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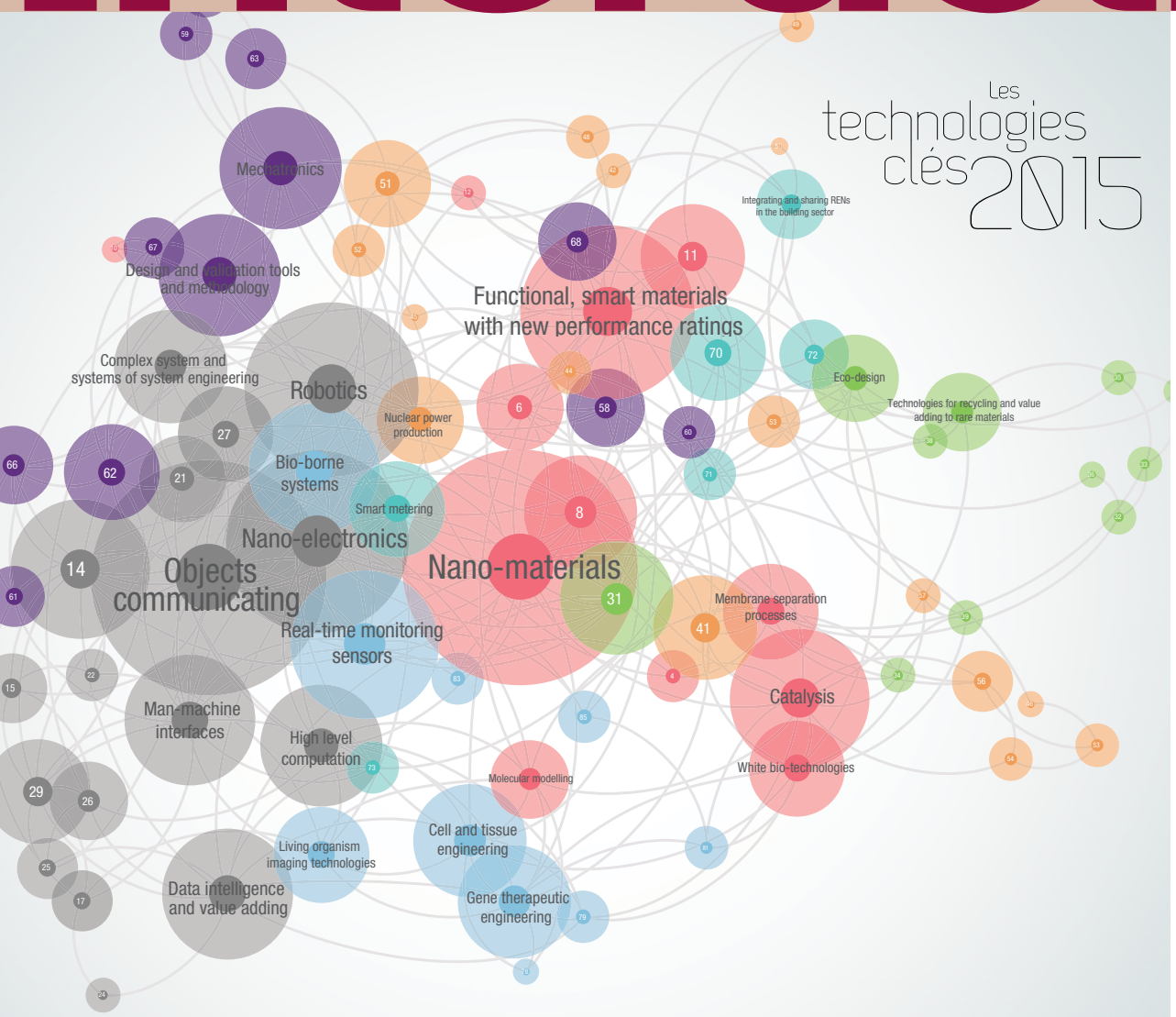
Interactions

Donnons un sens à l'innovation



Franck Ghitalla, senior lecturer at UTC and member of its Costech Laboratory

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FROM THE PRESIDENT'S DESK

Let's free the energy in the complex French HE and Research system

Innovation is one of the properties that derive from a complex system, provided that the intrinsic complexity is not simplified by amputating several features that are more than necessary to preserve its basic creativity, viz.,

- **Pluri-cultural,** since single-track minds are not conducive to new ideas and tend to run,
- **Pluri-disciplinary, and even trans-disciplinary,** inasmuch as innovation often takes place at the frontiers between scientific specialities and where social science have a major role to play when it comes to better understanding transverse issues with high strong societal connotation and challenges,
- **Multiple-partnerships,** relying on a dynamic University/Enterprise/Local context, which condition is vital if we want to mobilise all the actor and players involved in any innovative policy, in a coordinated manner,
- **Multi-scaled (local, regional, national and international),** since the dissemination of ideas and exchange know no frontiers, this not antagonistic to with the drafting of local site policy and fostering territorial affinities.

Drawing on the lessons of "innovating wisdom", let me just air the wish that the new French law on Higher Education and Research, voted in Parliament July 22, 2013 will procure – beyond various administrative and structural adjustments - a new, exploratory and experimental field in which we shall be invited to discover new forms of co-operation and synergy enabling UTC to efficiently combine the three dimensions of its partnership logic: viz., the University of Technologies Group, the PRES Sorbonne Universities cluster, the latter based on achieving excellence and the Picardie Regional dimension, to which we are attached. The articles in this issue of Interactions witness directly the overarching aim to adopt a multi-dimensional approach, whether it be for the Picardie Region's Strategic Plan or for the concept of the HealthCare&Technology cluster, or to implement the recommendations in the Lauvergeon Report or in the conditions underpinning Fanny Chapelin's success, cf. her award as Engineer of the Year 2013, category Science. Freeing the energy in the French HE and research scene, in the face of administrative viscosity. Here lies a real challenge for UTC today. ■

Alain Storck
President and Vice-Chancellor UTC

Laureate of the 2013 edition of the 'Engineer of the Year in science

Wednesday, December 4, 2013 the theatre-hall Paradis Latin hosted the 10th annual awards ceremony of the 'Engineer of Year', co-organized by the reviews Usine Nouvelle and Industrie & Technologies. Fanny Chapelin, a UTC graduate, now research assistant at the Department of Radiology of the School of Medicine at the University of Stanford (Ca-USA) was awarded the Engineer of the Year Prize in the category Science. The prize rewards her work in marking stem cells implanted in a patient so as to better see them in an MRI display. President Storck, UTC, a partner to the Prize ceremony personally handed over the award that marks her promising scientific research debuts. ■

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> Nos thématiques > Valorisation & stratégie d'innovation

UTC nominated at the Communications Trophies event

Over the semester January-July 2013, the selection Committee of the Communications Trophies selected 5 laureates in 32 categories proposed by the Trophy organisers; all told there were 1 500 candidates! At the Trophy awards ceremony, held at Nice, November 29, 2013, UTC's house bilingual publication « L'UTC, 40 ans d'histoire d'innovation », "40 years of Innovation" received the 2nd Prize for the best production by a public establishment editor. ■

Doctorat honoris causa to Guy Breton

During the 26th Jacques Cartier Talks (exchanges between scientists from France and Quebec), that were organised in Lyons, November 21, 2013, Prof. Alain Storck, President of UTC awarded UTC's doctorate honoris causa to Prof. Guy Breton, Rector of the University of Montreal. ■

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UTC'S 40TH ANNIVERSARY

UTC's 40th anniversary conference : *Innovating innovation*

For its anniversary conference, UTC chose to analyse in depth the concept of innovation. After 40 years beating new tracks, the question arises "How can we (should we) innovate innovation?" The distinguished speakers at the conference [convened in the magnificent Salons at the Sorbonne in Paris] addressed this question, proposing paths for further thoughts and actions, set as milestones for the 40 years to come.

Focussing for a moment on the recent, trendy innovation pitch, President Storck recalled the commitments UTC had already taken in this field. Witness the motto "Let us lend meaning to innovation". "The set of measures proposed by the French Government to promote innovation point – beyond some threadbare uses – to a real level of support". President Storck also recalled that UTC was making a definitive move to higher visibility and notoriety in an environment seen as conducive to better creativity and attractiveness. "Our local innovation and creativity eco-system sees us both as a university of technology engaged in research, training and knowledge transfer, and as a local key-player in the Picardie Region, in a partnership sphere of activities between the university, the enterprises and the regional territory. Success in innovation depends largely on the interactions among the various sectors, scientific fields and, of course, the actors themselves".

UTC at the heart of an innovative network

The local eco-system mentioned above is the Picardie version of similar schemes we see being installed and developed round the world, and is busy formalising links between the University, the enterprises and the regional territory, links which can be seen as "the hall-marks of UTC's chosen determination to be at the cutting edge". Senator Philippe Marini, Mayor of Compiegne recalled the original features of UTC, "neither a university, nor an engineering school, but a unique entity serving as an educational milestone and a factor for innovation", where "pedagogy anticipated the new [Bologna] system we now see applied in European Universities" … "UTC with its students and academic staff have become essential ingredients of our urban diversity [in Compiegne]. Together they have multiplied the links with our local economic tissue and we have readily noted the positive impulse created here. Witness the numerous innovating start-ups". What surmises Philippe Marini is the recipe for such results? "UTC is totally legitimate to encompass the innovation process globally", notes Marc-André Fliniaux, Regional Director for Research and Technology (DRRT). To this end, we must engage in debate, dialogue, confront our ideas, notably in the conference format like today!

> The digital revolution has not abolished distance nor time and there is no such thing as a purely virtual economy.

The concept of 'Open innovation' and input from the digital revolution

Chris Anderson, via a live video-link from San Francisco, was invited to open the debate. Chris took the example of his own company 3D Robotics which resulted from on-line interactions among thousands of Internauts interested in his feasibility questions about civilian drones. "3D Robotics has new become a 21st Century high tech company [Cf. http://3drobotics.com / and http://diydrones.com] It is the result of 20 years' experience in 'building' open source innovation products using the Internet; moving into a real world of electronics, transportation, mobile apps, etc.", deciphers Chris. "Open innovation enables you to innovate more rapidly whilst keeping costs down. Other companies can and do use our software, in the open source mode of course. It is a good thing provided we keep our added value thanks to building and eco-system, an open platform round these software packages and our finished products." Here we see that a totally different logic is (and must be) used by the economic players. "This is also holds", surmises

Bernard Stiegler, "for academics". The philosopher Stiegler recalled the origins of UTC, the objective assigned being to integrate the innovation concept in the French Universities, as it was seen by Schumpeter when he exposed his theory of 'creative destruction'. He went on to demonstrate that today the theory in in a blind alley. "Creative destruction in many instances has become destructive destruction, in which social systems are annihilated as are even psychic frameworks". The model on which originally UTC was built has collapsed and therefore we must "identify ingredients propitious to renewing the framework in the current crises and observe how input from the digital revolution will impact the new system's framework".

Open innovation enables you to innovate more rapidly whilst keeping costs down

'Peer-to-peer' exchanges, re-inventing innovation?

The Internet is above all a new inter-relation model that runs counter to the relationship producer-consumer. It reactivates the concept of 'contributive' actions and peer to peer exchanges, which was specific to ancient Greek civilisations and the foundations of rational thinking. As Bernard Stiegler analyses the situation, UTC should (and can) work on the development of a new 'digitised' framework that would guarantee 'contributive' research in a peer-to-peer mode, using open innovation models. "This would alone constitute a breakthrough in the innovation system itself. Universities are at the heart of re-inventing peer-to-peer models, open innovation, 'fab-labs', etc., given that they themselves are intrinsically peer-to-peer systems." Bernard Stiegler suggests that the next step must be to take action: "The UTC student population should serve as pilot fish to design and implement a 'contributive territory' and thereby re-invent the whole innovation process".

The importance of the territorial dimension

The importance of the territorial concept was also underlined by Alan Hart, an American architect-urban engineer. "Regardless of the excitement generated by the ongoing digital revolution, the vertiginous rise in connections, the supposed abolition of distances, the place where we live is more important than ever before, sharing ideas, meeting people, at those cross-roads where innovation emerges, … these are all intrinsically part of the territorial concept." Having noted how the world is full of barriers (at work, at home and in our social lives, etc.,) Alan hart proposes a form of urbanism that removes those barriers that run counter to innovative ideals. "Three changes have fundamentally transformed our visions of land planning within the past decade; the work place has changed, with a stronger integration between design and fabrication and increased attention to be paid to the local context and characteristics; the city in this scenario become a pleasant place again to live in; and the inhabitants of suburbs will move away from their isolated, monochrome environments and start returning to the cities". These 3 phenomena also modify the role of industry in a given territory. Alan Hart used the expression Industry 1.0 to describe the logic of companies like Google, Apple or Microsoft, who set up their HQs in distant suburban settings, creating corporate campuses where land space was easy to come by. "Then we saw Industry 2.0 structures re-integrating cities in districts devoted specifically to innovative schemes, such as exist in New York, Boston, Toronto, San Francisco, Seattle, Montréal, etc., in locations where industry, urbanism and combined social and cultural offer, with educational services and research all co-exist". In Seattle, the South Lake Union project took 8 years to plan and called on a great number of exchanges with the local actors and partners in order to create spaces conducive to the inhabitants of the district, to the enterprise and shops that choose to settle there, etc. Amazon Corp., for example, has moved a centre to South Lake. "What he have now is a dynamic situation that is attractive for young talents: South Lake has generated 20 000 new jobs and is proving deterministic in terms of innovative projects", notes Alan Hart.

