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Donnons un sens à l'innovation

Interactions

LES DOSSIERS

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❝ FROM THE PRESIDENT'S DESK

Art, technology, philosophy and culture:

a rich and profitable encounter

Philosophy enlightens Mankind and allows us to step back and think rationally;

Art is a human activity that addresses our senses, our emotion and our intellect;

Culture through its capacity to generate new ideas, its power to provoke, its strong potential to "make sense" and to enhance the revelation and development of a creative ecology;

Last but not least **Technology**, "the name for Science when it deals with products and processes that originate in human activities" (Guy Denliélou).

For all these reasons, UTC's commitment to promote synergies and improbable yet enriching encounters of actors from among these four forces is all the more relevant today and full of new meaning: together they are factors to enhance dynamic and innovative conditions conducive to creativity, as essential ingredients, not only for the competitivity of enterprises and production of economic wealth, but also for our individual and collective well-being. A new meaning that calls for, aids and assists conciliation of Humanity with Technology and which assumes that sustainable growth can be based today on immaterial long-term investments represented by training, research and dissemination of co-operative values, trust, taking risks and sharing know-how, experience and ambitions.

This issue of Interactions is a clear and positive illustration - by the witnesses called to the bar and through reports of ongoing research and other work of the reconciliatory dynamics that is part of the UTC credo. ■

Prof. Alain STORCK
President and Vice-Chancellor

Best rated French engineering schools: UTC rates 4th in the *Usine Nouvelle* charts

Each year the magazine Usine Nouvelle publishes its rating of the best French engineering schools. For the ranking order, three main domains are taken into account: 1° how successful are the graduates in finding jobs; 2+ what is the international stance of the establishment and 3° what is its proximity of research and training. In 2014, UTC was ranked 4th, gaining two places compared with last year's chart. ■

plus d'infos ▶ www.usinenouvelle.
com/comparatif-des-ecoles-
d-ingenieurs-2014

RUE 2014

UTC was present at the University-Enterprises Encounters 2014 event, presenting it new Innovation Centre as well as being present on the Sorbonne Universities Cluster stand. UTC President Alain Storck gave a lecture on the theme "What is innovation? What are the stakes behind the semantics?" ■

plus d'infos ▶ http://webtv.
utc.fr/watch_video.
php?v=KW5KGYXGG2YH

Innovation Fair at UTC's Innovation Centre

Thursday April 3 saw the first Innovation Fair convened at UTC's Innovation Centre, as part of the national Day for Engineering, initiated by the Ingénieurs et Scientifiques de France (IESF). Graduates, undergraduates and enterprise representatives visited the Innovation Centre and exchanged generally on the theme of innovation. ■

plus d'infos ▶ http://webtv.utc.fr

RESEARCH

UTC at the heart of *interdisciplinary projects*

What fuels could become substitutes for petrol in our car reservoirs? Is it possible to build a zero-energy-balance house? Several UTC laboratories have been studying these vital issues for the 21st Century, in interdisciplinary projects that associate UTC scientists with external teams. Interactions looked at the SISAF and Geo-EcoHome projects and this was what we found.

Faced with rarified petroleum products, development of bio-fuels is attracting more and more industrial outlets. Also, given that first generation bio-fuels, from crops such as colza, sunflowers, etc., compete with the same crops used for food purposes, research has been reoriented over the past few years on possible 2nd generation biofuels. These are derived from biomass that is not useful in food compositions, such as agricultural and forestry wastes. The only drawback is that such wastes are more difficult to 'degrade' into fuel components, viz., lingo-cellulose calls for more complex, more energy hungry treatment that straight crop processing.

SISAF: studies on ionic liquids

SISAF (acronym for Simultaneous Saccharification and Fermentation of cellulose) focuses on production of 2nd generation bioethanol with conditions that respect the environment. "Today, if you want to transform lingo-cellulose biomass into bio-ethanol, you go through 3 stages: pre-treatment of the cellulose, hydrolysis to obtain fermentable sugars followed by fermentation of the sugars into ethanol", specifies Isabelle Gosselin, senior lecturer and research scientist with the Enzyme and cellular Engineering units (GEC), located at the Picardie Region University Jules Verne (UPJV-Amiens) who is the project coordinator. The 3 stages mentioned above are conducted at high temperatures and pressures and involve very acidic molecules to degrade and transform the biomass. "What we are seeking to produce is bioethanol in the 'softest' conditions", explains Isabelle. "Ionic liquids are liquid salts at room temperature and have been used for a decade or so by the chemical industry sector and more recently in biology. We are currently studying the interactions between these liquids and enzymes and yeasts involved in ethanol production".

