the personal course choices fully open to the students as to their university cursus, their international mobility, our commitment to entrepreneurship and innovation … an open international vista, a pluridisciplinary approach, notably encompassing the benefits of social sciences and humanities, our addressing transverse issues, engaging in technology-intensive research activities and dynamic partnership policies … which together constitute the building blocks of a modern 21st Century combined university and engineering school, ready and forearmed to face the challenges of the future, beginning tomorrow ? These challenges call for agility, sobriety, reactivity, creativity and the courage to think differently. Not only must we promote, but we must also defend our original, different model, which is somewhat, to say the least, non-compliant with the almost mandatory standards used to frame HE activities, notably in the field of assessment protocols that date, still enforced today but totally inadequate when it comes to integrating or anticipating the ongoing changes!

• And what role should we accept and endeavour to play in the context of the new university structure known as the Sorbonne Universities Cluster, which tomorrow will represent one of the five to six French world class universities, while at the same time preserving our autonomy and our agility as needed to pursue the fundamental missions assigned to an engineering school, in respect to engineering sciences and their applications, to technology, to innovation and to the links that must be tied with the socio-economic milieus?

• Concomitantly, the French UTs must take on a better, structuring and federative role on the national HE and Research scene to assist in the emergence, recognition, organisation and visibility of strong “Engineering sciences, Technology and Innovation” approaches, recognised and active in a highly integrated approach with a continuum between Science, Technology and Humanities, plus a forward-looking vision of technological progress in Society. Such an ambition will reinforce, at the same time, the UT model, both quantitatively and qualitatively.

The French Universities of Technology have reached a crossroads of their development. Let us wish them ‘all the best’ in this transition phase, without gainsaying their basic values and continuing to ensure the promotion of our specific university model. ■

Alain Storck,
President & Vice Chancellor UTC

Two UTC undergraduates won a distinction at the IESF Prize competition

Alaeddine Hajjem and Fanny Illes were awarded 2nd Prize in the Category "Female Engineers". At the 2016 Video Trophy IESF event (learned society for French Engineers and Scientists). ■

http://jni.iesf.fr/746_p_45707/laureats-2016.html

Four laureates at the Guy Deniélou Thesis Prize event

Each year the Guy Deniélou Thesis prize singles out 4 laureates among the UTC PhD awardees after a selection of 6 finalists by a jury composed of members external to the doctoral school's advisory board. The criteria are quality of the thesis plus participation in campus life, scientific dissemination, etc.

- Timothée Baudequin was chosen for the Saint Gobain prize for his thesis entitled "Biological and mechanical characterization of a bio hybrid bone substitute and development of bone tissue scaffolds by electrospinning" carried out and presented at the UTC-BMBI laboratory.
- Kevin Carpentier was awarded the Poster Prize for his thesis "Personalised dynamic scenarios in virtual environment set-ups used for training", carried out and presented at the UTC- Heudiasyc laboratory.
- Yoann Fouquet, who carried out and presented his thesis entitled "Optimization used to dimension network links with varying capacity", carried out and presented at the UTC- Heudiasyc laboratory, won the ARC Prize.
- Last but not least, Liang Xia, was awarded the Regional prize for his thesis "Towards Optimal Design of Multiscale Nonlinear Structures. Model reduction approaches » », carried out and presented at the UTC-Roberval Laboratory. Liang Xia has in the past been awarded several other prizes and distinctions. ■

http://webtv.utc.fr/watch_video.php?v=XK7HAWK153UR

RESEARCH

Electric power generation and local "smart" grids

Grid operators, faced with a profusion of local renewable energy electric power producers, are now developing so-called "smart" grids to ensure stability in the overall power supplied to the end-users. With a view to helping the operators in their task to balance the grid, while promoting the development of renewable energy sources produced locally, the UTC-Avenues Lab. is proposing the development of local micro-grids to generate, store and control power exchanges with the national grid system.

Enabling anyone to become a renewable energy producer with the possibility to inject surplus production into the national grid is indeed an attractive concept but it brings with it a set of technical issues and problems. "Today's national grid in France is not designed to accept a bi-directional power flow", underlines Manuela Sechilariu and Fabrice Locment, both of whom are research scientists at the UTC-Avenues Lab. When there is excess demand, power generation stations must be started and brought on line to meet the demand, while excess power generation, in reverse, leads to voltage and frequency variations of the power delivered to the grid and the users. Today the network operators want to be able to adapt their grids not only to accept decentralised power production nut also the intermittent random inputs as produced by photovoltaic (PV) arrays and wind turbine generators.

Grid stability is a problem

One solution, when faced with the problem of 'diffuse' production means, and the essential need to balance production with demand, is to develop so-called "smart grids". In practical terms, this consists of implementing a communications/information network that is superimposed on the national grid and allows you to regulate the latter as a function of the information collected an exchanged. A smart grid of this nature will have the capacity to exchange information as needed to balance the whole power system. "It is

nonetheless a difficult task and necessarily calls for participation of a large number of producers to help the balancing overarching objective", details Manuela Sechilariu.

Local micro-networks communicating with a 'smart' national grid

The solution advocated by the research scientists and their team depends on the development of local micro-grids. The latter use local renewable energy sources, while optimizing production, consumption and storage so as to contribute actively to balancing the national grid performance. A micro-grid system, developed at the UTC-Avenues Lab. includes production facilities (PV arrays or wind turbine generators), storage and grid regulation systems. The main device is a system controller which acts as an interface with the national distribution grid and ensures a constantly- regulated power flow. "We have developed algorithms that help predict power demand levels, power production to be brought on-line and thereby ensure stability for the national grid as a whole", underlines Manuela Sechilariu. The research engineers are also satisfied that they can "ensure optimal power production, both in terms of operational cost and the appropriate use made of renewable energy sources".

UTC's Avenues Laboratory already has an experimental rig with photovoltaic (PV) panels up and running on the campus, with associate power storage units and algorithmic control systems. The next step will be to build and equip a scale one charging station for all-electric vehicles, the power coming from PV shelters, which connects into the French national grid. "The demand for fast charging electric vehicles could rise rapidly and leads to a sharp upturn of power demands on the grid", explains Fabrice Locment. One solution consists of developing micro-grids to recharge the vehicles and thereby decrease the national demand while enhancing and encouraging use of renewable energy sources. ■

Given other books mostly seen as several scientific and technical works compiled by editors, this book was written by two authors in a uniform writing style either for the theme homogeneity or phenomena explications. Wishing to publish a relatively comprehensive DC microgrid study dedicated to urban areas with a clear and rigorous exposition of building-integrated microgrid, the authors bridge the gap between microgrid architectures and power management general textbooks and the large scale microgrids and hierarchical control specialist textbooks which are written with useful detail for power converters' application.
It well be a useful reference for graduate students and young scientists in universities as well as all professionals and electrical engineers engaged in electrical power equipment/systems design, integration and management.

DIGITAL

What future is there for jobs and salaried work

in the 4th industrial revolution?

By Yann Moulier-Boutang, Professor of Economy, Sorbonne Universities - UTC

An unprecedented crisis for employment and salaried work

The 1974 oil crisis and its rebound in 1978-80, concomitant with the Iranian Revolution brought the "glorious thirty years" to an end (and likewise for their economic model). The latter rested on three pillars: access to cheap energy and raw materials, a mix of low qualification workers, mostly rural people migrating to urban areas with a relatively rare skilled, educated bracket and, last but not least, the application of Fordism, i.e., mass produced consumer goods for a sustained economic growth rate, among which the automobile was the symbolic epitome. Pay changes were contained within the limits of progress in productivity (Keynesian) while the employment model was dominated by full-time jobs with social protection (the so-called Beveridge 'Welfare State'); macro-economic balance was guaranteed by regular progress in buying power of the middle classes. This advantageous situation enabled 30 years' full employment. However, as markets gradually opened up round the world (later to be known as 'globalization'), the arrival of the 'baby-boomer generation' on the labour market, the sharp hike in fossil energy prices and for raw materials in general and salary rises (with a two-figure inflation rate), this model gradually fell apart, productivity gains slowed down and a form of chronic unemployment became the rule of the day. This corresponded to the famous Report of the Club of Rome [a global think-tank founded in 1968] appertaining to the limits to growth (1972) which led to a degree of awareness as to the damaging effects of industrial progress on the environment. And we note that the crisis is not just a one-off event; it was here to stay. The State authorities found it increasingly difficult to guarantee a high growth rate in the long term and the social protection systems were seriously affected by a shortfall of social contributions due to unemployment levels. Investments were reoriented to peripheral locations and even heavy industries like steel-making, or ship building were delocalized, as were light industries with high labour forces. However, this decline in the manufacturing sectors – which saw the proportion of industry in the GDP drop from 30-25% to 20-15% was offset by the creation of jobs in the service sector (mainly in finance, such as banking and insurance companies). For a long period, it was believed that growth would be driven by electronic and computer sciences and their applications (EDP …). But in fact these new industries were rapidly globalised and progress in productivity gains that were supposed to follow suit and benefit the entire economy (hence also for employment) did not occur, to the point that Robert Solow, Assistant Professor and economist at MIT (who was awarded the Bank of Sweden's 1987 Prize in souvenir of Alfred Nobel) openly questioned the positive effects of computers in the economy. The years 1980-2015 saw rapid transfers of factory units to the 'small' dragon countries (Korea, Taiwan ROC, Malaysia, Singapore), then to the high growth countries of the "old world" known collectively as BRICS (Brazil, Russia, China, Indi, South Africa). The 'financialisation' of production has accelerated because of the floating exchange rates and a financial market that sets the interest rates.