An eight-point statement to enhance our perception of innovation

Reflections on urban issues and planning are totally relevant, even if they seem far removed from questions about innovation. Professor Andy Pratt, chair of Media and Economics at King's College, University of London underscores the fact that the framework of perception of innovation must be enlarged even further. "Innovation", he asserts, "has been too narrowly bound by technological considerations". In order to enlarge the framework, Andy Pratt offers eight pointed statements, beginning with the nature of knowledge as his Point 1, which he sees as "neither objective nor atomised but rather inter-subjective and relational". Innovation does not stem from the simple addition of knowledge items, but comes from discussions, interactions, meetings. Point 2 – far from being a purely scientific and abstract phenomenon, innovation always occurs in a context and without this context, it simply will not take place. "There is therefore the dual notion of time and place that define the added value, the success or the failure of any ideas, in a holistic manner", notes Professor Pratt. Points 3 and 4: the digital revolution has not abolished distance nor time and there is no such thing as a purely virtual economy. Points 5 to 7 concentrate on what we can call the value or added value of innovation: innovation per se has no intrinsic value, inasmuch as it can change radically as a function of markets and sectors. We must therefore ensure that products arrive on time to meet demand, since there is no way to guarantee in advance success of failure of an idea or a product. It all depends on their attractiveness/popularity, independently from any technological superiority. The 8th and final point looks at the legitimate ways and means to protect or share an idea. "Legal constraints are every bit as important as the technical features of a given innovation. They define the relative powers of the players in the field. This final point and question delimits the possibilities of collaborative innovation and even open innovation", underscores Prof Pratt.

innovation has donned a fundamental social role

When engineers exit their ivory towers

The eight-pointed statement above could serve as a grammar for a new innovation. For Bruno Bachimont, UTC's Director of Research "innovation is more than an action, it is a process a new language that we still have to build and master. This language is no longer a dogmatic exposé only understand by specialists, nor is it a set of top-down orders and we must be ready to accept the terms whatever their source." Contrary to the situation that prevailed in the years 1940-1950, engineers and scientists have exited their ivory towers and now innovation has donned a fundamental social role – if only in terms of acceptability, recalls Alexei Grinbaum a research scientist with the CEA (French atomic energy research agency). The new situation had led to a new problem "Sheer complexity", stresses Yann Moulier-Boutang, professor of economics at UTC.

How are we to add economic value to intellectual capital?

In today's technology intensive society, the challenges to find the right technical solution to a given problem are infinitely more complex than before. Innovation encompasses an inter-relational density: we must vigorously involve social scientists, who are absolutely necessary if we want to see an intelligent, intelligible, transdisciplinary dialogue" In 2009, the Morand-Manceau report clarified matters, recalls Prof. Moulier-Boutang: innovation is not necessarily technical or even material in nature and its 'intensity' does not rely only on the number of patents lodged, papers published or GDP points invested in R&D. It is one of the 'relative' challenges of the 21st century "Should expenditure in R&D be considered as money spent, or credit or as an asset? Knowledge is built up from implicit points, from a halo that relates to the capacity of people to learn. Far more than registering a patent, know-how and intellectual capital now constitute externalities that an national accounting system do not recognise as such. And yet the value is extremely important and the question can be framed: how can we (should we) assess, protect and set up the value as a new wealth generating item/process? Prof Moulier-Boutang uses a metaphor – the value of bees pollinizing flowers, fruit trees … can be assessed as close to 790 billion $US/yr., compared with 1 billion $US for the honey alone. "Today we should be exploring the continent of human pollinating; we should analyse how the model is being inverted. As I see the future, this is the new frontier for UTC in coming years". ■

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CONFERENCE

Thierry Tuot, President of the Sorbonne Universities cluster and Alexei Grinbaum, research scientist at the CEA, addressed the "Innovating Innovation" anniversary conference. They offer two complementary visions of innovation and its place in the life of the City.

Taking nothing for granted

Thierry Tuot, who now heads the cluster Sorbonne Universités*, is in charge of an innovative structure, both in its format and in its objectives. For President Tuot, this come to taking nothing for granted and refusing any conservative attitudes.

«The cluster called Sorbonne Universités is a pluridisciplinary actor in the field of research, seeking solutions to meet societal expectations and producing new 'intelligence'", says Thierry Tuot. "We rely on the capacity and the skills of our cluster members to break down barriers between disciplines, training, to generate new passions that transcend our national frontiers." In 2012, the programme code-named SUPER (for Sorbonne Universités à Paris pour l'Enseignement et la Recherche (HE and Research)), was awarded a distinction as an 'excellence' initiative, in keeping with HE policy thrusts. "Our priority is to focus on innovation, by this we mean avoiding the pitfall of encouraging an consumer rush on technological gadgets, but concentrating on constantly refusing all forms of conservatism and insisting on adder value in terms of societal wellbeing and social practice", notes President Tuot.

The 'Convergence' programme : at the interdisciplinary interfaces

As President Tuot sees it, the very existence of the cluster is an innovative measure in itself: various establishments with differencing cultural backgrounds and composition now share a common identity and ambitious objectives. "We are definitely not merging, just mixing our tradition around joint projects that enhance the chances of succeeding in innovative research", feels Thierry Tuot. As an example: the 'Convergence' programme which comes with a budget of 1.75 Meuros to finance research projects at interdisciplinary interfaces to encourage the scientific teams of Sorbonne Universités to mutually benefit from each other's expertise. "UTC is one of the most recent and most efficient engineering schools in France. It operates halfway, so to speak, between social sciences and 'hard' science and engineering and provides a factor of social cohesion that is very important for Sorbonne Universités, which in the footsteps of those who rest forever at the nearby Pantheon, aims at producing the key actors of our time". In this perspective, Sorbonne Universités organised Dec.6 an international conference on "Trends in Innovative Education". "Efficient training as we see it consists of training already curious minds who do not take anything for granted and who refuse multi-secular ways of doing things. Training should become a life-long right, coming as a permanent and verifiable offer and not just be a slogan". Thierry Tuot's dream is that 5 years hence, Sorbonne Universités will be in a position to produce an alternative scientific expertise and will be listened to in our national debates (on fiscal taxes, on GMOs, etc.) as a mature, informed member of the City. ■

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*Sorbonne Universités is a PRES (a research and HE cluster), created in 2010, with 8 members: Paris-Sorbonne, University of Paris 6 (Pierre & Marie Curie), the University of Technology at Compiègne (UTC), INSEAD, the Muséum national d'histoire naturelle, the CNRS, Inserm and IRD (public research establishments).

Innovation : creating instruments conducive to dialogue

As Alexei Grinbaum - a research scientist at the CEA Laboratory on Material Sciences - sees it, reflecting on innovation is one of the prime debates of our time.

If we want to avoid seeing the debate stagnate at a trivial level, then our institutions must contribute in terms of ethics, philosophy, law, societal questions as issues arise though implementation of new technologies. "France in fact organises very few debates on these topics, contrary to what happens in the Netherlands, for example, where a research establishment on the ethics of science and technology has been created by three universities of technology", adds Alexei Grinbaum. "The new Dutch centre is working with economic actors in compliance with well organised dialogue methodology such that the technological development and the associate reflexion move forward hand-in-hand constantly".

France, champion of the Manichean debate

If, apparently, any debate of technological innovation seems blocked in France, the reason is that the French find it difficult to go beyond the "for" and "against" division where a dialogue becomes impossible. "It is a sterile happening which occurs systematically", deplores Alexei. "When we talk about a democratic debate, we invite a Quango, or NGO and an industrialist and hope that a dialogue will result. This is impossible. Democracy require that you use methodology and instruments to aid dialogue and that will lead to positions that are more complex and carry nuances". Thus, whilst we have observed that the debate in France on nanotechnologies has been a non-starter, Eindhoven in the Netherlands created a mobile "Nano Supermarket" that allows visitors to imagine concretely in a pedagogical way how nanotechnologies will change their daily lives. "This is something we really ought to create in France if we want to have proper conditions for public debate", suggests Alexei Grinbaum, for whom one of the main debates needed is to identify the legal and moral responsibilities of any person who introduces something new, something capable of changing the world or people. "On a European level, for example, any request for financing projects should include this issue for responsibilities", explains Alexei. The other debate needed relates to scientific promises. "There is a systematic gap between what science promises and the reality of things. How does our Society function today, given that it is more under the influence of technology than of political ideals; The expectation is the very latest i-Phone® and not a revolution: we must understand the changes that are fashioning our lives in the City and organise a new social and political deal". ■

> "Nano Supermarket" allows visitors to imagine concretely in a pedagogical way how nanotechnologies will change their daily lives.

The Health&Care Technology cluster *the forward-looking dynamics*

Two of UTC's laboratories – Bio-Mechanics and Bio-Engineering (BMBI) and the COSTECH (Knowledge, Organisation and Technical Systems) are the mainstays of the Health&Care Technology cluster or pole. The latter has, as its objective, to pursue studies into possible further synergy among the various actors in the Picardie area. There are already numerous examples of collaboration detailed in the following pages and also many links with the regional economic and institutional authorities plus other entities working on the health field. The Health&Care Technology pole is perfectly in line with the territorial ambitions of UTC, in its aims to build up a local innovation and creativity ecosystem in Picardie, and also in line with the Picardie Regional authorities' strategic plan called SRI-S3, prioritising as they have the health sector as one of the flag-bearing ventures for the Region's future.

PICARDIE HEALTH&CARE TECHNOLOGY

The Health sector cross-roads between *Humans and Technology*

They believe in it and areworking for it : Cécile Legallais and Catherine Marque (UTC's BMBI Laboratory) and et Charles Lenay (UTC's COSTECH Laboratory), the Picardie Region could become a landmark in the health sector, thanks to a novel approach and to strong levels of synergy among the various local actors. All three lend their voices to an exposé about "Health&Care Technology".

« Our Society today and particularly so in the Picardie Region suffers from a huge deficit in care, attention and kindness among humans. The word 'care' in English – which does not translate readily into French – is very appropriate here. The term is often referred to in philosophical texts, in ethical issues, but rarely in terms of technical tools that today count so much in inter-personal relations", notes Charles Lenay. There is so much to learn about the interface and interaction of 'care' and technology, which may or may not help bring people closer; if not then the social cohesion stands at jeopardy. "Care technologies are original in that they seriously deal with the question of mediation and technical supports. For example, when a self-standing dialysis machine is designed, we must integrate the possibility of creating a community of similarly equipped patients, and organise the communication between them and their hospital, to associate nurses and aids …", illustrates Charles Lenay.

Humanising health-related technologies

Here we have a problem that lies at the cross-roads of social science, engineering science and medical science. The objective is to humanise technologies and this can only be achieved by associating users and health personnel from the start when the technologies are being designed and/or implemented. "Very few scientific innovations in the health field are adopted by the users because they do not take into account the reasons for their use or their degree of acceptability. UTC, thanks to the excellent tradition of exchanging between the BMBI Laboratory and COSTECH Laboratory and to the links with local health actors is in a good position to address this emerging problem-area. The pole (or cluster) will enhance and strengthen the existing synergies", asserts Catherine Marque, working as she does with COSTECH on a cognitive aid system for the blind.

Bringing health and care within the patient's reach

Over and above this original approach that embraces inter-personal relationships and health technologies, the Health&Care Technology pole will be called on to answer the numerous local needs. "We must inter-connect medical and bio-medical devices and the questions of accessibility and use. One of the problems prevalent in the Picardie Region is the geography of the health care equipment and personnel and the absence of intermediate scaled assistance/aid to persons, to both medical and paramedical staff and to organisation/management functions. We really must create new connections between the patients and the health care system" surmises Cécile Legallais. "The difficulties patients encounter to access medical services in what we call a Regional desert call for a development of telemedicine relying on installation of digital networks and supporting infrastructures. Problems that relate to comprehension, acceptation, trust and behaviour require that we instil a real technico-social innovation to mobilise biomedical technologies". The Health&Care Technology pole would comprise these intermediate structures, the patients, practitioners and the tools to bring health services and care to the patients in need. This statement, of course covers a wide range of questions, from geographic meshing of the health network to designing the devices/infrastructures. For example, at the COSTECXGH Lab., design work is progressing in tactile interfaces for blind persons in collaboration with the Ecole supérieure d'art et de design at Amiens.

> What we want to do is to attract new skills to help us create innovating tools and devices that would serve the patients' well-being

Anticipating on tomorrow's questions, market opportunities and professional openings

"What we want to do is to attract new skills to help us create innovating tools and devices that would serve the patients'

well-being", explains Cécile Legallais. UTC must be a major player in this field just as the school of engineers was when the biomedical engineering courses were first imagined and offered at Compiegne. New jobs will be forthcoming in the care sector and we can wonder what these jobs will entail and how we can train students to be efficient in them. Whether it be through the pole and/or through the associated projects, UTC must be in a position to anticipate how the health sector will evolve." For example, tele-medical practice, monitoring and remote diagnosis will surely develop. Another asset for UTC will be "to engage philosophical thinking about care technologies in the field which will in turn lead to new basic research topics, in concrete settings", projects Charles Lenay.