Five academic partners in the Picardie Region

Five academic partners are investigating the subject matter: alongside UPJV, together with GEC who are studying laboratory scaled processes (100 ml), the electron-beam microscope facility has been called in to observe at each stage the evolution of the biomass ingredients when mixed with ionic liquids and an analytic platform to study the component mix dosing using chromatography and nuclear magnetic resonance (NMR). With UTC, we find the laboratory dedicated to Integrated transformation of Renewable Matter (UTC-TIMR) that bring the scale up to 1 liter (1 000 ml) and the Applied Maths Laboratory (UTC-LMAC) whose task it is to model cell and enzyme behavior. SISAF is an academic 3 year research project financially supported by the Picardie region authorities and by the REC FEDER fund. "We have collaborated with UTC-LMAC in the past, but not so far with UTC TIMR. The partnership is moving forward very smoothly, given that our tools and know-how are complementary and we have already registered some interesting results in respect to use of ionic liquids. These solvents open up large prospects for industrial applications", assures Isabelle Gosselin. Following an 18 month research phase, SISAF chose two ionic liquids that allow the operators to work at lower temperatures and pre-treatment pressures (300° to 40°C and from 50 bar to normal atmospheric pressure (1 bar), and with neutral pH. The next target is to bring the three stages together into a single process!

How do you build a zero energy house?

Geo-EcoHome, (acronym in French for 'Management, Optimization and Energy Conversion for 'Eco energy' homes' is a3 year project that began in October 3011. The objective is to build (adapt) a normal home, with 2 adults and 2 children, using production and storage of renewable energies (Ren) – small scale wind turbines, solar arrays and a lithium-iron- phosphate battery. The project is financially supported by the Picardie Region authorities and the EC-

FEDER fund; coordination is assured by Jérome Bosche, a research scientist with the UPJV-MIS Lab (Models, Information and Systems). The other laboratories associated with the project are UPJV-LRCS (Reactivity and Solid State Chemistry), UTC-AVENUES-GSU (Analysis of Environmental and Urban Vulnerabilities) and UTC-LEC (electromechanical engineering lab.). The partnership is based on three physical test facilities: the LEC SIRTEX for battery modelling, the photovoltaic equipment at UTC-GSU and the platform specialized in renewable energy sources (UTC-MIS). "The platforms will be used not only to validate and corroborate our research work but will also serve as show-cases for the public at large", explains Jérôme Bosche.

Energy management algorithms

Eleven research scientists and one PhD student are engaged in this project, the main production of which, for the moment, being definitions of algorithms used to optimize and manage various energy sources possible. The first algorithms relate to forecasting protocols – you have to be able to anticipate on weather conditions in order to store a maximum energy should a long,

unfavorable climate period set in – and the second set of algorithms relate to energy management protocols: which energy sources should be brought on line to feed houses and when? Lastly, a third group relates to control algorithms that lead to optimized use of equipment such as voltage converters and life expectancies of facilities. "More recent algorithms under development could be used to manage power requirements and supply to villages in Morocco. They are self-adapting as a function of consumption patterns and local weather databases", underscores Jérôme Bosche. The challenge facing the scientists is to correctly measure and scale the renewable energy sources: the aim is to find the best compromise cost/feasibility not only for solar arrays but also for small-scale wind power turbines. The test house is equipped with a heat pump and a 1 280 W battery, plus an electricity generator for extreme conditions and a depleted battery. "The house consumption data is based on a typical energy consumption profile for the Region. We guarantee

It would have been complex in an interdisciplinary sense: power control electronics, chemistry, modelling, control, energy,

energy supply (except for heating purposes) even if heating needs will be 60% met. Integrating the home heating parameter would have required an oversized ensemble for only a few yearly power peaks and it would have been complex in an interdisciplinary sense: power control electronics, chemistry, modelling, control, energy, etc. This is the first time that these 4 fully complementary laboratories are collaborating on a joint project. For the time being, we have kept to the provisional work programme. What we hope is that the experiments run on the test platform will validate our research results". Thanks to the project, the laboratories have learned to collaborate efficiently, stresses Jérôme Bosche, adding "We shall hopefully be able to continue to launch and develop new projects together! ∎

UTC's Innovation Centre,
'avant-premiere'!