Recurrent financial crises that took place successively in 1997, 2001 and 2008 increased the levels of uncertainty and loaded financial products onto the market-place (term purchases that formed the derived products market, guarantees against exchange risks, securitization of household debts and governments alike). For year 2015, the total in financial transactions amounted to ten times the value of the GDP (700 000 billion $US comparted with 70 000 billion $US) and, even with that, full employment was not restored in the develop countries concerned. The US economy performance owes a lot to a new and low cost source of energy (shale gas and bituminous oil), is largely illusory. If we take into account that a large number of women no longer seek jobs in the labour market we can see that the global US activity (men and women) is 60% compared with 88% in France, with an unemployment rate in excess of 9%.

The quality of these US jobs (low skilled workers, precarious contracts) represents yet another weak factor of the slow and hesitant growth rate. It can also be observed that there is a growing inequality between the higher, well-protected salaries and the low salaries. For example, in France (which incidentally is not the most unequal EU country) one quarter of the country's work force is aid at the minimum rate (SMIC). In 1968, the population paid at the then lowest rate (SMIG) was only 10 to 15 %. In the USA today, 30% of the workers are independent in a regime called "1099", which represents an economy in salaries paid out of about 30%.

What we see is a bipolar salary scene (like an ▶

Weekend at Compiègne for the second Sorbonne Universities Raid

Organised by UTC students and supervised by the Sports Service of the University, the UTC Raid SU is a multi-sporting event with students and staff from the Sorbonne Universities cluster as participants – the sports are Pedalo boating, Trailing, Run and Bike, Orientation race, paint-ball battles, all-terrain bike races... ■

Championship for flying hydrofoil catamarans

Tom Laperche, a UTC undergraduate in the core programme, elective Sports Elite section, finished second in the flying hydrofoil catamaran championships held at Cannes in April! ■

http://webtv.utc.fr/watch_video.php?v=KO685UBSHG9D

The visit to UTC by a Delegation from the Lebanese University

In the framework of reinforced relationships between UTC and the Lebanese University, UTC, on April 19-20, 2016, received a delegation representing the Lebanese University, led by Professor Rafik Younes, Dean of the Faculty of Engineering (FGUL) and Professor Clovis Francis, Head of the FGUL Research Centre. The two-day programme included visits to various UTC laboratories (Heudiasyc, Roberval, LEC and BMBI), discussions and status observations on joint activities between the two universities, notably in their joint Master's degree scheme, their student and lecturer exchange programme, research projects and associate organizational structures. ■

asymmetric hour-glass with a very narrow upper bulb) that accompanies and reinforces statute differences and when we hear proposals to unify the labour contract categories – to a single contract instead of the tie limited/unlimited contract, the model towards which we seem to be moving with an explosion of the salaries for the most favoured 1% of the labour force, an increasing heterogeneity in the first decile and a worsening situation in the last two, even three deciles. The present situation is explosive, indeed: the question will soon be: can a standardized salaried job (the time unlimited contract) be a privilege reserved for a minority fraction of our population?
The first digital wave affected the world of logistics, with spatial reorganization of production that led to a segmented value chain and delocalized units; blue-collar employees in the North were most affected by these changes.
The upward expectation for growth figures simply did not take place, in Japan or in Europe; the IMF has underlined the disappointing characteristics of today's 'world growth', facing deflation almost everywhere (price drops, zero growth and high unemployment). If the major banks had not stepped in with their 'quantitative easing' policies to deal with overabundant liquidities, we could well have slipped into a 1930-style depression. So, what happened?

More at UTC's Interactions portal interactions.utc.fr and via our social network pages :

PROJECT WORKSHOP

Caudron C430 *myths in flight once more*

The Caudron C430 Rafale, a two-seat, monoplane sports or tourism aircraft, made its maiden flight on May 22, 1934. Jean Mermoz and René Fonck, famed pilots of their time were trained at the Ecole Caudron in the Hauts-de-France. Hundreds of civilian or military planes were produced by Caudron in the last century but only two models of the C430 Rafale. It is for these reasons that the "Cercle des machines volantes]" [the circle of flying machines with its aeronautical fans have agreed to a long-term pedagogical and technological collaboration with UTC, to rebuild the mythical C430 and the Latécoère 28 on which Jean Mermoz was the first to cross the South Atlantic, May 12, 1930.

The project is managed by a UTC research scientist, Jean-Marc Picard, an aircraft fan who lectures inter alia management processes and quality. The project is managed by a UTC research scientist, Jean-Marc Picard, an aircraft fan who lectures inter alia management processes and quality. He has built a team of 30 (or so) volunteer students distributed in 6 groups in 2 project workshops. The objective assigned is to finish - in a 5 year period the reconstruction of both aircraft, thanks to UTC's technical knowledge and knowhow, complying with the original specifications.

This is a necessary condition – identifying the original material "specs" or to get as close as possible in the workshop studies. One group, for example, will be studying the cleanliness of the linen used to wing skins for the Latécoère, to test it for UV ageing and damp resistance, so as to be as close as possible to the original linen "specs". Another group will be using CATIA 3 D modelling to reproduce the Renault engine parts as used on the Caudron Rafale – these parts will be moulded/machined by a team at the IUT Saint Quentin. Other teams will examine the feasibility of replacing the steels of the early 20th Century by modern steel parts.
Rendezvous, at the air-shows at Creil and Margny-les-Compiègne, to exchange with the students and lecturer Picard, but also via Facebook if you wish to comment or leave ideas... ■

To meet the team and learn more, rendez-vous:
• at the air show, May 29, at the Creil aerodrome, with presentations by the Patrouille de France aerobatics team and also by other military aircraft;
• at the air show, June 11 and 12, at Margny-les-Compiègne, with in-flight presentations by military aircraft.

Series III

UTC startup

Following suit to Series I & 2 presenting just some of UTC's start-ups, we offer our readers the Series II which will continue on UTC's WebTV facility and via our social network pages. They indeed are the living proof that UTC through it's a la carte pedagogy and its training/research continuum enhances the maturing and personal development of all its students, encouraging them to express and release their creative and innovative talents.

Lift a finger; Gladys obeys...

Have you not always dreamt of a caretaking presence to set your alarm-clock, to get your morning coffee ready, switching off all unused electric appliances when you leave home? Gladys is a connected assistant programmed to deal with these repetitive tasks, in conformity with your lifestyle and routines.

For a minimal outlay of say 50€, this smart system is capable of planning and programming the use of all electric appliances in your home, provided they are connected to a wall-plug. More than being a simple remote control device, the freeware running on theRaspberry Pi mini-computer applies scenarios and proposes tailor-made solutions by connecting with your agenda and certain user applications. Distinct from other existing home control systems, Gladys asks the user what his/her personal preferences are. Depending on the answers to these questions, Gladys will organise a certain number of tasks. Depending on your desired time of arrival at your office, Gladys will calculate the alarm clock "on" time, taking into account traffic condition and the length of the trip. With soft ambient music and light, the announcement the weather condition outside will offer an easy-going wake up routine. "An Internet user told me that during a total power black-out; all the appliances at home went down, except Gladys who with her internal clock reset everything including the wake up time" says Pierre-Gilles Leymarie, a UTC student majoring in Computer sciences and applications who is the man behind this invention and project.