Seeking an original approach to health issues in the Picardie Region

UTC will provide all its expertise and the means of its laboratories to develop those tools that fit the needs of the territorial actors – in the hospitals, for the nursing staff, etc. Since 1989 Catherine Marque has been working with the Centre de gynécologie-obstétrique of Amien's teaching hospital (CHU) on a project to measure, analyse and model pathological uterine contractions. The project has been supported by the Picardie Regional authorities from the outset. "We hope that this diagnosis tool will help detect such 'at risk' contractions as early as possible and allow us to design a home monitoring unit", explains Catherine. The Region does not, as yet, possess a dense industrial, tissue to locally value-add to innovations that would derive from these projects. "In the long term, the Health&Care Technology pole will lead to the creation of start-ups and employment openings, and will shape the identity of the Picardie Region in a manner similar as to what has happened for the agro-food sector", surmises Charles Lenay. "The road ahead is long but the objectives are realistic and are in line with the mission to improve people's lives". ■

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http://www.utc.fr/costech

OBSERVATORY

Health and social inequalities

On the national score-board, the Picardie Region ranks last but one, whatever the choice of indicators, in terms of health factors (the last being the Nord-Pas de Calais Region)", recalls Alain Trugeon, Director of the Regional Observatory for Health and Social Affairs (OR2S).

The need and the room for progress are all the more evident in Picardie that the situation risks getting worse before it improves. "The gaps between family situations in the unflavoured Regions and the others continues to grow. Social inequalities related to health questions are getting worse and, if nothing is none rapidly to limit and reverse the trend, an important fraction of the Region's population will soon not have any access at all to the health services. It is even possible that the life expectancy span will diminish for these disfavoured populations", warns Alain Trugeon. This alarming perspective results from an undisputed analysis. Concerning cardio-vascular conditions, ailments, chronic illnesses (diabetes, etc.), the Picardie Region has very high levels of occurrence. Alain Trugeon sees growing social inequalities as the cause, with a North-South gradient that does not favour the Northern territories in terms of addictions, lack of physical activities, and nutritional problems, when comparing comparable groups, ageing populations, etc. "The consequences of the Papyboom have not been anticipated and we can see, for instance, that the retirement homes are full up already", underlines the Director.

Targeting and implementing health and social policies

The mission assigned to OR2S is to improve our knowledge base in health and social matters in the Region as a whole and on an infra-regional scale. The Observatory uses already existing data bases (mortality rates, hospital admissions records, family allocations, etc.) and carries out its own surveys. For example, since 2006, a large scale study has been conducted (with the local regional education authorities) to measure and record (for secondary school pupils aged 12-16 approx.) their body mass ratio, their nutrition habits, their general state of health … A focus is placed on certain categories, in terms of addictive behaviour, for example, or health in jail. The objective is to issue guidance for the regional policies in health and social matters, thanks to detailed analyses on the relative positioning of the Picardie Region with respect to the country as well as provide data about some 30 infra-regional "territories". The accuracy (or error margin) is such that we can observe differences in situation. Thus the Northern part of the Department Aisne today has a life expectancy similar to that of the city of Senlis 20 years ago. "The territories covered by the Agence régionale de Santé (regional health authority) have been defined on the basis of our observations and has allowed the decision makers to frame policies that targets homogeneous population groups", notes Alain Trugeon. He insists on 2 points: the need to create synergies among actors in social and health services and the importance that should be given to preventive policies.

> It is even possible that the life expectancy span will diminish for these disfavoured populations

A high priority: preventive measures

"Prevention campaigns are not always properly understood by the target populations. We must create specific communications tools to reach out to the disfavoured populations, like door-to-door screening for breast cancer. But actions such as these take up a lot of time and need many staff to manage them, and this is not so obvious in the current economic situation", regrets Alain Trugeon. He sees in tele-medecine a way to overcome the obstacle. "But it is not a small part of our business to be implemented if we want to improve the state of health of the populations concerned. The objective in fact remains being able to prevent the illnesses occurring, and this calls for policies in education, in food patterns and behaviour, etc. In the context of the Health&Care Technology Pole, the Observatory will be able to offer its priority setting skills and narrow don the possible actions and problem areas," suggest Alain Trugeon. Thus the activities linked to the Pole would provide concrete improvements in the field. The first research path for UTC will be to seek a match between the messages designed to make the target populations aware of a given problem/threat and the local characteristics. "We shall also have to set up bridges with the teachers and the educational services. Success in education here is essential to any health programme or policy".» ■

plus d'infos ▶ **http://www.or2s.fr**

DRRT

Complementary forces

"The health sector in the Picardie region is not highly developed yet, in terms of start-ups or research scientists for example, but gradually it is structuring itself round 3 regional establishments – the teaching hospital at Amiens (CHU), UTC and the Jules Verne Picardie University (UPJV). Launching a cluster project related to health questions has meaning for the Region" says Marc-André Fliniaux, Regional Delegate for Research and Technology in the Picardie Region.

The structure project was appreciated to the point that the health sector was registered among the priorities of the Region's intelligent specialisation plan (Cf. « SRI-S3, page 14), a document which outlines the attractive markets in terms of the European Cohesion Fund (2014-2020).

Research and training

"Apart from having an important number of Inserm teams in the Region, which alone indicates increasing health-related research activities here, UPJV and the CHU at Amiens have a recognised mutual expertise in cancer treatments. The Region also counts an internationally reputed flagship unit, specialised in maxilla-facial surgical repair (Institut Faire Faces)? This multidisciplinary speciality has an important structural impact on the region as a whole", adds Marc-André Fliniaux. Moreover, the Institut Faire Faces, the CHGU at Amiens and UPJV have worked together to set up a Health Pedagogy and Modelling Centre, called the CPA SimUSanté with an initial financial allocation of 8.5 Meuros in 2012 in the framework of the Government programme Investments for the Future. The Centre has also received its certification as an excellence initiative, unique in its category in France. The Centre will be installed with a cutting edge, shared simulation/modelling platform, accessible to all professional health workers who wish to have in situ training or top progress through e-learning procedures. The plan as it stand today is to open this Centre in 2015.

Marking the difference

"e-health is interesting for a region such as Picardie, insamuch as it can compensate for certain anomalies seen in the medical "desert" here. Moreover, out health pointers simply are not very good: we must consequently develop research efficient projects, in care units, in training protocols which are very important if we are to succeed", says Marc-André Fliniaux, who underlines the complementarity between UYC, UPJV and the CHU-Amiens. "This complementarity is rare at a regional level, creates an opportunity to instil an original, efficient and dynamic scientific thrust. The Picardie Region which is not as yet identified as an innovative area in terms of health research and issues must create its own specific characteristics and mark its difference with respect to other, more advanced territories. The complementarity among technological, medical and social approaches, the unique expertise gained in reconstruction surgery, our Regional culture and propensity for pluri-disciplinary work should help us progress in this direction. In the framework of a regional pole (or cluster) Health&Care Technology, the DRRT delegation, with the Regional authorities shall ensure that the most relevant actors and players in these fields are brought together to work on shared projects. ■

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LABEX MS2T

BMBI, a driving, federating force

UTC's BioMechanical and BioEngineering Laboratory (BMBI), will be both a driving and a federating force in the framework of the Health&Care Technologu cluster. The BMBI skills and equipment have made this laboratory a structuring institution of the Picardie Region; they could be made accessible to the economic and institutional actors of the health sector in the Region. Marie-Christine Ho Ba Tho, the BMBI Director, presents her laboratory.

UTC's BMBI Laboratory is an associate unit of the CNRS with pluridisciplinary skills that support and back up interdisciplinary research in fields that relate to living organism mechanics and to health engineering. Our research is focussed on medical devices and diagnosis tools, decision-aid systems and monitoring for trans-generational, functional and re-education programmes (from birth to old age). Our lab motto is "Understand and then act"; in this way we can contribute to improving life for Mankind from birth to old age and death. In the Picardie Region, we are strongly involved in the project of gthe Instuitt Fair face and the associate FIGURES so-called 'equipex', i.e., government recognised excellence equipment.

A player at the cutting edge of e-health

In the framework of the Health&Care Technology cluster, our Laboratory will be both a driving and a federating force. The cluster or pole will be able to avail of UTC's pluridisciplinary skills. For example, we are developing innovative technological systems in ITC Health, in the MS2T 'labex' (an excellence laboratory). The acronym stands for Control of technological systems of systems. For example, our SUPGEST project conducted jointly among UTC's Heudiasyc, Roberval Laboratory and ourselves, is the development of an aid system for monitoring limb movements (using onboard wi-fi sensors and video cameras) coupled to tailor-made, real time, biomechanical models. In parallel, we are enhancing the development of a technology intensive e-platform to aid in diagnosis, decision-making and the monitoring or follow-up of patients' functional re-education; this is the ICARE-U system. The latter will enable the patient to enjoy a degree of autonomy whilst guaranteeing home-monitoring by both the patients professional mentors and their family members. ■

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COMPIEGNE'S CITY HOSPITAL

The right equipment, *the right ideas!*

Compiegne's City Hospital has 1 200 beds and 2 500 staff, with a budget of 130 Meuros/yr. "All the actors in the Region's health sector enjoy a high level of mutual collaboration, sharing their expertise and equipment" feels Brigitte Duval Managing Director for the CH Compiegne Hospital.

In the framework of the Picardie Region Health&Care Technology cluster, the Compiegne City Hospital could give access to an advanced technical platform, including a medical imaging centre (CIMA) built in partnership with the polyclinic St. Come and UTC. "This partnership allows the inhabitants of Compiegne to have access to high level equipment", notes Brigitte Duval. "The UTC research scientists come to work regularly at the CIMA". Research in general is of high importance to the CH Compiegne, the first hospital in the region to have set up an antenna for clinical research. "I hope that we shall be able, in the near future, to begin research projects in nursing care", surmises Managing Director Duval, recalling that 1 600 babies are born there every year. Open to the city, the CH Compiegne works a lot with liberal profession practitioners and nurses. With the GCS e-health and the Regional Health Agency, it has developed and installed a remote consultation system, using digital pads, for liberal profession nurses faced with certain problems (assessing cuts and monitoring scar tissue and healing). "The pads break down totally their isolation when dealing with complicated cuts/wounds and allows the patients to contact the hospital doctors directly", details Brigitte Duval. "Now we must ensure that all the nurses are equipped with the same level of equipment".

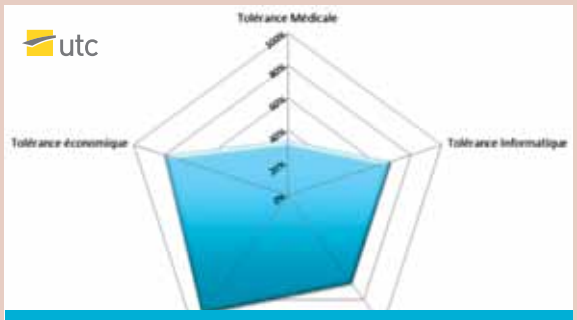
New technologies: one way to provide access to specialists

"The proximity factor helps this sort of dynamics, associating as it does the local players round research projects directly connected with the local realities", stresses Brigitte Duval, very much in favour of the creation of the Health&Care Technology cluster. "Our teams are especially motivated here and see in this innovation intensive project a way to retain and attract new talents to the Picardie Region". In terms of e-health, the Compiegne Hospital already has signed agreements with the hospital in Lyons and Noyon for the development of remote-X-ray facilities. For remote cardiology, the patients are equipped with portable reader/recorders that connect automatically to home units to ensure proper monitoring. Video-conferencing is used for meetings with the Amiens Teaching Hospital (CHU) to jointly analyse cases in oncology, in paediatrics, neuro-surgery, etc. "We can develop remote consultations even more, using new technologies and image transfer functions in an increasing number of areas. This has become a necessity faced with the growing specialisation of medical practice which sometimes requires that you travel 200 km to obtain expert advice. New technologies could solve some of the problems that relate to medical demography, provided we are able to delimit and identify the perimeters within which a real added value can be demonstrated", concludes Brigitte Duval.

> New technologies could solve some of the problems that relate to medical demography, provided we are able to delimit and identify the perimeters within which a real added value can be demonstrated

A novel research topic: adapted care for senior citizens

As Ms Duval sees it, one of the subjects that should be of interest to the Health&Care Technology cluster could be questions related to senior citizen and ageing ailments. Four EHPADs are connected to the CH Compiegne and of course the population of aged persons is growing inevitably. "We are already working on a project for remote-dentistry. Inasmuch as we do not have equipment adapted, it is difficult to bring an elderly patient to the dentist's chair. What we do here is set up a remote consultancy where a panoramic X-ray can be taken and be used for remote dental consultations. This centre could be inaugurated in 2014. If it come up to our expectations, the centre will be opened to receive the general public". ■



Cartographie de l'éligibilité d'un équipement biomédical - ex : stéthoscope numérique

MASTER

Tele-medicine *and the UTC students*

The Picardie Region GCS e-santé* proposed a project to UTC students in the Master 2 Health Technologies and Territory, the subject being how to develop and implement tele-medical infrastructures and services. Two UTC students, Lucie Lafresnay and Estelle Legoeul accepted to undertake the project.