UTC Tremplin (the University's alumni association) s organizing the First Innovation Fair UTC. April 3 will see the opening of the UTC Innovation Centre, a meeting place for UTC graduates and local enterprise to present the facilities' state-of-the-art equipment and to invite them to house their innovation projects here.

This open-day event also coincides with France's Engineering Day launched by the Federation of Engineers and scientists of France (IESF). There will be 4 special moments to mark the day. A walk-around discovery of the Centre and some projects presented by UTC laboratories, a speed dating session with the day's visitors to lead on to possible "Improbable Encounters", a presentation of some innovative companies launched

by UTC graduates and a conference lecture on the theme "Engineering almost beyond belief" by Jacques Honvault (engineer-photographer, inventor of differential synthesis and ultra-rapid photography).. As Céline Keldenich, Delegate General of UTC Tremplin sees it: "Our aim is to bring together various segments of UTC and the actors of the local innovation eco-system round the new Innovation Centre and explain how the technological platforms can

be used by both enterprise and the graduates, and also to enhance the encounters among potential users of the Centre's facilities and services". April 3's events will not preclude the Centre's official inauguration ceremony, a few days later. The organizers hope to see about 100 visitors for the first Innovation Fair. Objective: that they come back with their projects. ∎

Professor Christophe Len distinguished by the Indian Society for Chemistry and Biology (ISCB)

The Indian Society for Chemistry and Biology (ISCB) made Professor Len one of their Honorary Members at the 2014 ISCB Congress "Chemistry and Medicinal Plants in Translational Medicine for Healthcare", convened at the Chemistry Department of the University of Delhi, March 1-4, 2014. ■

Workshop Catalysis applied to biomass

March 27-28, UTC welcomes the 2nd workshop on "Catalysis applied to biomass - toward sustainable processes and chemicals". This event brought together both French and international experts in biomass and catalysis, who duly exchanged on the latest progress noted in these areas. ■

d'infos ▸ **http://cabiomass.utc.fr/**

Sorbonne Universities Cluster visits the Harbin Institute of Technology

A delegation representing the Sorbonne Universities Cluster, jointly led by Professor Jean Chambaz, President and Vice-Chancellor of University Paris 6 Pierre & Marie Curie and Prof Alain Storck, President and Vice Chancellor of UTC visited the Harbin Institute of Technology, March 15-16, 2014. The event was supported by the French Embassy to China and was the first scientific event in the framework of the 50th anniversary of Sino-French relationships; it also provided the opportunity for Professors Chambaz and Storck to gives talks at the first Sorbonne Universities / Harbin Institute of Technology Seminar, focusing on "Training, Research and Innovation". ■

d'infos ▸ **www.sorbonne-universites.fr**

RESEARCH

What inter-cultural challenges face business companies?

During the Economic Tuesday (Mardi de l'économie) organized March 25 at UTC's Innovation Centre, in the framework of the Industrial Spring operation (Printemps de l'Industrie), this was one of the key questions. Christelle Lhote, Director of HR department at Enercon and Jacques Pateau, research scientist, lecturer at UTC and consultant expert in intercultural management policies, offer some tentative answers.

Enercon is a German company specialized in manufacture, sales and maintenance for wind turbines. The company was set up in 1984 and is present today in 45 countries - France is their 3rd largest market. "Development at Enercon lies in privileging new territories for their turbines and crating new local jobs", stresses Christelle Lhote. "In France, where we have been in operation since 2003, we have 540 employees, half of whom are in the Picardie Region". Picardie has a sales unit, a project installation, management and maintenance company as well a factory for fabrication of concrete turbine towers since 2012. Choosing the Picardie Region was inspired by the patent dynamic nature of the regional authorities, the academic context and the presence of adequate training facilities (UTC and the Amiens Wind Lab., notably) as well as through is geographic location and the diversity of transportation facilities in and crossing the Region. "Enercon has been engaged in turbine design projects with UTC teams, in the framework of the Industrial Spring event and takes part every year in the Science Fête", adds Christelle Lhote who liaises between the teams in France and the German headquarters staff. Hence the importance of really coming to grips with intercultural issues and challenges.