A home-made innovation

Three years ago, this computer fan spent 8 months getting his prototype in order. "It was through seeing the assistant Jarvis in Iron-Man that the idea dawned on me - the connected technology already existed and all I needed to do was to assemble them an add on a bit of AI (artificial intelligence)" adds Pierre-Gilles with a smile. A self-made electronics expert (by reading lots and lots of documents on the Internet) allowed him to complete the project alone. "Whereas "classic" domotics systems have bills of several thousand euros to install, this is a "home-made" device which allows you to offer the possibility to build a smart home with only a minimum background in electronics and programming". The project is a success if we judge by the 11 000 downloads already. The system programme is in open-source and therefore can be adapted to specific needs. An extensive community of 450 developers continuously add on new modules to the basic set. The messages are translated into several languages, and adaptation to other connected devices or "boxes"" are some examples of improvements and developments. Using a freeware is also a guarantee to have a technology that is dedicated to home management albeit with a risk of prying, monitoring of private spheres. Since the first prototype, a second model has been assembled to match internaut expressed needs better. Pierre-Gilles is now thinking about developing a low-cost model: "The programme will still be open source, but why not envision a ready-to-use box for the public at large"? ■

Visualising Big Data

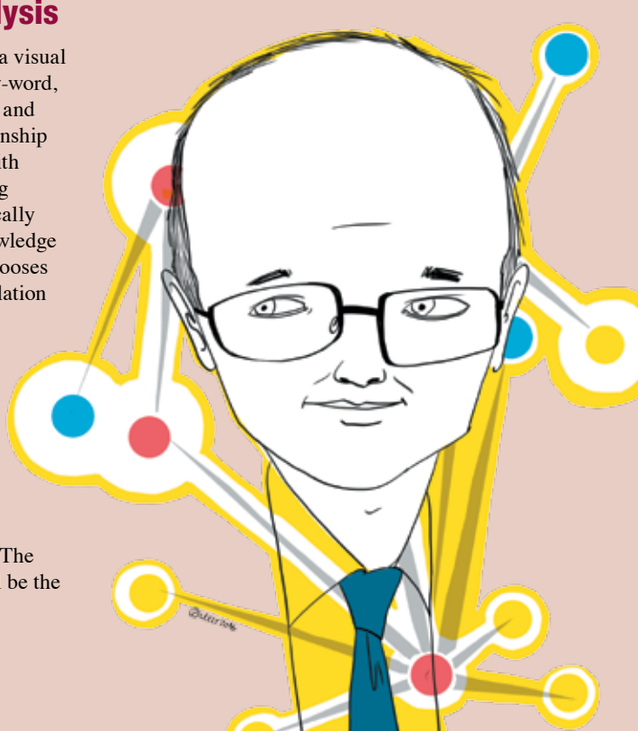
How do you proceed when you want to rapidly visualize the interrelationships between millions of data elements, whether they represent key-words, surnames or even banking transactions? The solution developed by the Linkurious start-up proposes a tool designed to explore graphs derive from complex data bases. Financial enquiries, reliability factors for EDP networks, scientific investigations … there is a host of applications and they continue to develop.

On the screen, a group of differently coloured dots interconnected by arrows (more or less big) and what we have is a graphic restitution of the financial flows and geographic locations that connect a myriad companies together. As an example amongst many others, we can see some astounding data-driven cartographic work proposed by Linkurious. "We offer an intuitive Interface that allows the professionals to use and handle the process easily", underlines Sébastien Heymann, co-founder of Linkurious. With his UTC-GI engineering diploma (majoring in computer sciences and their applications) and the elective specialty "Philosophy of Cognitive Technologies (PTC), our entrepreneur Heymann is no novice to the game of visualising graphs. When he was still an undergraduate, he set up a project group with the UTC lecturer Franck Ghitalla (UTC-Costech Lab) and with some other student friends an "associative" freeware package called Gephi, a tool to visualize graphs, notably useful for social science enquiries and displays. "This project allowed us to sharpen our teeth in the development of an International scaled project. These are elements you don't learn in first degree class-rooms. But we were awarded the Engineer of the Year prize by the magazine L'Usine Nouvelle. In the field of computer sciences, money is not really essential to start a project but you must know (or learn) how to get organized and secure partners", recalls our computer specialist. Some highly satisfactory collaborative agreements have been reached, with the RTGI (acronym for Territories and Geography of Information Networks), the CNRS and the University Paris 6 (Pierre & Marie Curie). To date the Gephi package has been downloaded 1.5 million times! The structure, however - based as it is on volunteer work and freeware - is not as yet adapted to a commercial environment. In 2013, Sébastien Heymann decided to set up Linkurious as a company proposing a graph visual package adapted to entrepreneurial needs. The then 30 odd year odd engineer started again from scratch: "Uses for graph analyses are very different in enterprise settings and certainly very different from the academic approach and Web technologies have become the recognized standard", he explains

Facilitating data analysis

Linkurious works somewhat like a visual search engine. Starting with a key-word, you can display a network of dots and dashes that materialize the relationship of the entity being investigated with other data sources. The underlying principle is to explore the data locally as a function of the available knowledge bases and the paths the analyst chooses to follow. Navigation and manipulation facilitate access to the various levels of information and serve to gain in speed for the analyses. Innovations in this field used to be restricted to home office society information services or for advanced scientific research. Now they are accessible for a wide-ranging professional world. The major banks, the EDP groups will be the priority targets as potential clientele for Linkurious. There are numerous areas where the need for such a tool can be felt - from checking the links of an offshore company with personalities, identifying the hidden links of certain bank accounts with criminal illegal activities, working out what the repercussions would be with a major blackout of an EDP service and/or its infrastructures. It was using this technology that the 370 journalists in the consortium (ICIJ) were recently able to establish links between the offshore accounts identified in the so-called "Panama Papers" and certain personalities. The banks and the French ministry for Finance already use Linkurious to detect possible money laundering and fraudulent transactions. Faced with such success, the as yet young and self-financed company now wants to engage in a fund-raising campaign to accelerate the company's development. ■

plus d'infos **www.http://linkurio.us**



Videos of UTC start-ups :
http://webtv.utc.fr

Meals, as and when you need them

We all recall that moment when, being a bit short of time, we cooked up a plateful of pastas or simply guzzled a packet of crisps. OK, it was so quick and easy but not exactly recommended for your body, if you repeated the drill too often … Antoine Boillet, well aware of this, took the easy routes, especially before exams. That was why he decided to develop powdered meals, on a formula base that included all the nutritional Ingredients a body needs, in the right proportions. That was how the idea of the start-up Smeal was born.

"I first of all proposed my idea in response to the call for proposals launched by UTC's Daniel Thomas Innovation Centre in September 2015 and my project was selected", explains Antoine Boillet, who graduated In 2015, majoring in Mechanical Systems Engineering (GSM) with the elective specialty "Productivity and Logistics" (PL). In order to prepare a perfectly 'balanced' meal, Antoine Boillet referred to the recommendations issued by the European Food Safety Authority (EFSA). "We used the same approach as nutritionists working for the benefit of high-level sports athletes and we started with nutrition tables to formulate our product", says Antoine Boillet. Nutrition is a field that he totally ignored before launching his project ad ideas. But that was not a problem inasmuch as "UTC taught us how to acquire new skills!"

We used the same approach as nutritionists working for the benefit of high-level sports athletes and we started with nutrition tables to formulate our product

Concretely, a Smeal is packaged as a powder sachet, containing the approximately equivalent of 3 meals. When a consumer is hungry he/she puts a required amount of powder in a cocktail shaker, adds a little water, shakes the mix and that's it, it is ready. There is no conservation additive so the product can last for one year, with no problems. "The idea is just to have a sachet in a cupboard at home and a meal ready in 30 seconds, if needed", says Antoine enthusiastically. Smeals can be consumed at any time of day and the doses is what the consumers reckons match their level of hunger. You can even buy a shaker with graduation marks to make a more accurate measure of the powder mix proportions.

Smeal is a vegetarian mean, with no GMOs and Antoine is planning, in a second phase, to propose lactose free and gluten-free varieties. The most important ingredient in a Smeal is oats. But the powder is composed in fact of some 30 ingredients, so as to offer a 'perfect' nationally balanced composition. Moreover, "we use an innovative sugar compound which has the special characteristics of being digested slowly and this ensures the consumer has a low glycaemic index", adds Antoine. "Soon our product will be certified compatible for diabetes sufferers".

Smeals bring consumers just the right daily prescribed amount of proteins, vitamins, etc. You could therefore eat Smeals all the time, although this is not Antoine's objective. "We want to replace function-intensive meals, where the aim is a search for efficiency in terms of time spent eating and nutritional balance, not eating for pleasure!" After a market survey and to add a dose of pleasure, the start-up Smeals is now proposing 3 well-known flavours (vanilla, raspberries and garden vegetables). "What we want to do is to launch other flavours that would fit in with the calendar events - pumpkin for Halloween, cinnamon for Xmas", adds Antoine.