Both students wanted to discover the world of tele-medicine, often portrayed as one of the future top paths in the health sector. Estelle Legoeul, who is following continuous training courses at UTC works at the Saint-Pierre Hospital on the Indian Ocean island of La Réunion, as a health care manager in medical imaging. "We shall soon be implementing a tele-medical AVC system between La Réunion and Mayotte. The project proposed by GCS e-santé therefore allows me to familiarise myself with this area that I shall certainly meet when I go back to La Réunion. Already the GCS e-santé trains health sector agents to use tele-medical AZVC devices. Lucie Lafresnay, doing her first degree training also wanted to discover the tele-me-medicine field concretely, its issues and methodology. Both students have met the GCS e-santé teams and seen the equipment. The question they are invited to explore is: from a regulations point of view, how should (can) tele-medical devices be used? For example, if a nurse places a stethoscope on a patient's chest, a doctor can listen to the heart beats at a distance. "For the moment, there is no regulatory framework as to the number of types of devices that can be used in tele-medicine. A possible framework is currently being studies at a European level", note the students, after several months searching for appropriate texts on the Internet and in addressing the question to professionals in the field, in the context of their Master's degree. Their conclusions have been forwarded to the CGS e-santé and will lead to a communication in January 2014. The aim now will be to maintain, encourage and extend this first link with UTYC's students by GCS e-santé, with courses relating to tele-medecine, internships, projects, etc. ■

TELEMEDECINE PLATFORM

Keeping up with telemedicine

Who could have guessed that the Picardie Region was the first in France to install a multi-service platform in tele-medicine? This platform was launched end 2011 by the GCS e-santé of the Region and is one of the range of solutions that this agency is implementing in terms of information systems in the health and medico-social sectors.

"We are responding to the calls from our 120 members, i.e., health and medico-social establishments with solutions embodying new technologies", summarises Dr Christine Bouter-Rixe who is the Director of the medical services and Stéphane Routier, Director of e-santé, created itself in 2008. The objective is to share available means, such as is done in the telemedicine platform, better known as Comedi-e where e-pads are used by the nurses to monitor wounds/cuts/ scars at home. "Faced with the difficulties to obtain an expert opinion rapidly – which often is a factor to slow down the patient's recovery – the local nursing corps asked if we could provide a solution. With the Compiegne Hospital, we developed an application to let the nurses film or photograph the wounds locally and then seek expert advice remotely; thus without having to transport those patients who have mobility problems," explains Christine Boutet-Rixe. The first remote consultation, via the tele-medicine platform, between the hospitals in Beauvais and Chaumont-en-Vexin, began in 2011. This was followed by a tele X-ray service between the Montdidier Hospital and the teaching hospital in Amiens (CHU). We are talking here about some 1 500 images remotely interpreted every month, which maintains the proximity X-ray activities and optimises time for the practitioners and patients.

Setting up a new dialogue between patients and the health professionals

The platform represents a base on which GCS-e-santé can install new applications to meet all sorts of medical speciality. "Given the extent to which it is now installed and the uses made of the facilities, the platform ranks us as top of all French Regions for telemedicinal practice", says Stéphane Routier. "Tele-consultations carried out with the explicit agreement of the patient set up a new form of dialogue with the doctors. Our tool allows medical files to be updated on-line, also to write a report in the remote file accessible by other practitioners via a secure access and network devoted to the health sector." The latest project of GCS e-santé which was launched with the support of the Departmental authorities, is to build an Ehpad viz., "outside the walls" (for outpatients staying in the homes). Monitoring and care can be served at home with a level of quality equivalent to an institutional Ehpad, thanks to telemedicine and data sharing.

> The platform ranks us as top of all French Regions for telemedicinal practice

E-health answers some problems of access to care

Despite the slow administration met in the national health insurance agencies who have not yet agreed to recognise telemedicine as orthodox medical acts, thus disregarding a Government decree issued in 2010 which makes such practice official, e-health now appears as a way forward with potential and promise. "All the actors in the health sector are now looking at the subject, given that it does come up with answers to several organisational problems", notes Stéphane Routier. "The solutions proposed relate to access to care in a context where proximity medical resources are becoming rare. It brings together those actors who deal with a given patient, and this leads to an efficient and coordinated use of telemedicine. It provides an extraordinary lever to change the way we do things, and this is needed in the long run". The various local institutions (Departmental and Regional authorities) have fully understood where their interest lies: they are now increasingly supportive of the actions undertaken by GCS-e-santé, who wishes to develop and make available new tools.

A living lab' ?

The latest project goes by the name of the "living lab" » which shares the means provided or made accessible by industrialists, institutions, health professionals and the universities in order to create conditions conducive to innovation. "It would be very interesting if we could involve UTC in all this. We have the health professionals' expertise and UTC has the biomedical engineering skills/. For initial (first degree) and continuous education courses, we could also work in the areas of tele-training and e-learning for which the methodology already exists at UTC and which we could develop internally", suggests Christine Boutet-Rixe, who notes and underlines the major force of the Picardie Region "given its middle range size and the amount of skills in the health sector it has, the Picardie region can count on high-quality players, accessible and who can be mobilised on joint projects. We must associate the regional health insurance companies to define the assessment protocols for acts conducted under telemedecine, failing which we risk losing on the dynamic nature of the trend. We must adopt a new vision and stance. The Health&Care Technology cluster must federate all our energies! » ■

BUSINESS START-UP CREATION

A start-up soon based in Amiens

Dynseo est une start-up qui conçoit des applications mobiles pour les personnes âgées dépendantes, à destination des EHPAD, des aides à domicile et des professionnels de santé. Elle s'implantera à Amiens au cours du premier trimestre 2014.

"What we must first note is that the reference tests related to cognitive and behavioural faculties are in impressively large folders that date back to the 1960s and 70s. Their infantilism is such that hey simply are no longer adapted to today's senior citizens, in the 21st Century" observes Justine Sauquet, General Manager for Dynseo – a start-up created in April 2013. The tests usually comprise children's games, and wood part puzzles and they are not acceptable to elderly persons. Those designed by Dynes draaw their inspiration from art-therapeutic practice: puzzles based on well-known pieces of art, questions and comments on these art-works … Over and above this evolution in practice, the applications developed by Dynseo try not to get the person examined in any difficulty – this precaution is necessary if we want the patient to go to the end of the tests, i.e., not reject them mid-way. "The last residual memory is that when we were 15 to 20 years old. Patients suffering from Alzheimer do not recall much about their life partner but can still recall a Van Gogh painting they liked when in their youth. In parallel, we have designed and are developing a platform to follow our patients statistically, recording their results and behaviour during tests. As a function of the evolution noted, viz. their success rate plot, the health care staff can modify the treatment and re-orient if need be, the patient to other structures or work-shops", explains Julie Sauquet, who discovered the health sector while doing an internship with Altran.

Clinical validation under way

Dynseo's applications, designed in collaboration with professional from the health sector and art-therapy specialists, are being clinically assessed at the Broca Hospital in Paris. Dynseo has made its tests available to a dozen or so establishments to see how the staff and patients concerned accept. "So far it has worked well; the computer pads are definitely better adapted to elderly persons than lap-tops or desk-tops" says the General Manager, who is enthusiastic about locating her company in the Picardie Region, where she discovered a local eco-system conducive to the development of the start-up. "We have had contacts with the Teaching Hospital in Amiens (CHU), to seek a partnership agreement to develop applications suitable to the hospital environment. We are also working with Evolucare and MiPih, likewise located in Amiens, which is only one hour from Paris", notes Julie Sauquet. Add to that another reason: Jean-Claude Hercelin, Head of development at Dynseo, is himself a native 'Picard'!

Recruiting engineers to develop the "apps"

"As we saw it, it would prove easier to work in the Picardie Region than in Paris intra-muros; part from the enjoyable dynamic flavour we see here, our correspondents such as the Regional Authorities or the Regional Health Agency are easy to approach. We feel we are better supported here and accompanied in our early phases than we might be in the Paris area, where administrative and institutional inertia generate lots of delays", says Manager Sauquet. "By setting up shop in Picardie, we shall be able to progress more rapidly". The start-up has 3 associates and 4 staff. "We now need to recruit 3 to 4 junior engineers to develop mobile applications". Readers, did you hear this? ■

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INTERDISCIPLINARY WORKSHOPS

UTC students in the field analyse *self-reliance and independence*

Can you imagine 16 UTC undergraduates who are invited to explore a given area of activities over a period of two weeks with a common goal: improve prevention of risk factors for the personnel working in the sector? This interdisciplinary workshop, organised in 2013 by Michel le Chapellier and Pierre-Henri Dejean, saw the students arrive in an EHPAD where they met with the management of an association to help dependent people at home

Beginning their field experience, the UTC students must be prepared to listen, to understand and to live the daily lives of the personnel they analyse. After 2012 and the Bonduelle factory last year, 2013 offered the opportunity to discover these realities in structures designed to care for senior, dependent citizens, in close connection with the Regionally launched programme "Age well in Picardie". "It's a case of practice before theory" summarises Michel Le Chapellier. "An approach that complement to training in an engineering school". The workshops are designed with a common requirement: striking a balance between quality of life style in a work environment and quality of life of senior, dependent persons. "Too often In France, these two features are considered separately: on one hand, prevention of risks at work, and on the other, quality of life for aged, dependent persons. Yet, when we think about it, the two are very closely related", stresses Michel le Chapellier.

Living conditions that are sometimes very difficult

The 16 students, who came from all departments of UTC, after a selection on the basis of their applications, the students discovered a very hard milieu, if we judge by the life conditions of certain aged persons. Their accommodation is often totally inadequate to the ailments or handicaps from which they suffer, given that it would only take a little change to make the situations more acceptable. "The feeling is one of abandon" adds Pierre-Henri Dejean. "But the relative naivety of the students, their sharp minds and engineering training which allowed them to work things out in the context of UTC, is a guarantee of a fresh, questioning view on problems as they arise".

Alleviating the isolation of the home care workers

Where home care workers are concerned, the students noted how isolated they are. "Their hierarchy do not know much about the milieu in which they work – the patients' homes – and do not communicate much with them. The students came up with the idea that these workers should be equipped with touch pads to liaise with their hierarchy; having a tool like this can be very useful when there are very frequent changes in planning or to record real living conditions at the homes they visit to forward them to the social services", details Michel le Chapellier. The device still has to be invented with appropriate applications, making it relevant and hoping that the workers will adopt it. Another solution proposed by the students, to mark the EHPAD corridors with signs identifying areas where nothing should be 'parked', as is done in factory floor to mark out clear circulation routes. A lot of time could be gained by the medical assistant staff- for example, to get a wheel-chair through a corridor when it is cluttered... The students also reported that if there was an indoor furniture hoist in the EPHADs it would facilitate no end the work of the health care personnel who have to thoroughly clean each apartment when there is a change of occupant.

> This, for us, will be a concrete illustration of sustainable innovation : innovation that provides a real service to person in their day-to-day existence

Looking for 'sustainable' innovation in health matters

Will these propositions be enacted? "Some of them could be implemented by the structures themselves, for example, the idea of the indoor furniture hoist. Others would call for partnerships with external actors, the social housing authorities, the local authorities, etc. Our challenge now is to encourage the actors to cooperate and implement our suggestions", stresses Michel Le Chapellier. The Health&Care Technology cluster would be an excellent framework to get people to work together. "We are having discussions with a local technical lycée to build a prototype multi-function 'chariot' for the home care workers" adds Pierre-Jean Dejean. "This, for us, will be a concrete illustration of sustainable innovation: innovation that provides a real service to person in their day-to-day existence." Both these UTC professors would like to organise a workshop in the hospital milieus. May the latter pick up the suggestion! ■

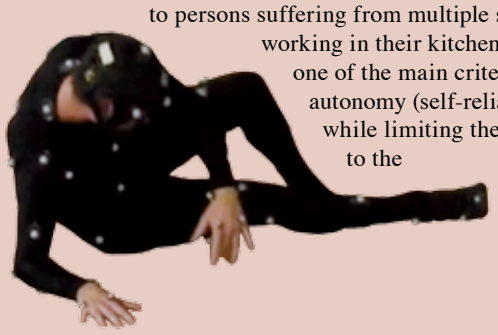
> Our challenge now is to encourage the actors to cooperate and implement our suggestions

BIOMECHANICS

Enhancing, facilitating, *personal autonomy*

UTC's Bio-Mechanical and Bio-Engineering Laboratory (BMBI) is conducting numerous research projects with actor/partners in the Picardie Region. Here are some led by Prof. Frédéric Martin, revolving round bio-mechanics.

A first project, called VIRTUAL-IMC, was conducted in a partnership with the French Red Cross Bois-Larris Centre at Lamorlaye in the Oise department. "The topic investigated here is muscular-skeleton modelling for children suffering from palsy", says Frédéric Marin. The consequences of a cerebrovascular accident (CVA) may affect only the mobility control centres of the brain. As the children grow up, they develop a haphazard form of locomotion, despite having a normal bone and muscle structure. This disorganised locomotion then leads on to bone deformation. "The Red Cross centre has a clinical analysis platform to quantify locomotion; we have obtained some relevant results that are currently being published in scientific reviews. Our links with the Red Cross have remained strong." A second project, called VESTA was conducted with the University Picardie Jules Vere (UPJV) and the Centre for Rehabilitation at Corbie in the Somme department. The object of this project is top define equipment and stances best adapted to persons suffering from multiple sclerosis working in their kitchen, which is one of the main criteria to define autonomy (self-reliance) at home, while limiting the fatigue to the patient. "The challenge was first and foremost of a technical nature: how do you simultaneously measure the necessary energy expended by these person? The results of the project which was terminated only a short time ago contributes to building a knowledge base on the theme of personal autonomy and gerontechnology", notes Frédéric Marin.