France and Germany do have a few cultural differences

Being proficient in several languages is necessary but not sufficient when it comes to successfully setting up units of a foreign company in France, or the reverse, viz., a French company abroad. You must have a good insight into the cultures of the two countries and be careful to listen to your counterparts, if only to avoid getting stymied in the process", she explains. For example, German engineers can focus on a single mission and their work load is highly segmented, whereas French engineers are trained to understand the project as a whole before they get involved. "In essence, we have to shift our point of view, get into the other man's (or woman's) shoes to understand what makes them tick, so they too can understand us better, the way we assess things, all of which depends on a system of values embodied in our higher education systems, our family cultural backgrounds, our religions or the history of our counties", notes Jacques Pateau, who teaches in intercultural management at UTC and in Germany too at the MBA course he gives at the Mannheim Business School).

His doctoral thesis was on a study of cultural factors in communication and the way French and Germany companies tend to operate. As a business consultant, he first helped companies on both sides of the Rhine, before he enlarge the scope of his consultancy to embrace the world so to speak – vive la globalization! "Globalization has been marked by Anglo-Saxon management practice, the French model – which is based on very rapid decisions but including a large margin for manoeuvre when it comes to applications – appears unwieldy, complicated for many of us. In Germany, Chancellor Angela Merkel can take up to 3 months to form a Government and the media do not find this unacceptable. You just could not imagine that happening in France! Another difference is that French often proceed by allusion and can be 'tongue in cheek'; Germans are far more explicit and even outspoken".
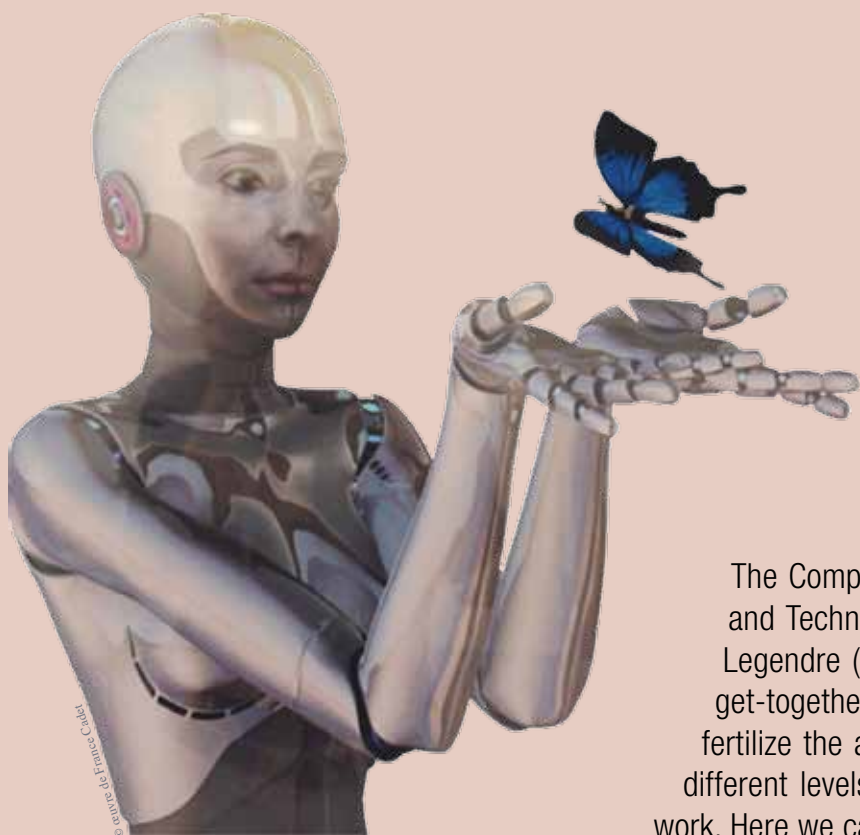
UTC creates beach-heads abroad

Enercon propose un stage pour donner les clés de Enercon proposes training modules that offer some keys to working in an intercultural context. In management terms, Christelle Lhote must distinguish the culture features from the job specifications and avoid the teams getting blocked. "This approach is an important ingredient of our successful long-term implantation of units in France". The inter-cultural key is not the only one you need to understand, adds Jacques Pateau. Without lampooning foreigners, you have to get to know your counterpart as an individual person – this is the inter-personal key. On top of this, you have to master co-operation as an ensemble, in terms of corporate strategies. During this Economic Tuesday – where we saw Emmanuel Vielliard, director international development at Bronze Alloys, François Floutier, Regional Delegate for Ubifrance and Luc Alba, UTC graduate, now in the management staff of Safran Electronics – demonstrated that intercultural challenges are shared by very many business companies. "The conditions that impact on a foreign market-place just do not allow you to side-step cultural considerations. To really understand cultural nuances in a foreign country, you have to identify the best entry points", stresses Christelle Lhote. "I learned that UTC is developing close partnerships with universities abroad and these institutions can prove to be excellent relays to setting up business sites in the country". ■