As of the coming summer, those interested will be able to order meals on-line (in France first, followed by Europe a little later). "We have ideas to develop the business, new format and associate tools!" concludes Antoine with a cheery "Bon appétit !" ■

d'infos plus ▶ **smeal.eu**

d'infos plus ▶ **http://webtv.utc.fr** > Nos séries > Une filière, un métier

Holî's 'Bonjour' takes care of you

In order to conquer a share on the American market-place, you need to present a product that, is ''trendy', of course, but also with a name that sparks the buyer's imagination. Grégoire Gérard, when he presented his connected alarm clock at the Las Vegas 2016 CES (Consumer Electonics Show), it had a typically French flavoured name "Bonjour"

Connected objects are nothing new for Grégoire Gérard, who graduated from UTC in 2003; they are the core business of his start-up Holî. He notably developed the 'Smartlamp', an i-Phone controlled lamp distributed in all Apple Stores. It was the return on eXperience messages from clients that made Gérard decide to specialize his start-up. "A non negligible fraction of our clients were using Smartlamps mainly in their bedrooms. As of 2015, we decided to focus our activities on the bedroom and the sleep phases. To develop new products, we worked with sleep research centres and specialist practitioners". This introduced a more scientific side to the devices and this suited Gérard perfectly. "I chose to go to UTC because I wanted to acquire a strong technical base of skills, even though I always wanted to develop applications and products". Holî then produced its Sleep Companion, a luminotherapeutic lamp associated with a sleep analysis "app".

In 2016, a new challenge awaited the start-up - to conquer the American markets. "To do this, we decided to launch a new product we presented at the Las Vegs 2016 CES; we called it "Bonjour". The Las Vegas trip allowed us to validate that the product's functionalities were the right ones and that the name Bonjour was fine for American eyes and ears". "Bonjour is a connected alarm clock with multiple functions. "We all begin and end our day in the bedroom and we have all sorts of automatisms when we wake up, such as checking the" weather", says Grégoire Gérard. "But just constantly picking up and switching on an i-Phone can be tiresome and the issue of RF emissions worries users more and more. Bonjour allows you to address this question because for those that worry about EM radiation, the Wifi function switches itself off during the night, reassures Grégoire.

Moreover, the clock has built in artificial intelligence (AI), so it's possible, for example, to ask to be awakened earlier if the weather outside is good enough or if there are expected traffic jams on the car commuter trip to the office. Bonjour also displays some useful information - weather, traffic, agenda … "The device has a loudspeaker to reproduce music. From a technical point of view Bonjour is iOS (Apple) compatible and likewise with Android".

"The Bonjour alarm clock will also be connectable to other devices in the product range. All our products are connected via the same "app", explains Grégoire, "and this will evolve as we produce more devices. This is much easier for the user to handle but also for us in the company. More than just being an alarm clock, Bonjour is a way to connect into one's personal digital world and connected home. It's a shortcut to all your connectable devices. You can, for example, control your home thermostat, your intrusion cameras or any other Holî device, such as the sleep companion".

In order to launch his alarm on the American market, Grégoire decided to start a participative financing campaign on Kickstarter, "this being a way to get a foothold in the US markets and be able to tell a great story as well". The Kickstarter campaign should begin June 2016 and will "propose" the Bonjour device at 129 euros. Later, when ready, it will go on the international markets early 2017 at 199 euros approx.

Grégoire Gérard is already indulging in some forward-thinking: "In September, we plan to present a "sleep tracker" that you place on the mattress and this will allow you to wake up at the "right time" in the sleep cycle. The sleep tracker will interconnect with Bonjour and thus trigger the alarm at just the right time". Holî looks after you ! ■

plus d'infos **www.holimotion.com**

Videos of UTC start-ups :
http://webtv.utc.fr

In 1928, Maurice Martenot* developed a musical instrument with an 'expressive' key, much appreciated by the musicians when modulating the sound volume they produced. Unfortunately, he died without revealing his secret. Eric Simon, a UTC graduate who specialized in industrial design, has come up with a solution that reproduces the famous touch-key, in a tactile control box called 'Touché'.

A digital string-like controller

«Basically, we are all musicians and composers", explains Roméo Verlet, who is the sales manager for Expressive E. "Eric composes music for films, Victor Grimaldi also a UTC graduate is a musician in a trip-hop group and I am a rap composer. All of this gives us some complementary features to share". Indeed it is the principle that drives this founders' group. It enabled them to become aware of 'other' ways to work, with each musician playing his part in a different manner.

"Victor and Eric began developing the project together, following Eric's placement at University of Paris 6 (Pierre & Marie)", adds Roméo Verlet, "and they came knocking on the door of the SATT Lutech (a technology transfer enabling company). I was in charge of business prospects there and when we decided to invest in this project, we got on very well together. The basic idea was to set up a company to reproduce the Martenot key. We established Expressive E, with Alexandre Bellot, the 4th founder member (a qualified ICAM engineer, specialist in industrial engineering sciences)".

"Touché" is a tactile sound controller inspired by the famous Ondes Martenot, which you connect to a synthesizer and it give the musicians a hand control over a multitude of parameters. The controller itself has a tactile wooden surface (cf. demo at their web-site); then musician ha the same range of nuances and modulations he/she would get from the same acoustic instrument. "The controller connects into any make of synthesizer and the musician can 'reshape' the sounds ad libitum", explains Roméo. "With our "Touch" controller, we are running somewhat against the grain of what all the 'synthe' makers are doing today. Our product is very simple to use and it feels almost exactly like the sensation you get from the equivalent stringed instrument. This is the strong point of Touché, modern stringed instrumental music".

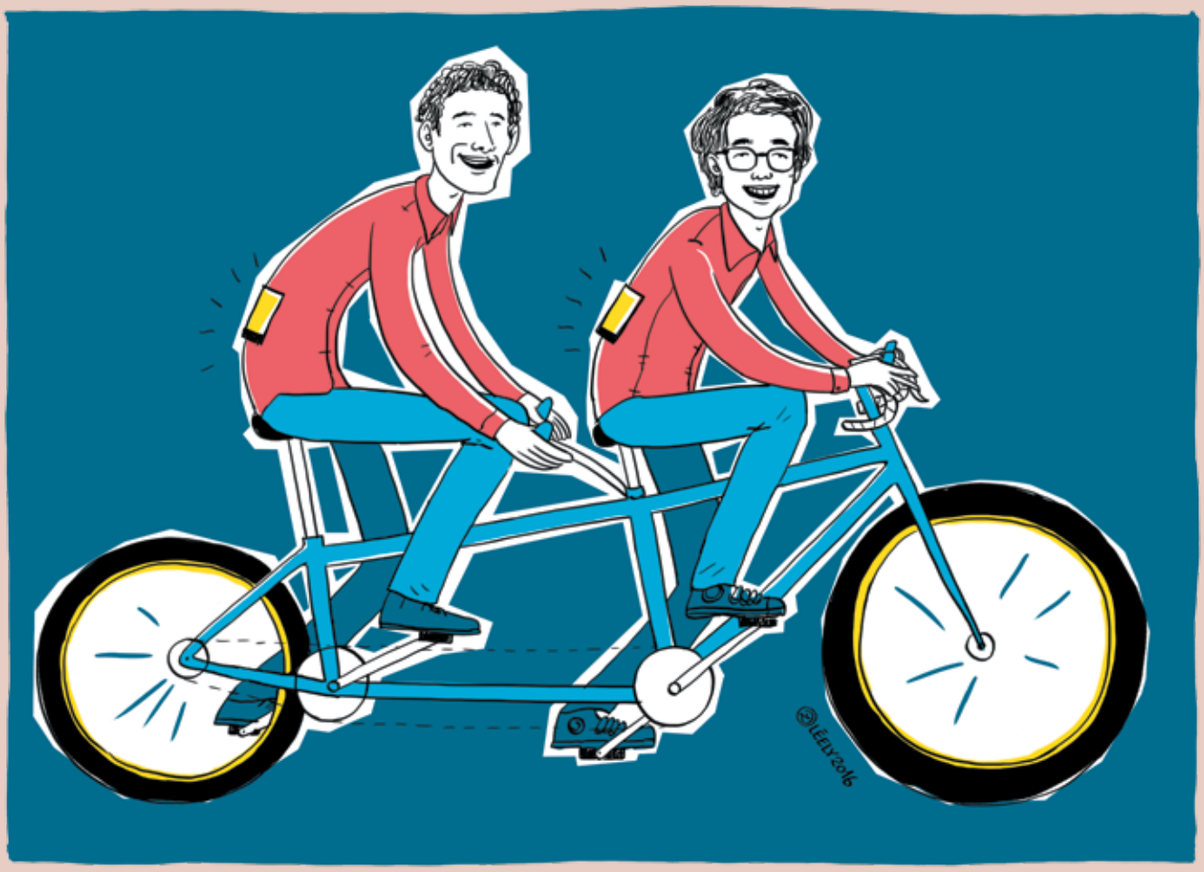
The physical design of Touché was handled by a French design agency. "It turned out that wood is the material best adapted to all the configurations you may want and expect from such a controller device". The controller unit comes with its own in-built software and this allows for a very wide range of variations. Several teams are working at the start-up to make sure this controller is compatible with all the synthesizers on the market-place.

"We also met with over a hundred musicians, including those with Portishead, Massive Attack, Björk...» announces Roméo proudly. "They too participated in development of the product. Their 'returns' and expressed feeling when using Touché had an influence on the route we took for the device and its design characteristics". Getting used to the controller is fairly easy but of course this will depend on each musician. "You don't really need training as such - you just learn through your own hand movements. Anyone can have a go, and succeed", concludes Roméo.