> Design a haptic glove with force feedback

Regional finance for the MANDARIN project

Two other projects are under way with the Picardie Region: one with the Institut Faire Face related to quantifying facial movement after face paralysis resulting from a CVA, to adjust the rehabilitation period; and the ANR certified "MANDARIN" project which also involves the CEA, INRIA and the industrialists Renault and Haption. The object here – the budget being 850 000€P for 42 months: to design a haptic glove with force feedback. "The Picardie Region is financing the project with 100 000 €, supporting our involvement in a national scope project. The money will cover the costs of a doctoral student for 3 years and will add influence to UTC vis-à-vis the French national agency for research (ANR) and other project partners". The Health&Care Technology cluster should not shy away from projects that interest the public at large. Frédéric Marin opened the way when presenting the science behind 'capturing' a movement during an artistic performance at the Picardie Week of Research and Innovation. "The Theatre de la Faïencerie, in Creil, is very interested in our approach. We are now in contact with them to possibly put our work 'on stage'" says our scientific researcher with enthusiasm! "We have already built up strong and constant links with regional and national actors in the health sector. The cluster here would provide an excellent way to formalise these links, with the prospect of strengthening the health sector in the Picardie Region as a whole." ■

> The results of the project which was terminated only a short time ago contributes to building a knowledge base on the theme of personal autonomy and gerontechnology

plus d'infos ▶ **http://www.anr-mandarin.fr/**
http://www.youtube.com/watch?v=PAOp1xuR4nc

BIG DATA CENTER

Enhancing *Picardie Region's notoriety*

Frédéric Serein, Deputy Director General of the MiPih* asserts that "If we all work together, our Picardie Region can claim a national and, why not, international notoriety, in a digitised local health sector"

The MiPih* is a group to which certain regional hospital sector computer centres contribute; it has some 500 agents who generate a turnover of 60 Meuros, and is concentrated in 4 sites (Toulouse, Bordeaux, Reims and Amiens, the latter with 120 staff). The activities of MiPih can be classified in two domains: editing of software package and data processing services to meet hospital needs. For example, it is the prime supplier of hospital sector pay-sheets (250 000/month). It also offers a health data storage facility, for example, the remote medicine data base of GCS e-health (e-santé). Likewise, it develops services that depend on new ICT technologies, such as the hospital admission (and pre-admission) self-service information machines.

Training: one pillar of the pole to be built

Today in Picardie, patients can insert their national medical cards (the French 'carte vitale') in one of the self-service machines and read time and place for their next appointments, with an access map. "Our aim here is to free time for the medical personnel and to facilitate registration of the arriving patient. We have tested a computer gateway whereby the patient can register pre-admission information from home", details Frédéric Serein. "Using Internet seems natural now for a growing number of persons and they do not understand why these tools are not more extensively used in the hospital environment. The MiPih has two secure data centres, one in Toulouse and the other in Amiens where the local MiPih unit was located in 2008. "We have set up an excellent link with the GCS-e-santé, Evolucare, the Picardie Region authorities, the hospitals. Today we need to recruit and we are working with UTC and UPJV (Jules Verne University) to attract computer scientists and help recruits settle in the Region." MiPih is assembling a pedagogical training package with UPJV and hopes to do likewise with UTC, given that its activities are at the crossroads of two professional areas, health sector and computer sciences. "We need to develop specific training courses to conjugate the two, worlds, health and computers, in close connection with the medical faculty", suggests Frédéric Serein. Training like this could become one of the pillars of Health & Care Technology cluster.

Start-ups, big data and health issues

Le MiPih is a major component to enhance the Region's notoriety. The start-up Dynseo was convinced to settle its premises in Amiens (Cf. p 10). In mid-October, the MiPhih invited the territorial actors to celebrate their first five years in the Picardie Region and exposed some of their projects for the future. The conclusion is that "we must build an innovative regional project that will unites the existing forces and attract new skills and talents. The question of big data in the health sector could be one aspect of the projects, and which we could better define together" suggests Frédéric Serein again, adding that the size of the Picardie Region could be a trump card to play. "The actors are already close enough and are indeed conscious that there is a need to valorise the Region. The health sector could provide numerous job openings tomorrow and, necessarily, the digital world will be the basis for development. All the conditions are there and ready to succeed a Health & Care Technology cluster". Such a cluster will help attract new talents to the MiPih, the latter then being in a position to offer its technical expertise and experience in handling the tools and component facilities. ■

*MiPih: a public interest group with contributions from some 400 public health establishments.

SMART HOSPITALS

« *Smart hospitals* », a new frontier

The observable facts cannot be gainsaid. "For several decades now, health authorities obey mechanisms that are akin to industrial practice: economy of scale, work specialisation and process organisation of operations", says Francis Langevin, demonstrating this with figures. Hospital units have now moved out of the cities and their 'operational life expectancy' is 7 to 8 times that of their technologies". These are some of the challenges facing the health sector and where a solution could lie in a "smart hospitals" project proposed by Francis, a research scientist/lecturer at UTC seconded to the Ecole des Hautes Etudes en Santé Publique (EHESP) to direct their Chair of Health Technologies.

There is an additional background evolution: the top-down pyramid hierarchy left by the industrial revolution is being replaced by a more horizontal, network-intensive organisation. "As in the case of other institutions, the frontiers of hospitals are moving/. In parallel, the ageing of populations is changing the profile of then patients: critical illnesses are being gradually replaced by chronic and polypathological disorders – and this has a strong impact on the hospital organisation itself", feels Francis Langevin. Patients will have a less urgent need to see their lives saved rapidly and more of a need to find a hospital near their home to monitor a chronic ailment on a regular basis.

This analysis enables us to establish the most relevant way to implement our smart hospital concept and the units

Care in a smart hospital

"The role of hospitals is therefore changing in-depth" as Francis Langevin see things. There are new phenomena – bringing medical and medico-social services closer, implementing necessary data processing systems to know the (bed) availability factors, etc. "UTC and the EHESP Chair have built up a very strong partnership to address these questions in collaboration with the Health Agencies in two Regions: Pays de Loire and Picardie." One of the possible routes forward is to analyse 'care paths & protocols' and to remunerate the units. "We shall be using cartographic/mapping techniques to identify the most homogeneous path and its operational mode. This analysis enables us to establish the most relevant way to implement our smart hospital concept and the units, which will be 'communicating buildings specialised in local e-health monitoring", says Francis Langevin. Units such as defined above exists already in Germany, for example. They can respond to the issue of medical desertification, to rapid replacement of medical equipment, to the balance of hospital budgets, etc. Now we have to help with their acceptance/installation in Picardie! Could this be a mission for the Health&Care Technology Pole? ■

A new look at innovation

French Prime Minister Jean-Marc Ayrault has appointed Anne Lauvergeon, CEO of Areva from 2001-2011, to chair a new 'Commission on Innovation 2030'; the Commission comprises some 20 personalities – industrialists, scientists and economists. The Commission's Report sets out 7 ambitions for France in this field.

In your view, could these 7 ambitions lead to a real industrial policy in France?

The Commission I had the honour to chair received its remit, April 18, 2013, to select a number of strong ambitions based on major innovations. Our work was complementary to that undertaken by the Nouvelle France Industrielle in the framework of the industrial and innovation policies decided by the Government. The ambitions we chose are all long term: they should stimulate innovative practice in enterprises of all sizes focusing on sustainable priorities so that France can avail of world-class leaders in rapidly growing sectors. These 7 ambitions are opportunities we cannot afford to neglect, all the less so that they correspond to strong societal expectancies. They also represent strong potential markets for which France has solid key features.

What obstacles do you see opposing innovation in these same sectors?

France's international competitors will not sit down while our country moves with determination into these markets. We must be aware of this and stop "zapping" and dispersing our efforts. We must concentrate on a limited number of ambitions and mobilise all we can get (from public and private sectors) to attain our goals. It is as if Society today was simply afraid to innovate. Our Commission recommends some structural reforms in terms of education to entrepreneurship and innovation per se. Our children must learn in school and lycées that taking risks can be value-adding and rewarding. For this reason, we propose that there should be an innovation principle, seen as complementary to the precautionary principle.

How could we free opportunities in these areas? What is the nature of added value you foresee for 2030?

The Commission selected these 7 ambitions to be in phase with global needs. The sectors concerned will be world-level markets and with very high financial prospects (sea water desalination, value adding to big data processing and storage). The major associate innovations will create wealth and lead to employment opportunities in France. Of course, this creation of wealth will also depend on our capacity to win these markets. For this reason, we must get our act together today in order to ensure that we shall have these economic champions in France in 2030.

A series of innovation-intensive competitions was launched on Dec.2, 2013, with a budget outlay of some 300 Meuros. What are the selection criteria and what do you expect in the way of applications.

The world-level competitions in innovation that we are launching also have the objective to attract talented persons to France and to support them in order to 'create' the world leaders in these 7 pre-defined fields tomorrow. The competitions are open to all. Any enterprise, small or large, French or foreign … who wishes to develop a project and create employment in France can be an applicant. Each competition has 3 phases. First phase began December 2, 2013 to pre-select some 100 innovation-intensive projects. Each project pre-selected will be financed by the French state an amount of 200 00 € to cover R&D expenditure. We shall begin the second phase in a year's time. A more stringent selection process will identify some 30 "most innovative" projects and will be accompanied in their development. Public finance could amount up to 2 Meuros per project and we wish to co-finance these development phases in partnerships with the private sector. A third phase will bring the number of projects down to 10 or so, to help the beneficiaries expand with an input of public finance up to 20 Meuros/project. Final selection will depend on the coherency of the project with a chosen ambition, its innovative features (technology based or not), its technical and/or scientific feasibility, its economic potential and above all other considerations the capacity of the applicants (project leaders and managers) to be really successful in the market place. At the Commission, we want to select men and women truly capable of taking their innovation projects forward!

> Movements between public and private domains in terms of development are often necessary, to see the innovations complying with a real need and to position themselves appropriately in Society.

What will be the role of research and of the universities to implement these ambitions?

The calls for projects are addressed to single enterprises or to ad hoc consortiums, whether in association or not with actors in the public research sector. The project leaders are free to choose the means they see best fitted to efficiently developing their innovations. The Commission chose 7 ambitions in areas where France has intrinsic advantages, notably in public and private sector high level research. Movements between public and private domains in terms of development are often necessary, to see the innovations complying with a real need and to position themselves appropriately in Society. But it is up to the enterprises to decide: they are the candidates and it will be among their innovations that the selections are made. ■

DID YOU KNOW THIS?

The seven ambitions set out by the 'Innovation Commission 2030' are energy storage, recycling of raw materials, valorisation of rich marine resources, of plant proteins and plant chemistry, personalised medical care, big data and the so-called 'silver' economy.

A made-to-measure artificial extracorporeal liver?

The joint seminar, of the Hepatinov Teaching Hospital Department and the CSIS, based at the developing Saclay Campus, co-organised by D. Franco (Hepatinov) and C. Legallais (a UTC research scientists and lecturer, who received the Bronze Medal of the CNRS for her work at the forefront of tissue engineering at the UTC Bio-Mechanic and Bio-Engineering Laboratory (BMBI), took place November 20, 20123 at Villejuif, just South of Paris. The seminar was attended by over a hundred research scientists from many different areas and specialities (clinical practitioners, biologists, bio-mechanical engineering scientists, engineers. The first session of the seminar was specifically devoted to liver reconstruction through bio-engineering processes, this being one of the research fields of C. Legallais' team. Cécile Legallais is currently working closely with the Centre Hépato-Biliaire of the Parisian Hospital Paul Brousse, with two INSERM units, the Picardie Region Biobank and with two industrialists in the perspective of developing an extracorporeal artificial liver (that will enable the patient to have a satisfactory hepatic function while awaiting a liver graft operation. ■

Drones top the billboard at UTC: world-scale state-of-the-art – RED UAS

UTC's Heudiasyc laboratory organised the Second International Research Workshop on training for and development of pilotless airborne systems, November 20-22, 2013. Research scientists and engineers from 23 countries attended. Various sessions (paper presentations) addressed a variety of topics during the 3 days (navigation, multi-rotor systems, vision, design, etc.) along with in-flight presentations of the UTC drone present. ■

d'infos plus ▶ **http://webtv.utc.fr/watch_video.php?v=B8NGGX272YN4**

UTC will organise the World Innovation Summit for 2014 - Liège

November 14-15 saw the 2013 edition of the World Innovation Summit convened at Liege, Belgium, and co-organised by the University of Liege, UTC, the Ecole de Technologie Supérieure de Montréal (ETS), Canada. This year the theme chosen was "Sustainable and innovating transformation of territories: the technological, social organisational and cultural challenges". President Storck, UTC took part in the Round Table on the subject "The role of technology in territorial changes - Technology Push or demand pull?" Close on a hundred actors in the fields of innovation met in Liege and exchanged about subjects like creativity and sustainable territorial innovation. One conclusion of the Summit was that UTC will be hosting the next World Innovation Summit, in 2014. ■

THE RESEARCH AND INNOVATION WEEK

Picardie Region:

a strategy to acquire an intelligent specialisation

France's Picardie Region is putting the final touch to its "smart specialisation strategy", called SRI-S3, an exercise advocated by the European Union (EU) to efficiently mobilise the structural funds between 2014 and 2020. Nathalie Van Schoor, Deputy Director General of the Picardie Regional executive's division "Economic Development, Research and Innovation".