When digital, artistic and technological worlds meet at UTC

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The Compiegne National Encounters – this year a day of exchanges on the theme Arts and Technologies was jointly organized March 25, 2014 by UTC and the Espace Jean Legendre (named after a former Mayor)in the framework of the Composites Fair. These get-togethers of artists and scientists serve to remind us how important it is to cross-fertilize the arts, sciences and technologies and how important it is too for UTC, at three different levels: in classroom and workshop training, in research and in innovative project work. Here we can see digital technologies at work, breaking down the barriers between some fields that traditionally are walled precincts.

In the area of classroom and workshop training, digital art creation is discussed in a minor course called "Digital Technologies for Culture"[1]. Students are invited to reflect on technical and cultural aspects of the impact of digital techniques. They are introduced to the underlying social, economic, legal, cognitive challenges of digital techniques … extended "hands-on" to artistic considerations. Students indeed must by themselves be made aware of creative artistic work, turning objects and processes away from the usual destination and inventing possible new worlds. There is a degree of similitude between an engineering profile and an artist. When an engineer is designating new objects, products, he is in essence indulging in a DIT exercise with various heterogeneous ingredients (these may be scientific, but also social or economic); and this DIY approach is akin to that of the artist[2].

Bringing the artists into the laboratories

In terms of research, there is a strong incentive to seeing artists in the laboratories. Just like scientists, artists set up experiments. If art work and scientific research are intrinsically different, designing an art experiment can be like preparing a scientific experiment, and the artists can see their work as somewhat scientific. Cross-fertilizing arts, sciences and technologies allows you to throw light on a scientific and creative approach inasmuch as artistic creation sets up conditions of observability and manifestation of a phenomenon. It is a scientific approach that combines technological development and creation and a good example here is the project called La separation[3], proposed by the group Alis, the UTC Costech laboratory and some student engineers. The key idea is to view words in such a way that they can be cut horizontally (depending on the font used) and reassembled visually to form new words from the half-words[4]. It is a project that takes us to the frontiers of what digital technology can create. The end-product will be an "app" for smartphones and touch-pads and also for a device called Kinect, which will allow the user to manipulate and play with language components endlessly.

Art-work, a never-ending extension for technology

Cross-fertilization of arts and technologies can also lead to innovative results, such as with Immersive Music Painter[5], which offers the user an immersion artistic experience. The user is standing in the dark and uses an infrared tracker to draw light trails and music marks in the air round him/her. More recently, the ongoing project Eplays[6] proposes a system to control and modulate sound files (MP3, for example) by making real-time hand movements. The objective is to give the user a way to interact directly on the tempos and the speed of execution of a given file content, just like an orchestra conductor. Eplays can meet the needs of professional and gaming environments, such as the music conservatory, live shows and digital art exhibitions and also in day-to-day amateur musical and artistic events. The project is supported by the UTC Innovation Centre; there will be a patent registration and a start-up to round up the scene. With a historic precedent engineer (artist Leonardo da Vinci), the cross-fertilization of art and technologies is essential to build up a contemporary cultural and technological context that the digital world makes possible. Artists exploring possible creations and engineers building utilizations – when they meet – should contribute to a digital culture per se, and not a master-slave relationship with technologies, but as an unending extension of technology's possibilities. ■

1. http://www4.utc.fr/~tcn
2. Odin, F. Thuderoz, C. (eds.) (2010). Des mondes bricolés ? Arts et sciences à l'épreuve de la notion de bricolage. Presses polytechniques et universitaires romandes.
3. http://webtv.utc.fr/watch_video.php?v=2M8DS67O9WHN http://i-trace.fr/2013/separation/alis/
4. Par exemple les mots utc et art : http://i-trace.fr/2013/separation/videos/
5. https://www.youtube.com/watch?v=dRlznjKKjB0
6. https://vimeo.com/86632593

STUDENTS

An evening out at the Compiegne Palace,
bringing Art and Technology closer

"Stun the gallery!" a call to discover Compiegne and be surprised, issued every year by the Château authorities addressing the UTC students and those at the Ecole du Louvre. On a one night stand, they become the guides of this history-intensive monument.