"Touché" will be on sale before end-2016, for less than 500 € a piece. "We are preparing for a distribution of Touché in all musical instrument shops and also at international outlets", announces Roméo. "We really would like to see our invention as a lasting actor in a very demanding industry and which call for lots of further developments." ■

plus d'infos **www.expressivee.com**

A Ray of light



With the Belight project, a simple mobile phone is all cyclists need to be seen and safe. More than being just a light on a phone, as is the case for numerous “apps”, this new road bound companion allows the cyclist to signal changes in direction and stops. It is also a connected object whereby the position of the cyclist can be forwarded to nearby car drivers (via a geolocalization function).

Three UTC students working at the Btwin Village in Lille are at the origin of this project: Lancelot et Colin, doing their end-of-studies placement and their tutor Yue Hue. "Side-lights, headlights and traffic indicators are obligatory for cars, so why should cyclists be content with less security?" notes Colin Gallois, one of the three co-designers of Belight. Like his comrade Lancelot Durand, Colin is finishing his major in Mechanical Engineering (UTC-GM) with the specialty Engineering and Industrial Design (IDI) and he underlines the benefits of ‘polyvalence’ and ‘adaptation’, acquired during his UTC studies. “UTC made me curious and gave me then capacity to solve problems by simplifying them and at Btwin, we are busy also with the efficiency and design of their products”. It was during the first edition of the Hackathon, launched by Decathlon last February and targeting Btwin staff that the idea took shape. Yue Hue, their tutor, himself also a graduate from UTC suggested they participate. In 2016 the theme was that of connected objects, given that the equipment maker was interested in the promising development of this market segment and the ideas their staff might propose. “The initial subject was framed “If our objects had a soul”. That was where we imagined a sort of guardian angel for cyclists without having a lamp to hand”, sums up Lancelot Durant. During the 48h the participants had, the trio came up with a concept and imagined its possible commercial forms. Yue dealt with the software coding, while Lancelot and Colin covered the graphic ID, the communication aspects and made the video, as well as some textile prototypes. The simplicity and relevance of the product was found most attractive by the Jury who awarded them the Innovation Prize. This free and constantly available tool replaces former, cumbersome lighting systems that were easy to forget, to steal and even break. The underlying idea was to propose a back-up lighting system which would work no matter where you are. Our trio of designers are now working on a direct clip-on system to attach the device to the cyclists’ shirts (or shorts). Another strong feature of Blight is that it can be interconnected with car-mounted geolocalization ‘apps’, such as Google Maps. This community dimension will enable drivers to signal the presence of cyclists advancing on the same route. The three engineers are also now considering how to integrate their concept into the Decathlon range of products. “We are in phase with the corporate Decathlon philosophy that proposes sports equipment accessible for all its customers”, Coin notes enthusiastically..■

Videos of UTC start-ups :
http://webtv.utc.fr

An « app » to help you

take medicinal drugs correctly

More and more French people are taking to auto-medication, without necessarily knowing the right way to take their drugs or aware of the potential interactions and possible side side-effects. Having made this observation, Pascal Huynh, Cédric Tang and Kevin Tan developed Medicamentum, a web and smartphone 'app' they presented at the Assurance Maladie Hackathon* competition, the final round of which will take place on May 10, 2016 in Paris.

After establishing his first start-up, Beyowi, in Bangkok Thailand, Pascal Huynh, a UTC-GI graduate (2008) who majored in computer sciences and their applications, decided to open a web agency to develop smartphone 'apps' and web sites in France as of January 2015. He was rapidly joined by Cédric Tang, UTC-GM graduate (2008) who majored in Mechanical Engineering, Kevin Tan, UTC-GI (00 and Chloé Fasquel, a digital graphic designer. It was via the development of a project for a chemist to provide information about medical drugs that they decided to register for the Assurance Maladie Hakathon*, where they presented their project baptized "Medicamentum'.

"Medicamentum" is an eco-system and takes the form of a web site and smartphone 'app'", explains Pascal Luynh which enables users to be informed and to forewarn them about the correct intervals and doses and possible drug interactions or risks of allergies …". To this end, Medicamentum makes use of data provided by the Assurance Maladie and its subsidiaries. The platform site will thus warn the user if there is a risk in taking several drugs simultaneously, or a risk of overdose, notably when the patient changes his/her family doctor. "However, we must not be considered as a substitute for practitioners or health specialists", confirms Pascal. "Our 'app' provides better communication, with serious, valid information".

Medicamentum therefore preferentially targets users who wish to have reliable information about drugs, such as the health professionals, the pharmaceutical sector, the faculties of medicine and the pharmaceutical laboratories. As for the interference with private spheres, Pascal Huyn and his associates are clear: "anonymization is primordial to the impartiality of our platform and we shall never be storing any private sphere data about the users on our servers."

As far as the Business Model is concerned, Medicamentum will be free for users. "We want afterwards to build up partnerships with the pharmaceutical sector and the laboratories, so that they too can adapt and improve on their drugs", says Pascal. "The more our eco-system is used, the better will be our possibility to draw statistical conclusions, thanks notably to the users to accept to fill out 'after care' questionnaires. Naturally the questionnaires will remain totally anonymous and we shall be collecting only general data such as age, disorder frequencies, allergies … The answers to the questionnaires might, for example, lea to pinpointing certain drug interactions or side-effects that had not been detected during the clinical test phases".

A prototype will be finalized in the month of May, ready for the competition final round. ■

* The Medicinal Drug Hackathon aims at creating services or applications that will benefit the population at large, the health sector professionals, the health institutions or the public authorities who use or work with medicinal drugs and to gather together the data available in the French 'Assurance Maladie's EDP system, or data made public by other organizations and/or institutions.

Videos of UTC start-ups : **http://webtv.utc.fr**

Taking Science out to Main Street

The objective of the start-up MyScienceWork is to make science accessible to the public at large, thanks to on-line archiving of scientific papers and to use of the social networks. The company was established in 2010, by Virginie Simon, a UTC graduate who majored in Biotechnologies, with co-founder Tristan Davaille, a financial engineer with a degree in economics who graduated from Reims Management School; with its 15 staff members, it is based in the USA with offices in Europe. The University of Stanford, Ca, the Institute Henri Poincaré (Paris) and the ARC (Cancer research) Foundation are among the clients.

It was during a placement with a large pharmaceutical laboratory that the then UTC undergraduate, Virginie Simon, became aware of the importance of keeping up to date with research work ongoing round the world. Hyperspecialization tends to makes you forget that there is a global scientific context out there", Virginie insists, recalling the very special topic she had worked on in the placement. With her engineering diploma tucked under the belt, she followed suit with a PhD at University of Paris 6 (Pierre & Marie Curie) on the use that could be made of nanotechnologies in the search for cancer care and remedial action. It was during this experience that the idea germinated to mutualize science on line. "I spent an enormous amount of time on the Internet monitoring the scene to try to identify the right people, with as my only aid the free on-line summaries of scientific papers", she recalls. While doing her CIFRE (industrially supported) PhD thesis, she also ran into the difficulties of pluridisciplinary research. That was when she imagined a one-stop portal where the papers from different specialties could be archived. The idea of MyScienceWork was born. With his diploma from the Reims Management School, Tristan Davaille joined the adventure fairly soon after, bringing with him his talents and skills in management and finance. "The key feature when you want to launch a start-up is to find the right people as your associates", explains Virginie. An investment fund and the Luxemburg Government were quick to approve the potential of the project. "This enabled us to be among the laureates of a start-up competition and to enjoy a 3 month stay in the Silicon Valley, Ca". It was this enriching period that led to setting up the MyScienceWork's home office in San Francisco, where Virginie Simon now resides. A recent partnership with Google Scholar reinforces this presence outside France. From a financial point of view, the two co-founders have raised 4 Meuros to date.

In contradistinction with other offers on the market, the key feature off this tool is to have conjugated the power of a 30 million paper data base with the exchange possibilities offered by a social network.

A multivalent platform

In contradistinction with other offers on the market, the key feature off this tool is to have conjugated the power of a 30 million paper data base with the exchange possibilities offered by a social network. There is a better visibility and a worldwide accessibility for scientific research for the benefit not only of the scientific communities but also anyone keen on science or the journalists who specialize in these themes. The business model involves sales of the platforms, called Polaris, to universities, foundations and engineering schools. Each client's structure has a data storage capacity for his/her chosen publications, plus a profile system for the authors and an interface to its colours. Statistical tools also enable the site administrators to measure the audience for works hits and to set a profile for the internauts connected, which offer an interesting decision aid tool to help frame research policy strategies. Polaris likewise facilitates exchanges among scientific authors by making accessible 500 000 research scientist profiles representing different specialties. Tailor-made system arrangements can be proposed as well as communication/ dissemination services for the public at large and for the media contacts. "Our aim above all, is to democratize knowledge and take it down Main Street", concludes Virginie, our corporate, entrepreneurial, executive boss. ■

plus d'infos **www.mysciencework.com**

A new look at
Could entomophagy be a solution for 2050?