SRI-S3 is the acronym in French for "Regional Innovation Strategy for Smart specialisation strategy". In order to draft this road-map document, the Picardie Region did not have to start from scratch. In 2008, the Region formally adopted a plan for its Research and Higher Education activities and policies, followed in 2010 by a Regional Strategy for Innovation. "We had already oriented our regional policies to favour research and innovation" recalls Nathalie Van Schoor. "The SRI-S3 called for some extra work, to specialise". In order to assist the Regions to draft their texts, the EU defined 4 principles: the 'territory' must be specialised in a context of omniscient global markets, competitive assets must be identified, those that have critical mass in terms of added value, partnerships must be encouraged and promoted. The ambition here is to focus resources and efforts on those fields of activity that are seen as relevant in terms of competitivity.

3 objectives and 10 strategic axes

"In order to design the SRI-S3 plan, we first of all had to work with those in charge of the local research and innovation ecosystem, in order to identify the major projects in the Region and verify that they are in agreement with research fields to ensure that there an overall coherence. The third stage allowed us to identify promising markets and partnerships in Picardie", explains Nathalie Von Schoor. This process resulted in establishing 3 main objectives and 10 strategic axes, as follows.

Picardie Technopole and UTC's Innovation Centre

The 3 objectives are: to develop instruments for governance and administration; to accentuate regional actions and focus more on local competitive assets; structure and implement a novel and innovative environment. "We must bring our forces together and orient them to specialisations – these will be reassessed during the period 2014-2020 so that they are adapted to the evolution of the operational programmes decided at EU level", adds Nathalie Von Schoor. Each of the 3 objectives is subdivided in strategic axes. The first objective corresponds to 3 axes, beginning with the structuring the Picardie Technopole. "Picardie Technopole is an ensemble of services and persons specifically assigned to the economic development of the Region. The regional territory is analysed and assessed, for diffusion of innovative actions, creating and enhancing synergies and partnerships to bring added value to the Region. UTC's Innovation Centre will be one of the focus points for the actors engaged in joint projects". The 2 other axes are organisation of governance

and implementation of monitoring assessment systems for the SRI-S3 scheme as a whole.

Five promising markets in research and economic development

The second objective covers two axes – specialisations in fields that are already competitive and in promising sectors. The Picardie Region is placing its bets on 5 important sectors: industrial production and transformation of plant materials (agro-machinery, precision agriculture, agro-industries, plant chemistry, methanisation, human and animal food stuffs), Mobility and 'urbanicity' (design and production of vehicles and sub-assemblies for the automobile industry, materials and innovative assembly procedures, energy storage and associate services), smart vehicles, social innovation and, last but not least, reconstruction surgery and health related technologies. "The first two sectors have now attained their maturity, the other three are jewels that the Region is observing closely", notes Nathalie Van Schoor. The third major objective covers 5 strategic axes: integrating control of environmental and industrial toxic risks; developing further digital capabilities and systems of systems; reinforcing differentiation and innovation devices; enhancing and encouraging development of entrepreneurship and internationalisation; adapting financial tools to accompany innovation. There is an overarching vision to formalise this work: "Our aim, by 2020, is to see Picardie becoming a Region that is recognised for its capacity to innovate. Job creation and new enterprises, registration of patent claims, pilot projects, etc., all of which will serve as indicators for our performance. The challenge is now ensure every actor working together to achieve this aim". ■

d'infos plus ▶ **http://www.picardie.fr/sri2013**

INNOVATION SUMMIT

International Summit for *creative urban districts and territories*

Thousands of visitors came to discover the Creativity Week, organised by Creative Wallonia (the creativity and innovation programme of Wallonia. High point: the International Summit "SUSTAINABLE TRANSFORMATION OF INNOVATIVE DISTRICTS INTO CREATIVE TERRITORIES", co-organised by the University of Liege (Belgium), UTC and the Ecole de technologie supérieure (ETS), Montreal (Canada).

The festivities were launched by the inauguration of three "creative bubbles", open to all where even the craziest ideas could be discussed, drawn, mapped out and implemented using 3D printers. Between Liege and Louvain-la-Neuve, these 'makers' labs' proved highly attractive before moving to their final "home", called La Chapelle, an underground club in Liege which till recently was abandoned. And now houses the IF Campus home offices, a permanent laboratory for creativity financed by Creative Wallonia. The most important event during the ambient workshop fever of meetings, exchanges … was the International Summit focussing this year on creative territories.

Reinventing urban districts

With a few planetary 'top-of-the bill' guest speakers such as Elmar Mock, co-inventor of the Swatch, Rem Koolhaas, architect, Ivan Poupyrev, from Walt Disney Company, etc.), the discussions attempted to answer the question "Could a de-multiplied dynamic ensemble of local urban initiatives bring about a territorial transformation? And how? "We brought together the actors of creative urban districts round the world: Cape Town, Barcelona, Grenobles, Toronto, Silicon Valley, etc.," details Thomas Froehlicher, Dean of HEC Liège and Member of the steering committee of Creative Wallonia. "All these territories have re-invented their urban 'tissue', with a common goal: to attain sustainability, intelligence and high quality living conditions. To succeed and create the necessary links, each territorial actor has accepted to go beyond his assigned traditional missions". The 2014 Summit will be organised by UTC in France. ■

plus d'infos ▶ **www.creativewallonia.be**

A UTC CHAIR

The STEMBANCC *Project*

The objective of the European project Stembancc, which started in October 2012, is to develop a stem cell bank using material from 500 patients with clearly diagnosed pathologies. Pr. Frédéric Bois, Chair of Mathematical Modelling for Systemic Toxicology at UTC and his team are contributing their modelling skills.

"Today, in order to test the effects of new medicinal drugs on persons suffering from certain well-identified pathologies (heart disease, kidney disorders …), we can either use cells from the patients' biopsy material, or laboratory grown strains", explains Professor Bois. "The dual problem is that biopsies only provide a limited number of cells and laboratory strains are in fact cancer cells if they are to replicate indefinitely. For this reason, they differ from cells taken from the patient".

The STEMBANCC Project

The European Union decided to launch the STEMBANCC project to find a solution to the problem outlined above. The project leaders are at Oxford University (UK). Project duration is 5 years, financed by the European Commission (EC), in association with the Innovative Medicines Initiative**, which is a technological platform grouping together a number of international pharmaceutical industries. Their objective is to develop a library bank of induced human pluripotent stem cells sampled from 500 patients with well-known pathologies. The patients are being recruited on a voluntary basis, throughout the EU. Patients with well-defined pathologies (of fairly frequent occurrence, such as diabetes, heart ailments, neurodegenerative illnesses, psychiatric disorders …). The recruitment protocol follows very stringent criteria. "The skin cells or blood cells are sampled, dedifferentiated and returned to their stem cell state", explains Frédéric Bois. "These stem cells can be re-differentiated on request from the pharmaceutical laboratories to produce liver, kidney, heart or even neurone cells". Once there is a sufficient quantity of the required differentiated cells, it will then be possible to test new medicinal drugs on them, measuring the drug's efficiency and listing possible unwanted side-effects. "The objective is to find medicinal drugs that are best adapted to patients with specific diseases, such as diabetes, heart or neurological disorders", adds Frédéric Bois. "Compared with biopsy cells or cultivated cell strains, the new population of cells examined are potentially closer to "normal" human cells. They would also have the advantage of being available in unlimited quantities since the bank will comprise cells that can be replicated infinitely". The cell bank would also enable several laboratories to carry out identical tests for the purpose of confirming previous results obtained during analysis of the medicinal active molecules at play.

The role assigned to UTC

Prof. Bois' team is involved in developing the appropriate mathematical models, capable of analysing the toxicity levels of the medicinal drugs tested. The models aim at extrapolating results obtained with a given strain of cells under test-tube conditions to the entire body. To this end, the UTC team is collaborating closely with another team at the University of Innsbruck, Austria, working on oxidative stress in kidney cells. "A lot of medicinal drugs induce oxidative stress and in the long run it can damage the cells", notes Frédéric Bois. "It is therefore very interesting to study its effects on cells for patients suffering from kidney diseases, for example".

Long term objectives

In the long term, the objective assigned to the project extends to controlling production of stem cells that, according to Prof Bois "could allow us to rebuild tissue, or even a complete organ for a patient and this would eliminate any risk of transplant graft rejection". ■

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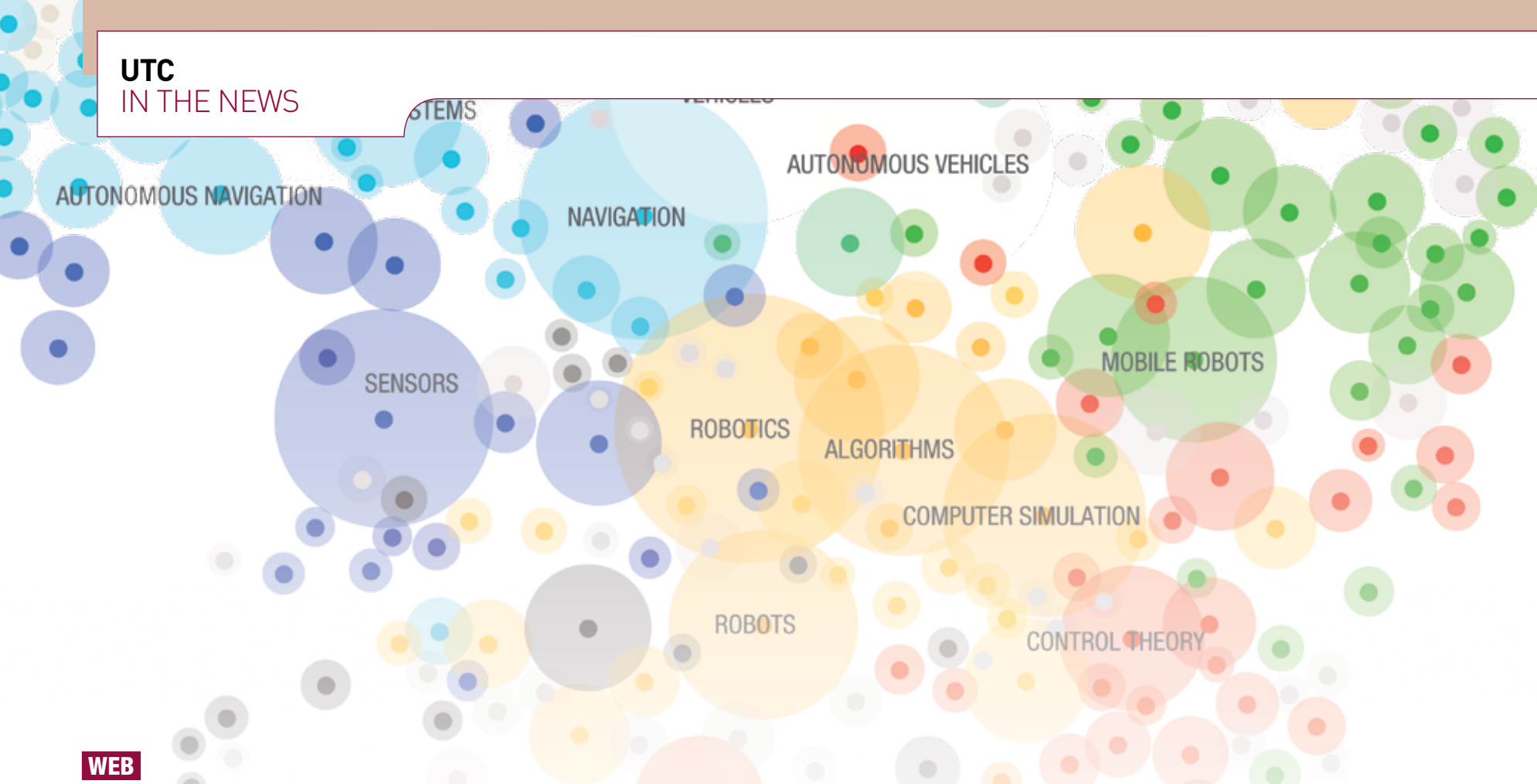
*induced pluripotent cells have the capacity to differentiate themselves into any other type of cell present in an organism (kidney cells, skin cells, neurones …) as well as being able to replicate indefinitely in a culture milieu.

**The Innovative Medicines Initiative (IMI) is part of the joint technology initiative (JTI), one of the instruments used to implement the 7th Framework Programme (FP7) for Research, Development and Demonstration. It should be noted that this programme is a joint programme between the EC and various pharmaceutical industries represented by the European Federation for Pharmaceutical Industries and Associations (EFPIA). Both parties are co-financing the programme, 50% each.



WEB

Cartography invades the Internet

Franck Ghitalla, senior lecturer at UTC and member of its Costech Laboratory is a pioneer in web cartography. Like the cartographers of terrae incognitae, he analyses the field before proposing a synthesis comprising more or less extended 2D disks, joined by lines the thickness of which define a function of chosen parameters.