«Our objective was to be in lie with free entrance to national monuments for the under-26s** and we thought it was an interesting way to create an event that would enable the youngsters to 'take over the Château', so to speak, says Caroline Gaillard, head of the Cultural Development Service of the Compiegne Palace. It was her idea to combine the invitation for UTC students and those at the Ecole du Louvre in Paris, convinced as she as that a common look at the Palace collections could enhance some of the facets and become a unique experience. For a whole evening, these students would be the guides taking visitors through the Palace rooms. Entrance is free and this night visit is worth the trip. "Given the great success of the first Palace Soirée, in 2009, we have renewed the invitation every year since, with a different thematic each time", adds Caroline Gaillard. A number of UTC associations have contribute to the success story: UTC's orchestra, Stravaganza who accompany the walk-about through the Palace, Orion who propose a hands-on introduction to astronomy, etc. But they key roles are those of the pairs – one UTC + one Ecole du Louvre who set the high-note on the event. "Every year, about 20 students are attracted by the project. We offer a week-end training for the visit and each year we present the thematic chosen and the various "speakers' halts" in the corridors. Each of the twinned guides is legitimate and complementary to his/her twin and it's this which gives the visitors a really rich tour".

A work of art is an alchemy between art and technologies

When Nadège Fiard was a UTC undergraduate in Urban Systems, she took part in her first edition; it was "… so good that I started thinking with Caroline Gaillard about how to strengthen and prolong the links between the Château and UTC". Nadège was founder of the association Cultur'Acte. Objective: to recruit young guides not only for the "Stun the gallery" event but also the animate the Château every first Monday when the visits are free. Nadège has taken part in 3 previous editions and this gave her the opportunity to discover the cultural riches of Compiegne and to make friend outside the university. "The connections between Art and Technologies were never really self-evident. We had to find links for the event but also to move beyond the University engineering horizon and discover other points of view, other levels of sensitivity". Robert Blaizeau, a graduate from the Ecole du Louvre, has also taken part in three previous editions. He loves the place and set up an association called Young friends of the Palace of Compiegne. Robert confirms what Nadège says: "My role as a guide was to present the artistic features of our tour, while my engineer companion describes the technicalities of how the pieces of art and the décor were assembled. We were very complementary and this alone was interesting because the creation of a piece of art, whatever its nature, necessarily needs a technical input, it is the fruit of an invisible and fascinating alchemy between art and technologies – they, in essence, nourish each other".

Edition 2014: "Life back-stage in the Château"

For the Château itself, the evening is a fete: one of the rare occasions when the place is taken over by young people in a festive, enthusiastic, informal and convivial atmosphere. Caroline Gaillard is delighted: "The students quickly feel at home and that is terrific. During the evening, the guides are proud to be able to talk about our heritage here and our Château professionals appreciate this time when the site can be "reinterpreted" through young eyes. And for the visitors, it's a good moment to discover the Palace from an unusual angle". This year the event is programmed for April 23 and visitors will be allowed into areas where normally there are no visits – the behind the scenes service corridors, the bath-rooms, etc. To discover the Life backstage at the Palace. Nadège Fiard and Robert Blazeau invite our readers not to miss out on the opportunity to create a young ambiance round the Palace. Nadège is doing her double degree in Germany this year and would like someone to take the reins of the Association Cultur'Acte and maintain the links between UTC and Compiegne's Château. Are we interested? Candidates welcome. ■

Composite compounds
a robot-friendly Fair

Robots will take front-stage at the 17th edition of the Composites Fair, at the Espace Jean Legendre venue, March 25-April 17. The Fair provides a platform to question the link between robots and artistic production. Will art no longer be exclusive to humans?

The Espace Jean Legendre* is a focal point in Compiegne for the link between artistic creation and digital technologies, thanks to its proximity to UTC. With the Espace Jean Legendre UTC established the Composites Fair in 1998. "At the time, artists tended to be wary of digital technologies still in their infancy, and technologists saw no reason to be interested in artistic domains. Today, I still have to spend a lot of time defending the idea that the link is relevant. Yet when we think about it, technology has always influenced art: the advent of electric light-bulbs replacing candle-lights totally changed the theatre", explains Eric Rouchaud, Director of both the Espace Jean Legendre and the Imperial Theatre. "Scientists and artists aspire to perfection, which of course they never attain. Together, they can innovate and explore new horizons that they could never have envisaged alone".