Romain Fessard is a rather unusual character. For over ten years now, he has been advocating insects as a foodstuff in France - and this is not just a hobby for him. He breeds, prepares and distributes insect-based foodstuffs and was one of the pioneers in France making a case In favour of fly-food, or more scientifically, 'entomophagy'. At the TEDxUTCompiègne, which is a programme of public lectures designed to "Inspire Creative approaches, to encourage Change and to enhance Innovation", Romain Fessard explained to the audience how consuming insects could change the deal in terms ion sustainable development is concerned. His subject was perfect for the January 2016 TEDx session, the core theme of which was "The 2050 Horizon, Innovation and Society".

DID YOU KNOW THIS?

TEDx is a public lecture scheme which enables schools, colleges, enterprises or local authorities … to reproduce the concept of then TED lectures created to disseminate ideas "worth disseminating". The licensed TEDx programme is organised directly by the students? UTC will be organising its 3rd Conference venue in 2017.

Do Westerners really balk at the thought of eating insects?

Well, yes, there is a degree of reticence in the West when it comes to eating insects. Nevertheless, when I experiment today with insects specially prepared as "aperitifs", some 80% of the guests accept to taste them. Entomologist Marcel Dicke asserts that on average a French person consumes 500 g insects per year, through contaminate fruit, or vegetables collected industrially. Insects inadvertently get trapped in jam pots, fruit juice 'bricks' or vegetable soup packs … Food intake systems may change too. The Romans loved a most unusual dish, the pink flamingo and especially appreciated the bird's tongue, served at 'business luncheons'. Today, potatoes constitute the second most consumed foodstuff in the world, just after wheat. And yet there were suspicions, in the 17th Century, that wheat could transmit diseases such as the plague and were only fed to pigs and prisoners. Tomatoes for a long time were only considered as decoration in North Europe before reaching our tables in the mid-18th Century. Our sense of taste constantly evolves and quite probably eating insects will become commonplace in the West by 2050.

> Insects also produce 10 to 100 times less GHG (greenhouse gases) than a herd of cows. In terms of space needed, they also represent a huge gain. One tonne of insects can be produced in 3 months on only 30 m²

How do you see insect eating change in the world and in Europe in particular?

Today, about one third of the planet eats insects on a daily basis. The number of insect species consumed in the world is close to 1 900 and the figure is constantly on the rise. Most of these insects are collected directly outside, in fields, on trees … it is a food source that goes back to our origins, Men eating insects probably before they began hunting and eating meat. The only regions in the world where this is not an accepted feature are Europe and North America; in Europe, only the Netherlands and Norway can made the change and you will find restaurants in these two countries who have had insects on their menus for 10-20-30 years now. In France the turnover in this foods sector probably does not exceed 1.5 Meuros. I personally learned to enjoy insects over ten years back and I quickly moved to set up the web-site http://www.insectescomestibles.fr/ so that other in France could discover the products in Europe and particularly in France. I was the first trader to produce insects in France. In the beginning I only sold whole insects and today I have several species on sale. We breed comestibles insects but we also prepare them. The range runs from insect-aperitifs, to insect flour and other products such as protein bars. The breeding and raising of part of our stock take place in Pattaya, Thailand, because the temperatures there are more favourable to insect growth. This sort of breeding/raising is very widespread in Thailand and offers traditional products that are environment-compliant, such as 100% natural Thai ▶

crickets. Concerning transformed products such as protein bars or insect pates, we are gradually developing a real level of expertise in France, a sort of techno-food with a mix of innovation and nature compliancy.

Can insects be considered as contributing to sustainable development schemes?

Insects may one day represent the mainstay, staple diet of human food! Already, they can be seen as delicious with a variety of tastes! For example, flour maggots taste like hazelnuts, crickets resemble potatoes. Remember that insects are very rich in protein contents, some species even more than beef. There are regions in the world where pregnant women or ill persons are encouraged to privilege insect intakes. By 2050, it will be necessary to feed some 10 billion inhabitants on Earth. With today's diets, with increase meat on our plates, it simply will not be possible in the long run to keep up. It takes 10kg of vegetables to "make" 1 kg of meat, 5 kg of poultry or 9 kg of insects. The latter therefore display a favourable ratio here, not forgetting that they can be fed on organic wastes, such as discarded food, manure or garden composts. Insects also produce 10 to 100 times less GHG (greenhouse gases) than a herd of cows. In terms of space needed, they also represent a huge gain. One tonne of insects can be produced in 3 months on only 30 m². Such a surface would allow you to raise one cow, yielding 400 kg over 4 to 5 years to rear it to maturity. Insect DNA is quite distinct from human DNA, so the questions of transmission to humans of various illnesses and disorders is avoided - whereas these problems do exist when we consume produce from poultry and other mammals. And for all those people who worry about animal wellbeing and who are not happy seeing animals going to the slaughterhouse, entomophagy will be a way to limit one complicity with various forms of cruelty to animals.

Can insect product be developed easily?

Production can be carried out in an artisan way and does not call for any special skills. It needs few means and reproduction and breeding only require small surfaces, in the countrysides or in urban areas, in every country round the world. Insects need heat to develop so it will be less costly in terms of energy in warmer climates, but is not impossible to envisage insect farming in large European cities or in the USA. Setting

up an insect farm only needs small surfaces and few means, so local production can be enhanced. Today the prospects seem promising. Countries like Belgium, Italy or the United Kingdom are interested in the field and insects are already beginning to come onto the shelves of the supermarkets. ■

INTERFACES

Interfaces,
key word of the ICACM 2016 conference

Focused as it is on the mechanical properties of innovative materials, the ICACM Conference brings together the world's foremost specialists on the field, inter alia the role played by microstructures in material behaviour, at different scales. UTC, the University of Paris (P&Marie Curie) and the Sorbonne Universities Cluster co-organize this year the Franco-American ICACM Conference.

The world of materials today is undergoing continuous innovation, witness the advent of electricity conducting plastics, ultra-resistant coatings that make metals almost rust-proof or nanometric-scaled composites with optimised resistance and lower mass. And if the experts still use real experimentation, we can observe an ever-growing presence of digital tools. For this 9th edition of the conference, the International Center for Applied Computational Mechanics (ICACM) has decided to focus its attention preferentially on materials and in particular on the role of microstructures in material behaviour at different scales, including the macroscopic level. "By studying material behaviour at differing scales we hope to understand the physical mechanisms that apply at these levels and their impact on macroscopic material behaviour", details Salima Bouvier, Director of Mechanical Engineering Department at UTC who heads the Materials and Surfaces research team and who is co-organizer of ICACM 2016.

ICACM, from inception to today

ICACM began in 2005, following suit to a meeting between Oana Cazacu, who at the time was a research scientist at the University of Lille –France and John "Row" Rogacki, who was a research scientist to, at the Research and Engineering Education Facility (REEF) of the University of Florida. "We worked together at the REEF given that computational mechanics was an area of high interest for the Air Force Base at Eglin where they were conducting research assignments into conventional weaponry", notes John «Row" Rogacki. Following that the two specialists built up their Franco-US relationship developing a collaborative network thanks to the organization of a thematic conference. "A number of French and American universities were approached to participate and, given the interest expressed, a Franco-US organisation team was set in motion to convene the first conference at the REEF in 2007", details Dr. Rogacki.

If, originally, the ICACM Conference was a Franco-US initiative, it is because of the strong involvement of these two countries in the field of digital computation. "Numerous famous French origin mathematicians laid the bases of this specialty", notes the American researcher. But one must not forget the major American research work carried out that served to structure the specialty and the strong scientific links that now exist between the two countries, facilitating the organization of joint work programmes.

Today, John "Row" Rogacki is now Deputy Director of the IHMC (Institute for Human and Machine Cognition), Florida. He is no longer personally involved in organizing the ICACM Conference but continues to support it by supervising the contents and helping to securing financial support in the USA. The 9th ICAM Conference, June 1-3, 2016 will be co-organized by UTC and the University of Paris 6 (Pierre & Marie Curie), making it a Sorbonne Universities Cluster event, partly financed by the COMUE.