What topic, we may surmise, is on Franck Ghitalla's mind at the moment? The answer is to map innovation or as he says "My aim is to develop indicators that reflect on the vitality of innovation in the field". Patent claim registration, publication of articles in scientific reviews, creation of corporate structures, projects recognised in the competitivity clusters, etc.: the range and variety of information needed is vast and must be made intelligible. We have reached a point where the regular repetition of the term 'innovation' does not always correspond to a correct denomination; the proposed cartographic work will allow research workers to follow and assess public policies in this field. "What is the return on investment (ROI) for the subsidies provided by the regional authorities? We do not have the tools or methods yet to calculate the ROI", explains our research scientist who joined UTC in 1998. "We must also define the relevant ingredients to attain the level of an efficient public policy. Our first results show that the most resilient and most efficient regions favour the thematic diversity of innovative domains". This is a clear suggestion that it is wise not to place all one's eggs in the same basket, but not to the point of forgetting a concentrated thrust dictated by a strategic vision.

Detecting citizen innovation

This cartographic project is co-financed by the Region, the country and the EU, and must answer with two questions: 1° who else is working in the field? ; 2° with whom are they collaborating? We must therefore identify the networks between the actors, whatever their nature or their size. "The cartography proposes a larger, more complete vision of innovation than is usually the case, taking the logic to integration, if relevant, of the 'civvies' street' actors or associations. Innovation is not an area restricted for industrialists and scientists but is open also to citizens. This is indeed the case of innovations related to issues of sustainable development, many of which follow a bottom-up logic, staring at the citizens' level before the entrepreneurial world or the politicians form a relay", adds Franck Ghitalla. The vision of innovation, which may arise from local interactions and not only a top-down incentive from the top of the pyramid. It is in a position to offer a far more extensive cartographic dossier and a more fine-tuned understanding of the underlying processes.

Accounting for ecosystems and their interactions

The sources available to effectively carry out such a work load are numerous. "We are using literature supporting projects proposed by the universities, by competitivity clusters, technology intensive research establishments, chambers of commerce and industry, start-up nurseries, etc. The Internet also provides as vast source of information, which then demands an enormous amount of work to sift through and concentrate the data which will be of use to us", adds Franck Ghitalla. So, what will be the contribution of the cartography proposed here? That of overviewing a given complete eco-system, to the point that we are able to synthesise its characteristics and organise them. "Maps represent extraordinarily powerful tools to analyse interactions among the actors of a given eco-system, and this makes them very interesting when it comes to deciphering natural, biological eco-systems. If the data we are compiling are not resituated in a map form, the understanding of innovation will not go beyond some figures and trends. A territorial identity is therefore essential and the scale of our Regions in France seems quite appropriate", concludes Franck Ghitalla who – if we

consider his explanations and objectives – could very well be in a front-line position in his own cartographic work!

Cartography creates business concerns round UTC

Franck Ghitalla attaches special importance to transmitting his passion for and his knowledge of the Internet to his students, some of whom created business concerns in his faculty office. He was already fascinated by the Internet worlds at the end of the 1990s, and he has always been convinced that a better understanding of web evolution would open up incredible new pathways to innovation. Two cases in point are Linkfluence and Gephi. The former company was launched in 2006 by 4 UTC graduates who developed solutions to listen in and analyse the social networks; they have now become a software editor. The company has raised 5.5 Meuros and is rapidly becoming an international actor. Gephi is an open source Internet cartographic company. Their success was phenomenal with a rapid 200 000 downloads It was bought out by LinkedIn and its inventor now works there. “I have other projects underway with my students, including mapping the scientific knowledge produced by UTC over its first 40 years, with its 5 600 papers published in highly reputed reviews”, says the research scientist Ghitalla. “What I really would like to do is to invent and propose some new tools enabling the institution to explore its heritage”.

Serving the cause of access to health care

Cartography can be applied to many different domains. The health sector is one that interested Franck, one of whose projects could fit in with the aims of the Health&Care Technology cluster under the responsibility of IYTC’s BMBI and Costech laboratories (cf. Dossier pp.5-12). “A half-dozen strong group of UTC’s students, in collaboration with the teaching hospital in Amiens (CHU) are carrying out a cartographic exercise of the health care system in the Picardie Region. This tool will allow the institutions to discover the bottlenecks and hurdles to attaining a good care offer for the patients, in order to optimise the regional offer in health care acts and services”, explains Franck Ghitalla. To carry out the cartographic work and define typical care protocols, as a function of the various pathologies present, or the patients’ age, etc., we must now compile the data covering the health care establishments and the anonymous data of the patients themselves. Final objective: to define the locations for future “smart hospitals” which is a project defended by François Langevin (lecturer research scientist at UTC-EHESP, cf. p.7). Franck Ghitalla also foresees possibilities for applications of cartographic techniques and skills to personalised health care and to the field of gerontechnology.

> So, what will be the contribution of the cartography proposed here? That of overviewing a given complete eco-system, to the point that we are able to synthesise its characteristics and organise them.

Breaking down barriers between worlds

If we consider the diversity and possible value-adding features of the applications, cartography based on digital data should grow in scale and scope. “Today we have access to tools that can handle big data, including cartographic procedures. What is missing is a culture of design that allow us to develop interfaces that are more oriented to the needs of the end user. This evolution will surely transit via interface designs for smartphones and pad computer devices. I am very interested in combining the skills and knowledge of designers and those of computer scientists” says Franck Ghitalla, who, consequently, works with Charles Lenay and Anne Guénand, with the UTC’s TSH Laboratory (technology and social sciences) in the framework of a joint programme ‘UX Design’. “This is a master’s level course that breaks down barriers. UTC supports this kind of initiative, which brings a real added value to UTC and offers an extraordinary degree of freedom to the lecturers-research scientists. I do not think I would have had the opportunity to teach this way anywhere else”. ■

plus d’infos ▶ **http://ateliercartographie.wordpress.com**

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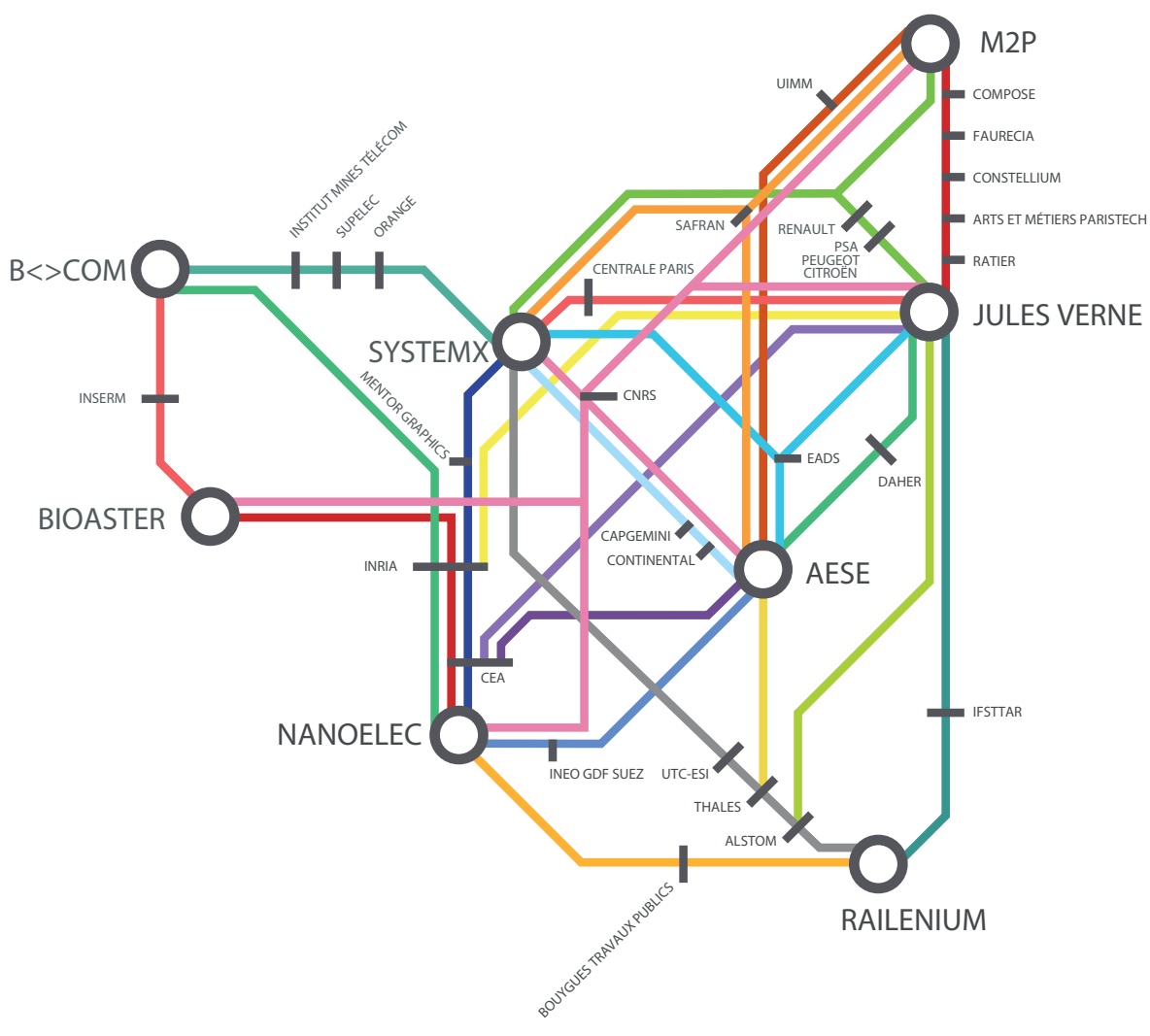

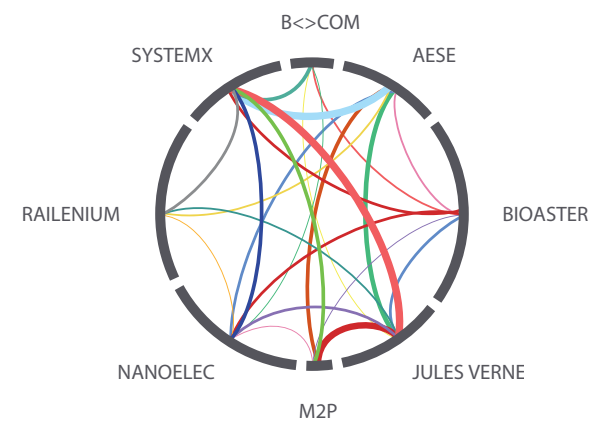

LIENS ENTRE IRT PAR LES INVESTISSEURS COMMUNS

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RESEARCH

Tomorrow's all-electric cars

readied in UTC's LEC Laboratory

The UTC LEC Laboratory (Electromechanical Engineering) focuses its research on one topic: "to design an on-board electric actuator and propulsion system". Hidden behind this descriptor is the entire vehicle's electric power system, from battery to wheel drive, which is the object studied. This global vision – rare for an academic laboratory – is a source of innovations.

As an example: the Stop&Start® concept was developed at the LEC with the industrialist Valeo, a historic partner of the laboratory with its 20 or so staff (10 of whom are full-time). From the main propulsion unit to power electronics, not forgetting the battery, the scope of their research goes beyond electric cars: "As soon as you start to create a movement driven by a battery in an autonomous system – cars, trains, etc., the LEC has the skills wanted," asserts Guy Friedrich, LEC's Director. Two main research themes overarch work at the LEC – the "optimal machine design" and on-board power feed systems – with a unique feature, viz., the development of digital models so as to remove obstacles to electric powered mobility.

Virtual prototypes for Renault and Alstom

The first research thrust consists of developing efficient digital models to predict and improve, case by case, energy consumption, range, noise levels, etc. "We are producing virtual prototyping, as close to reality as we can get », summarise Guy Friedrich. Thus LEC built a digital model for Renault's electric car Zoé, and likewise for tramways and locomotives built by Alstom. What is the interest in making virtual prototypes? "Contrary to real prototypes, ours cost far less and we can run an unlimited number of trials" notes Guy Friedrich. The second research thrust relates to development of digital models to better understand, in real time, the phenomena that interplay in the car's battery – which is a principle component of any electric propulsion system.

Understanding batteries to increase their life expectancy

"Battery behaviour depends on numerous parameters, such as temperature, acceleration, load, etc. We must observe and understand how batteries work and perform if we want to improve safety and range. What are the risks of a battery overheating? How does the battery equipment age? Questions like this require the combined know-how of chemists and electricians and they (the questions) are essential inasmuch as the life expectancy of any of today's batteries does not exceed that of the vehicles in which they are mounted. We are developing models that predict the age status, or battery behaviour in the case of hard drive conditions. The objective here is to programme the power control electronics so as to increase range and battery life expectancy." The challenge is of considerable scope given that the price of a battery is one third that of the whole vehicle (all-electric models)! At the LEC Laboratory, two ANR (the government's R&D vetting and financing agency) projects are worth mentioning, viz., SIMSTOCK (between 2007 and 2010 with a budget of 4.2 Meuros) and SIMCAL (2009-2012, budget 3.6 Meuros), are in this category. Guy Friedrich adds "We shall soon be engaging on a post-Zoé thesis with the automobile company Renault".