Inventing new forms to address the world

Today, technology is all around us and the link with arts seems more self-evident. What happens when artists use innovative technologies to enrich their art? "Seventeen years ago, for example, some artists were of the opinion that images and digital techniques would crush living representations. Today, the connection between these two worlds has been domesticated and reached a degree of maturity that guarantees the balance between arts and technologies. Digital arts are revolutionizing everything, from the way we write music scores to texts, not forgetting the world of stage-play or dissemination of art works", says Eric Rouchaud. "When artists no longer surprise their audience, they are no longer artists. Technologies can provide one way to invent new ways to address the world". So, what is the nature of the link between arts and technologies? How will it evolve? How will the link affect one or other production domains? How should be bring this link to the public at large? Question like these and more will be at the heart of the Fair and we can see that the programme is a mix of theatre, dance, concerts and exhibitions, not forgetting the national Arts and Technologies venue, organized with UTC every year for the past 3 years.

Robotics and choreography: experts at human movement

There is a day for debates, with free access, that will bring together robotic experts, artists, scientists, historians, producers, to exchange their experience and points of view on this year's thematic "Robots". This year robots are front-stage. "The concept of robots (and the word) was in a play written by Karel Capek**! Robots are everywhere in sci-fi, but there are not many robot specialist engineers are aware that the robots' special skills can be of interest to artists. The way a robot moves can interests a choreographer and can introduce a new imaginary angle to a show. Just like engineers looking at the same theme (movement), a choreographer is a specialist for human movement", stresses Eric Rochaud. "This year we shall analyze the link between robots and writing". How would you write a show with or even for a robot? What are (should be) our relationships with robots? And more exciting: are we not robots ourselves? The Fair – over and above the special Robot Day – will include a dance show entitled "Robots!" authored by the well-known choreographer Blanca Li and co-produced with the Espace Jena Legendre. The exhibition Ro[bots], free access, will run to April 17 and deals with the respective roles of men and robots. "For example, artists will interact via robotic exchanges over chat sessions, to invent more poetic writing processes", adds Eric Rouchaud, who hope to see thousands of visitors coming to enjoy this astonishing and attractive programme.

Art-robots?

"As I was preparing and organizing the Fair, I discovered that robots' artificial intelligence (AI) could be used to enhance both artistic and poetic production without excluding the human touch. This opens up some extraordinary prospects". Will we someday in the future see an art-robot? "There will always be theatrical productions that rely on a single actor and 5 cents of stage props., robots playing flute solo scores, etc. But as they become more and more sophisticated, the robot will be increasingly present", surmises Eric Rouchaud. "They can already paint well beyond human capacity. One day, who knows, they will create their own art work". ■

Link to the Composites Fair Festival and its programme: www.espacejeanlegendre.com/composites.aspx

*named after a well-known Mayor of Compiegne

** R. U. R. (Rossum's Universal Robots), translation from then Czech «Rossumovi univerzální roboti», written in 1920, staged in Prague 1921 and presented on stage in New York 1922.

Espace Théâtre de Compiègne
Jean Legendre
scène nationale de l'Oise

Festival
Les Composites
arts vivants, arts visuels et arts numériques
25 mars → 17 avril 2014
Compiègne

Théâtre
Danse
Concert
Exposition

Robot©Michal BATORY

RESEARCH

Research
providing access to culture

Imagine visiting a 'personal' museum, arranged as a function of your tastes, your background, your expectations … all of this with a smartphone "app". This is the objective of CIME (Contextual Interactions for Mobility in Education), coordinated by Dominique Lenne, UTC-Heudiasyc Laboratory.

What interests Dominique Lenne is to encourage learning processes in mobile situations. Visiting a museum is one such situation – walking along corridors and moving from one piece of art to another – where mobility and learning go hand in hand. There already exist a lot of solutions, such as audio-guides, but they do not propose different 'pathways' round an exhibition or activities that vary according to various parameters such as user profile, his/her position in the museum, or the time spent in front of certain artworks, etc. "Our aim is to enrich the visit using information adapted to the context, via a set of recommendations, for example, capable of suggesting other paintings as a function of those already that had specially drawn the visitor's attention", adds Dominique Lenne. "The 'app' can also propose animations to make the visit even more attractive".