From micro to macro-scaled research

The main questions revolve round the ways and means to identify relevant scales at which data can be collected and used to model certain phenomena. The specialists also focus on the mathematical computational tools available so as to be able to describe these physical phenomena at a relevant scale. "Architectures and microstructures are becoming increasing complex today" underline Salima Bouvier, who also notes that "the classic tools used to characterize material behaviours are inadequate". The scales investigated run from the nano-metre (10-9m) to the centimetre (10-2m) and the research scientists are working on the development of digital tools capable of integrating the complexity of the microstructures while ensuring the precision and efficiency of the computations. The objective is to be as close as possible to the physical reality of materials and to quantify "imperfections" of the real materials, their heterogeneity. By way of an example, a flaw often leads to a catastrophic material break. It is therefore important to be able to statistically describe the events observed: this is done using fine scale probabilistic descriptions for material flaws.

Modelling used to improve experimentation

The relationships between digital modelling and experimentation are changing today. Formerly, experimental results were used to assess or even correct digital models – today the same models are used to complete the date and results obtained in real experiments. The exchanges between experiments and digital computations facilitate our understanding of those mechanisms that operate when the materials are in use. "For example, when designing rosin impregnated stitched carbon fibre composite structures, the models can reveal certain anomalies at the stitch borders", explains Salima Bouvier who suggests that the test protocols could be focused on these specific points. A concept known as "test-computations" will be addressed in several papers presented at the Conference.

Describing matter in terms of its volume …

One of the new challenges - in terms of decription and characterization of material behaviours – is to be able to access volume-related information. Until recently, the experimental approaches enabled descriptions of material surface behaviour. "Today we have measurement protocols and tools to explore the surface behaviour of materials, but the question remained: how to explore the materials in depth, using non-destructive testing", underlines Salima Bouvier. The question, she adds, is how to extrapolate a surface information to the rest of the material under the surface. With the progress noted in tomography and other volume-related forms of investigation coming on line, it is now possible to explore damage zones through a given material sample. These new techniques offer a rich harvest of experimental information and lead to validating the corresponding mathematical models. Inn like manner, to take into account the real architecture of materials in the modelling software, we now have tools that enable the scientists to build 3D models of the material architecture by aggregating a series of slice-cut images. These tools are continuously being improved.

If, originally, the ICACM Conference was a Franco-US initiative, it is because of the strong involvement of these two countries in the field of digital computation

… and controlling the interfaces

What is "interface"? Undoubtedly yet another key word for ICACM 2016! The interface designates the contact area between two material surfaces. For example, it is the zone that separates a metal alloy from its coating, or the contact area between the fibres of a composite material and its matrix, where the forces between the fibres and the matrix are exerted. It therefore is a very thin element which does not lend itself readily to experimental measurements, not because the tools do not allow us to reach such a small-scale zone but the results can be 'flawed' by the two materials on either side of the contact zone. A second difficulty resides in the fact that the interface is a highly complex area in terms of its architecture and specific properties. It remains true, nonetheless, that gaining knowledge of the interfaces is of prime importance since often they are relatively weak parts of the structures. To illustrate this, we occasionally see paint scaling, premature cracking of material, certain forms of corrosion … If we can get to better understand these properties, we shall learn more about the potential weak spots and then take adequate compensatory steps to correct this.

A second difficulty resides in the fact that the interface is a highly complex area in terms of its architecture and specific properties

The ICACM 2016 Conference, organized by the UTC Roberval Laboratory, is financed partly by the UTC Labex Programme inasmuch as it integrates variability and indeterminate factors to a specification of the materials behaviour under investigation. One half-day session is devoted to probabilistic and stochastic approaches useful in material behaviour description. ■

http://icacm2016.rbv.utc.fr
Contact: icacm2016.rbv@utc.fr

AGENDA

interactions.utc.fr • www.utc.fr

Final Round of the « Eloquent Flowers »
Tuesday May 10, 2016
The oratory art competition "Eloquent Flowers, organized by the University of Paris (Sorbonne) and UTC is open to all students in the Sorbonne Universities Cluster. The final round, open to the public will take place at the Bibliothèque nationale in Paris, 6:30 pm, May 10, 2016.The subjects are revealed to the candidates beforehand, but they have a limited time to develop their 'arguments' and oratory presentations. In 2015, it was a UTC students Guillaume Ouattara enrolled in UTCs 'HuTech' (Technology and Humanities) core Programme who was declared final winner.
www.fleursdeloquence.com/
webtv.utc.fr/watch_video.php?v=ANBW7MSD7R9N

10 000 Festival-Goers for the 3rd Edition of the Imaginarium
May 14-15, 2016
This edition of the Imaginarium Festival, supported by UTC and the Sorbonne-Universities will yet again be organized at the Tigre hall, in Margny-les-Compiègne, with the aim to bring together at least 10 000 festival-goers over the two days. On the programme – 24h live music and also an associative village with animations throughout the weekend. Organizers already announce the participation of Hyphen Hyphen, Naaman, Alesia, Last Train...
https://imaginariumfestival.com

Challenge of the newspaper « Le Mondes des Grandes Ecoles et Universités»
June 4, 2016
The 8th edition of the Challenge du Monde des Grandes Ecoles and Universities will take place at the Charléty Stadium, Paris 13. It will provide the opportunity for students to meet and compete in various sporting events and also to look for contacts and appointments with the Manpower resources teams of the companies present at the Job Forum.
www.cdmge.fr

Round Table on the question "Can we still talk about technology in the media?"
June 1st, 2016
UTC's Roberval Prize committee is organizing a Round Table on the subject "Can we still talk about technology in the media?" as of 4 pm, June 1st in the Salle des Actes at the Sorbonne (Paris 5ème). The moderator will be Pierre Lefèvre, journalist and author. The event will bring together Pierre Lena, Member of the French Academy of Sciences, Marguerite Tiberti (Editor for the Young People's Section, Ed. du Ricochet), Sophie Bécherel (radio programme France Inter), Laurent Thiberge (Future Mag) and Daniel Ichbiah (Comment ça marche ?).

9th Franco-American Symposium on Structural Mechanics
June 1-3, 2016
This symposium is organized by the UTC-Roberval Laboratory and the University of Paris 6 (Pierre & Marie Curie) in the framework of the Sorbonne Universities Cluster.

The Mechatronics Rem Conference 2016
June 5-15-17
Mechatronics REM 20116 is a yearly event convened in a European, country, a multi-focus conference which brings together the communities of Mechatronics (11th Franco-Japanese Congress on Mechatronics, the 9th Europe-Asia Congress on Mechatronics) and the REM conferences REM (17th International Conference on Research and Education in Mechatronics).

RESEARCH

'Mass-producing' transfusion
blood platelets

A group of research scientists have developed a microfluidic process capable of producing large quantities of blood platelets in several hours only. Their work opens up new pathways to in vitro production of platelets and stems from a collaboration between physicists and biologists (the Gulliver Lab., ESPCI Paris and the Inserm Institute and the start-up PlatOD). The results of the studies were published in Nature Scientific Reports and have led to registration of a joint patent claim by ESPCI, the CNRS, Inserm and PlatOD. Anne Le Goff, now a research scientist at the UTC-BMBI Lab relates the investigations in which she participated.

Blood platelets are mammal non-nucleated cells, only a few microns in diameter, absolutely necessary for blood to coagulate (clot). The demand for transfusion of platelets is increasing constantly, notably because of the multiplication of chemotherapy protocols and of bone marrow transplants. From a physiological point of view, platelets are formed by fragmentation of the cytoplasm of larger cells, the bone marrow megakaryocytes. We have known for a number of years now that the flood flow in capillary vessels irrigating the marrow plays an essential role in the formation of platelets. It was this discovery that motivated increased research activities in the field of microfluidics, to study the fragmentation of the megakaryocytes and blood platelet production. Most systems to date mime the crossing of the bone marrow by the megakaryocytes. And, although the initial observations were successful in showing how the cytoplasm fragments into platelets, the quantities of the latter were far too low to enable any valid biological characterization.

The scientists in our team chose a different approach, which was not limited to reproducing exactly the mechanisms taking place in the bone marrow. In the system they investigated, the megakaryocyte suspension was made to flow directly in a microfluidics chamber with a very large number of cross-strut pillars to which the cells adhere, while remaining subject to the hydrodynamic forces at play, the latter enhancing their elongation and fragmentation. What the scientist observed was a reorganization of the megakaryocyte cytoskeleton, to take on the shape of 'pearl necklaces' (cf. photo). The cytoplasm then subdivides, under the effect of the hydrodynamic forces and releases platelets into the perfusion stream on a sustained, regular basis. "Thanks to these hundreds of micro-pillar structures in our lab-on-chip, we were able - over a two-hour period - to produce a sufficient quantity of platelets, viz., enough to allow their characterization. We demonstrated that - as we had expected - the platelets were not activated as they left the bio-reactor chamber but remained sensitize to chemical activation which is what we need to have them fulfil a clotting function in the receiver's blood-stream", says Mathilde Reyssat, a research scientist at the Gulliver Lab, ESPCI, Paris.