In the framework of the government programme Investments for the Future, UTC's LEC Laboratory has just commenced two research projects. One, by the name of ESENCIELE carries a budget of 79 Meuros for 3 years with 11 partner companies (Valeo, PSA, et al.) the objective assigned being to design a hybrid electric/petrol engine at an affordable price. "The hybrids we see today on the road are most often up-market products. We want to develop the same but with a small cylinder bore," says Guy Friedrich. The other project associates two UTC laboratories (LEC and Heudiasyc) with the Carbon-free Communicating Vehicle and Mobility Institute (VeDeCoM), based at Satory, near Versailles, SW of Paris. This project was awarded a government label as Institute for Excellence. "Inasmuch as our special scientific and technological skills in this area are recognised, we have succeeded in setting up a subsidiary antenna of VeDeCoM in Compiegne", says Guy Friedrich proudly. "The objective in doing this is that we can become a platform of expertise in clean, smart vehicles". Another ambition is to become a "centre of excellence" in material chemistry, in collaboration with University of Picardie Jules Verne (UPJV) and Professor Jean-Marie Tarascon. "The aim of our collaboration is to design batteries for tomorrow, those that will replace lithium-ion models and which will enable the vehicle's range to be extended to 400 km for a reasonable price. We are ready to welcome talented persons attracted by these prospective, future themes". ■

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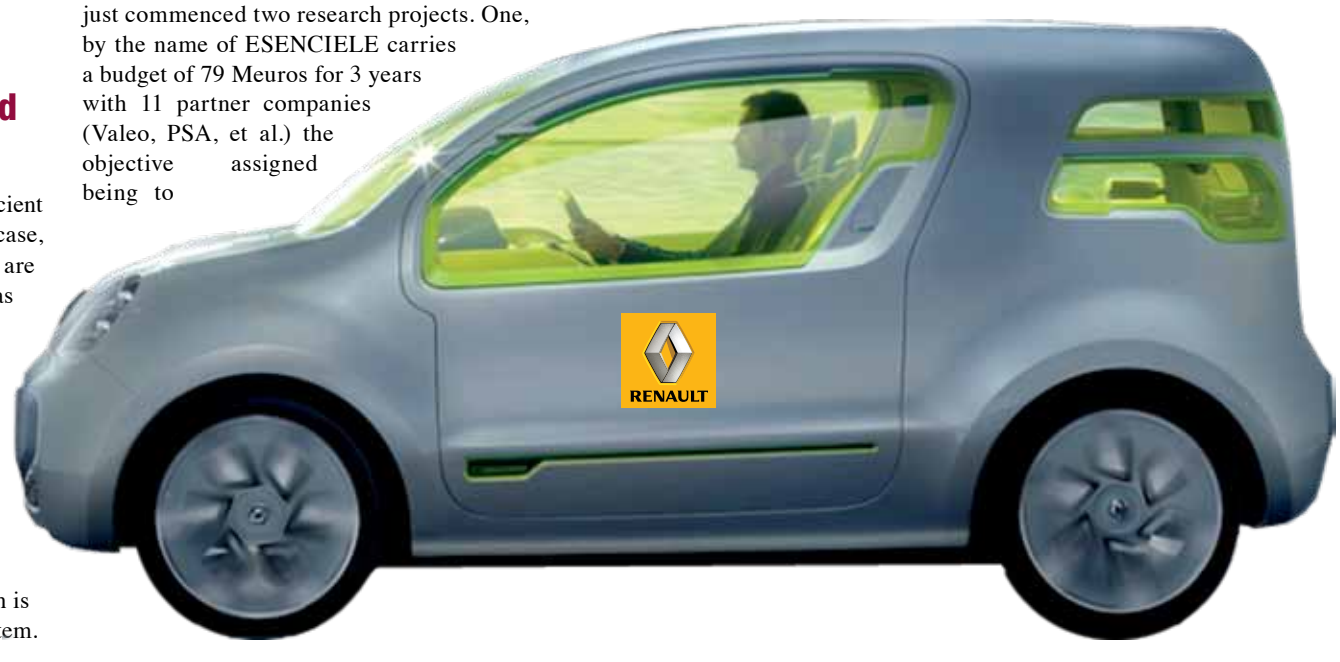

STUDENTS

Smiirl : connecting real life and the digital world

"The digital world has no physical reality in shop-stores, while we observe that the shop-owners are investing increasing in digital tools and products. What we hope to do is to build a bridge between the two universes", says Gauthier Nadaud, by way an introduction, co-founder of the start-up Smirrl, with Raphaël Pluvinage, his room-mate when they were undergraduates at UTC

The first connected object they designed was called Fliike. A sort of vintage box, with a display that shows the number of fan-followers on Facebook®. Fliike was placed in the shop-window or behind the counter, depending on the amount of visibility the owner wanted and inter-related the virtual identity and the physical existence of a shop. All 500 boxes assembled in the pre-order run were sold (300€ each, before tax). By mid-January, they will be in their first shops spread over 30 different countries! "In essence, the box allows you to engage in a conversation between the shop-owner and his clients, inviting the latter "to like" and even share the Facebook® page, which today is still a very rare event. We are now entering the era of inter-connected objects and the shop-owners' world is currently under-exploited. Contrary to main brands who can invest massively on their digital identity, the smaller shops have neither the time nor the tools needed. That is where we provide a solution, via a first, simple and readily accessible object" specifies Gauthier Nadaud. And the idea scored a bull's eye!

"Equip 1% of the world's stores with a Smiirl object!"

"The only way to validate the relevance of our idea was to launch pre-orders since the connected objects market is not yet open. We carefully planned and structured our PR and press pitch, and this led to 200 papers, some of which were on reference sites such as Technocrunch. The orders followed rapidly", notes Gauthier with undisguised satisfaction. The future of the start-up, created 18 months ago, looks rosy indeed. A start-up nursery called Le Camping hosted the team at its beginning, followed by an incubator setting also located in Paris. The next stages will consist of delivering the Fliike-boxes to the customers, possibly reorienting the product design as a function of the customer feedback, raise funds, recruit personnel, increase the production capacity, fire off and test some new ideas, create a distribution network … "We have begun with a fairly simple object, to create the company and embed ourselves properly in the economic market reality. A market for connected objects will definitively take off in coming years", hints Gauthier. "So, what are our plans and ambitions? Easy, to equip 1% of the world's stores with a Smiirl object!" ■

plus d'infos ▶ **http://www.smiirl.com**

UTC'S 40TH ANNIVERSARY

A Gala event to mark UTC's 40th anniversary

November 30, 2013 – 2 600 persons attended the annual UTC Gala night to celebrate the University's 40th anniversary; the venue was the Chantilly hippodrome. The theme the students chose for their Night "the 40 year itch".

«The gala was an ideal setting to celebrate with everyone", explains Marc Jourdaine, President of the Etuville association (gala organiser). "I love UTC, with its very novel operating mode when created 40 years back. Today and tomorrow we must continue to be inventive and encourage student creativity". And the Gala proved this amply – 8 ambiance decors, 15 performing artists, a fashion show, a rock and roll competition, a fireworks show, posters and photos that recalled the 40 years, etc. The guests were spoiled and tickled pink … the last 'early-bird' departures were recorded somewhere round 5 am! "The feedback we got was great, very positive", notes Marc. "This is a large-scale organisation with a budget of 110 k€. The organisers can learn a lot about management, project organisation and how to anticipate problems! As an example, suddenly realising that the evening before the Gala that the reusable eco-cups (pre-printed in the UTC Gala colours) measured 25cl and not 33 cl, the quantity priced by all the associations in charge of the bars. We had to modify all our contracts consequently," adds Marc with a smile – today he is in his 5th UTC year, specialising in process engineering and he especially liked working in a team environment with a common goal. "An organisation like this can scare some but with a solid efficient team, we can make it work. The most impressive moment was when the doors opened; no matter how carefully we had planned the night, we had the feeling that the boat was launched and that nothing could change its heading? And that is why we need to anticipate as best we can". Here's some free advice for the next Utuville President: learn from the past, but make sure you leave your own distinctive stone when it is your turn to organise this important UTC event. ■

L'AGENDA
interactions.utc.fr

Open Days at UTC
January 18, 2014

Now a regular event, at this time of year, UTC and its research scientists and lecturers meet the young French school (and future) leavers who want to learn more about university admission procedures, about course content and the possibilities of completing part of their curriculum requisites abroad. A second open day will be organised March 15, 2014.

plus d'infos ▶ **www.utc.fr/JPO_billets_v2/**

The PHITECO seminar on "Current techniques in coding and deciphering relational identities"
January 27-31, 2014

The PHITECO seminar on "Current techniques in coding and deciphering relational identities" will take place at UTC January 27-31, 2014. Attendees will be able exchange on the mediator function (ombudsman) enables by certain techniques, between individual persons and the world around them (natural and social). Special attention will be paid to certain techniques such a face graft surgery, or digital techniques and their implications on the individual or the collective identities of the persons concerned.

UTC/CPU Seminar: digital and creativity
January 31, 2014

Preparatory to the Conference of the French University Presidents and Vice-Chancellors (CPU), that will be convened May 21-24, 2014, UTC will organise a preparatory seminar January 31 with pre-registration of lecturers, research scientists, students and industrialists.

Inauguration of the UTC/CETIM hydraulic platform
January 24, 2014

The new platform at the Institute of Mechatronics will be inaugurated 11h30, January 24, 2014, at tehe Rives de l'Oise techno-park.

The world Innovation Summit 2014

After ETS and the University McGill in Montreal, 2012, and the University of Liege 2013, UTC will be organising the next prochain World Innovation Summit October-November 2014, in Paris or Compiègne. This summit allows the participants and international innovation actors to meet, exchange and debate.

From Stanford, with *passion* and *gratefulness*

The Director of Daldrup-Link, her host laboratory at Stanford, California, proposed a job to Fanny Chapelin, after a 2-month internship. With her diploma in biological engineering, Fanny has been working with Daldrup-Link for the past 2 years and has just been nominated laureate of the 2013 Engineer of the Year Prize (Usine Nouvelle).

While she was at UTC – where she spent "the best years of her life" – Fanny Chapelin studied the speciality "Design and innovation of bio-products". She did her first industrial placement with the French company Guerbet which allowed her to familiarise herself with contrast media products and to gain an early insight to research and work in the USA. "At the time, Guerbet was working with an America company who proposed that Fanny did an internship in their laboratories in California. Since I already travelled a lot during my studies, I wasn't over-enthusiastic about moving to the USA ..., until I heard the magic word, Stanford!" Fanny only came back to France to present her end of studies dissertation.

Marking stem cells by intravenous injection

In Stanford, the 'rooky' research scientist investigated a contrast media product called ferumoxytol used to monitor the status of an implant replacing bone or cartilage in the human body. The Daldrup-Link Laboratory has been working with this specific product for about 10 years –originally it was an iron supplement for anaemia cases. "Bone marrow in these cases is seen as black when analysed by MRI, and this led to the idea that ferumoxytol could be used as a media contrast product. I developed the technique that now allows us to administer the product by intravenous injection", explains Fanny Chapelin. If the implant is black compared with the surrounding tissue, this indicates that it has been accepted by the host body. If the implant image is clear, this can mean that the implant is being rejected. Fanny finalised the possibility of resorting to ferumoxytol intravenous injections, which process avoids having to extract stem cells from the patient and culture-replicate them for the purpose of cell marking. "Stem cell extractions, via an invasive process, were a source of worry for surgeons; the possibility to get the results by intravenous simplified the use of the ferumoxytol media product." Clinical trials have begun. "Implant contrast media products were removed from the market-place", notes Fanny Chapelin. "This implies that there is a real need in the health sector and, since the ferumoxytol had already been authorised for anaemia, its certification as a media contrast product should prove simpler. Between 5 to 10 years from now, it could be adopted by the professional practitioners and enable – if necessary – a rapid replacement of an implant, thereby contributing significantly to the patients' wellbeing."

On her way to a PhD in the USA?

Fanny Chapelin is captivated by her research. "Our laboratory has extraordinary means and tools. This provides a major opening for further research", ensures Fanny? Another feature is that the lab.team is truly international in its composition. The members hail from India, Pakistan, Russia, Iran, Germany … "There is a high level of mutual aid among us, albeit to keep our English technical vocabulary up to par! " Having lived on the campus a while – "Stanford is a magnificent township constantly upgrading its facilities to keep to the forefront, a place where students can live, study, work without leaving the campus" – Fanny moved out of Stanford. She then came over to Paris, just for a few days after being nominated laureate of the 2013 Engineer of the Year Prize awarded by the magazine Usine Nouvelle. "My lady lab. director encourages us to participate in a maximum number of events inasmuch as they add visibility and help with seeking finance for the research programme. That was why I applied to be considered for this Prize with for an instant imagining that I would be the winner. After all, I'm only two years into my career now", she adds enthusiastically. Fanny Chapelin is also very grateful to Claude-Olivier Sarde, Head of the specialty courses in Design and innovation of bio-products at UTC. "Apart from the fact that his lectures were brilliant, he really looked after us. For example, he fought tooth and nail for me to get the 'admin' documents I needed for admission to Stanford", says this young lady who, this year, will register to prepare a PhD thesis in the USA. "In 5 years' time, I hope to successfully obtain my PhD and then pursue research into tissue engineering and medical imaging. There will certainly be new developments of MRI techniques, given its totally non-invasive feature". ■

BIO EXPRESS

2006
Obtained her Baccalaureate in Beijing, China

2009
Admission to UTC

2012
Graduated from UTC, followed by a first professional job with Daldrup-Link Laboratory, Stanford, Ca.

2013
First scientific paper published

First presentation of her research work at the WMIC (World Molecular Imaging Congress) 5 000 attendees, Savannah, Ga)

Laureate of the 2013 edition of the "Engineer of the Year in Science" Usine Nouvelle.

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