This original set of results derives from a rich collaborative effort by physicists, biologists and medical practitioners. The academic research staff worked hand in hands with the engineers from the PlatOD start-up, created by Dominique Baruch, whose objective is to produce platelets "on demand" within the next few years.

This work is a first step towards large-scale blood platelet production in vitro and therefore towards new forms of transfusion protocol. There is still a long list of studies remaining to be carried out, such as animal in vivo coagulation tests and in the long-term, some clinical trials are expected, in just a few years' time.■

EXECUTIVE EDUCATION

A Patient's Quality for life

For several now, a partnership between the UTC research scientists and the EPS Maison Blanche, Compiègne (establishment specialized in mental health disorders) practitioners has allowed special training for hospital staff in seeking day-to-day life quality for the patients. The research team has instated a university diploma for quality in mental health treatments, to train staff and have them more aware of the issues involved.

«As far as health sector workers are concerned, a "quality assessment approach is often perceived as a constraint", notes Jean-Matthieu Prot, a project leader in continuous education programmes at UTC. It is seen as synonymous of "more procedures and admin work" and as a serious re-assessment of their professional practice as a controlling factor. In order to demonstrate the usefulness of adopting a quality assessment approach, UTC and the EPS Maison Blanche together with the Saint-Anne Mental Health hospital in Paris and Perray, in the Vaucluse (South France), are proposing a university diploma (DU) addressing the question of quality assessment (QA) in mental health treatments and care. One objective assigned to this DU is to improve considerably the image of "quality" per se, too often considered today by the personnel as a control function initiated by the French High Authority for the National Health Sector (HAS).

An initiative at the strong instigation of the French High Authority for the National Health Sector (HAS)

This training package is due both to research done by Jean-Pierre Caliste, emeritus research scientist at UTC, In charge of the specialist Master's degree on "Standardization, Quality, Certification and Benchmarking" and his meeting in 2007 Maria-Cristina Galeazzi, a professional psychiatrist at a time when the HAZS was issuing new demands that forced the establishments to assess some quality related questions. Maria-Cristina Galeazzi proposed that she represent the Maison Blanche to examine the questions. "Psychiatry is the medical specialty that comes closest to quality concepts, inasmuch as in our day-to-day practice, we must diagnose, assess and readjust our therapies and observe the patients' improvement in an iterative manner again close to QA", says the professional Galeazzi, who is also co-Director for "Quality and Risk Management" at the joint directorate set up for the Groupement Hospitalier de Territoire (GHT) EPS Maison Blanche, Compiègne, CH Sainte-Anne and GPS Perray in the Vaucluse.

Removing differences in quality levels between establishments

Today the demands in terms of standards are the same for the three establishments under GHT who have all expressed the wish to harmonize their knowledge bases. It was indeed at that point that the decision was taken to create a specialist HE-DU diploma for Mental Health Practice. "This called for a considerable amount of preparatory work to disseminate a quality culture that varied a lot among establishments, with the aim to come up with a formula that could be applied to all establishment structures", underlines Jean-Matthieu Prot.

« What we want is to see the in-house vision change in respect to quality concepts and practices, insisting on the cohesive nature of different underlying activities and building up a sense of meaning on a day-to-day basis to enhance relationships between mental health care teams and their services". A considerable amount of pedagogy was instilled here to improve the trainees' perception of a quality-intensive approach to their profession. This DU course aims at helping trainees to accept and use a given methodology, enabling them to correctly identify a problem area and improve on it and to identify and propose objective markers to assess the quality of the service provided and the care given to the patients. One objective is to develop methods to share thoughts about how to establish work protocols that comply with each professional's constraints. The DU offers a recognized diploma that can lead to the person being designated as the 'QA referent' in his/her service. The QA referents then should help disseminate a shared culture among the establishments. To this end, the lecturers have the trainees focus both on acquiring new knowledge and tools to conduct change for project management, in tools and methods (analysis, risk management, EPP (assessment of professional practice)) and getting health sector professionals and service users involved (representatives of users and manger at the HAS, for example. The participants on the DU course will be invited to analyse the processes and practices by using quality assessment tools relevant to mental health cases and their context. They will implement improvements, for the patients, for their families for the health sector professionals also, in a tutored project. Following this unique training course (in France), the persons trained (doctors, health sector mangers, ,nurses … will be able to define an action-oriented logic that aims at improving professional practice and to better structure in-house and external PR communication in compliance with today's certification demands on health establishments and care units in general. ■

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Presented by **Toby,** UTC's 'Visitor from the Future'

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life-styles

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Sensors can detect the patient falling, record and transmit heart beat rhythms to a monitoring centre and, if need be, to the emergency services. Our gratitude goes to the doctor and the UTC-Heudiasyc Lab for guaranteeing this assistance to persons in need !

Opening up new paths

Odile Asselin, Head of the Learning Technologies Project with ResMed, accepts new challenges as she progresses.

Odile Asselin was attracted by and admitted to UTC after her Baccalaureate. She graduated in 1989 with the major Bio-Engineering and the elective specialty Biological Foodstuff Products (PBA). "I really felt fine at UTC, which turned out to be an engineering school that corresponded exactly to my expectations! I was interested in new technologies applied to the living spheres, to health problems and at the time, UTC was the only engineering school with subjects like that on its training cursus. The relatively long placements with enterprise and the possibility to carry out semesters abroad were also 'not to be missed' opportunities. With hindsight, what struck me was that UTC was a great place to get one's act together, with the open choice of courses and elective specialty", Odile recalls. At the end of her last semester at UTC, Odile, who wanted to complete her technical training background with groundings in marketing and finance, registered for a Master's degree at the ESSEC Business School [one of the best in Europe].

Finding her way

With her two HE diplomas, Odile started to work in jobs with strong relationship potential. Firstly, with Dositek, a small biotechnology-intensive start-up, where she developed company-client relationships. She then joined INTEGRA Biosciences, a German-Swiss company, as a technico-commercial engineer, the company doing very well in France, riding, so to speak, the new technology wave. "I love challenges with the idea of being able to integrate some very innovative products to the French market-place with research labs as my clients". In 1999, a new posting and new functions saw her at Elvetec Services, Heading their Marketing Department. She was kept busy with Sales, Product range management, Event-oriented activities and the Medical biology lab scene as her market-place.

At the patients' service

5 years down her career path, Odile was recruited as Product Manager for ResMed. As of this point, Odile Asselin engaged in a strong career route with ResMed, a specialist in sleep phase respiratory disorders. Profiting from her prior experience in marketing, she shifted to the training aspects as Head of an e-learning project: "I had the impression that I had accomplished lots of things and I wanted to face a new challenge, opening new doors so I accepted to start this project from scratch since at that time there was no distant learning protocol to hand". Interested as she was in managing complex projects, Odile participated in dissemination of scientific knowledge: "Beyond product training, the aim was to share clinical knowledge related to the sleep syndromes and pathologies. For example, we developed models with virtual patients, employing techniques similar to those used by the armed forces and the air-force and some university and hospitals are anxious to access our protocols!" Her training course in e-learning received the Peter Farell Award, 2013 [ed.note: founder of ResMed] "This is a prize that valorises innovation and is also a recognition of a team's achievements with an international project that will enable us to share our know-how in the field with our clients!" In 2014, continuing to pursue her personal aims and always on the lookout for new challenges, Odile was appointed head of the Learning Technologies Project, notably with the European market-places in mind. "After working on the contents, we had to develop and deploy the dissemination platforms. I cannot stress enough the value of having done marketing and digital processing beforehand", she insists.

Constantly calling oneself to question

With each new function, Odile also aimed at calling herself to question. This implied a great deal of energy and dynamics that she personally invests to create new projects and explore new horizons. "The evolution here is natural, inasmuch as the posts I held did not exist before I was offered them. What I enjoy intensely is to accept a new mission and to move on with it. It is very encouraging and pleasant to hear positive testimony from people who feel better thanks to our equipment. That, I suppose, ties in with my desire to be useful!" Her dual educational background, a blend of engineering and marketing allowed Odie to make the difference. "UTC made me quite pragmatic in my ways. I think that all engineering graduates possess a high capacity to innovate and for me the driving force was to be able to commit myself to something that really benefitted Society. In terms of employment, the 'connected health' concept, just like remote (e-) training schemes are taking off now and are full of promise. What we have here is a way forward that will make patients feel they are better cared for", concludes Odile. ■

BIO EXPRESS

1986	Admission to UTC
1989	Graduated with the major GB (bio-engineering) and the elective specialty Biological Foodstuff Products (PBA)
1990	Master's degree from ESSEC – IGIA (the Institute for international agro-food management)
1991	Sales and Client Manager at Dositek
1993	Technico-commercial engineer with INTEGRA Biosciences
1999	Head of the Marketing Department at Elvetec Services
2005	Head of PPC Products at ResMed
2009	Head of the e-learning project at ResMed
2014	Head of the Learning Technologies LMS Project at ResMed

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