Semantic representation and museum visits

The CIME research project brings together two UTC laboratories, Heudiasyc and Costech, the latter working on cognition processes, and also the Modelling, Information and Systems Lab at the University Picardie Jules Verne (UPJV). The project is financially supported by the Picardie Region who wish to contribute to development of virtual visits and aids to museum visits in the Region. The museum of Compiegne's historic Imperial Palace were immediately attracted by the project possibilities, opening up prospects to modernize access to the works of art and encouraging new categories of visitors. "Using tactile pads and smartphones can bring in a younger generation of visitors, inasmuch as these devices are part of their daily life now. It also helps the museums integrate social networks at large, notably allowing visitors to exchange before, during and after their visit, or to add-on to the recommendations to see other given pieces of art", says Dominique Lenne. An inbuilt feature of CIME is its semantic representation, allowing programme authors to integrate shared characteristics, artistic styles, locations, artists, etc. "This semantic representation is based on an ontology of cultural heritage with concepts such as artists, styles, etc. As a function of the distance between the concepts and the local context (visitor localization, nearby relevant pieces of art, user interests, history of the visit …), the tool can issue recommendations as to a suggested route among the exhibits", adds Dominique Lenne.

Geo-localizing visitors accurately

This will not be an easy task. The first obstacle is how to geo-localize the visitors accurately on the museum. "To do this, we have to use technologies that are more advanced compared with normal smartphone localizers", stresses Dominique Lenne. "We could of course extend the 'app' to other outdoor visits and this would prove simpler in terms of geo-localization". UPJV and then regional heritage service "Patrimoine & Tourisme d'Amiens Métropole" are focusing on this additional possibility in the framework of a study to set up a centre for interpretation off architecture and heritage in the city of Amiens. "After a primer visit to the centre, a tourist visiting Amiens could continue to discover the architectural heritage of the city following a personalized visit. The app can therefore be attractive not only to museums but also to local tourist offices and local authorities", says Dominique Lenne. There are numerous questions and issues raised by CIME and they go beyond the frontiers of the project: how, for example, do you integrate the visitor's environment? How do you distinguish between a virtual and a live visit? How do you assess the interest raised by a given artwork, in a given ambience? For the time being, Heudiasyc is assembling an initial "app" and then research team hope to be able, over 3 years (2013-2016) to produce a market-ready product. "We hope to be able to valorize what makes our project/product different from other existing solutions, viz., the capability built into our device to take the visor(s context into account, and this would provide for a far higher added-value compared with a strict download and treatment of an Internet site's contents". The CIME research project demonstrates how technologies can facilitate and enrich our access to art. ■

At the heart of
Virtual Reality (VR)

Music, dancing, theatre: VR now enables artists to explore new interfaces and new relationships with the real world. For Indira Thouvenin, who has been working for 14 years in this area of research "interfaces and technologies allow you to go farther is recording movements and soon our systems will be able to record emotions".

Virtual Reality (VT) and its possibilities invaded the artistic scene more than 20 years ago. The first set-ups mimicked reality and/or simulated and replaced its functions: digitized decors to represent cities, forests, etc. according to the scenic needs. "The second phase was oneiric, fantastic: the devices enabled creation of a parallel universe. Today, we have moved into a phase of augmented virtual reality (AVR): artists interact with digital devices and these augment the effects, reinforce the sensations" says Indira Thouvenin, UTC research scientist and lecturer in charge of the course "Virtual Reality". In a totally virtual environment, the décor is like a system that connects to the artists. In a mixed reality, robots assimilate artistic performances, as has been done by the choreographers Blanca Li and Marie-Claude Pietragalla in their most recent show (respectively entitled "Robot" and "M. et Mme Rêve" [Mr and Ms Dream] »).

Art calls
for a delicate touch

"Artistic production lends itself extremely well to experimentation in virtual reality; there are real challenges to capture movements. You need very fine definition, of the same order as pianist's fingers of a piano keyboard. Art calls for a delicate touch, for fluidity and this is no easy task in virtual reality", says Indira Thouvenin. In this light, the PhD thesis defended by Rémy Fresnoy, called "Descript" aims at creating a mixed reality device to aid in the art of calligraphy. "Movement analysis turned out to be extremely complex! Adds Indira Thouvenin. Among the most recent PhD theses Indira has overseen, the project IMS, acronym for "Immersive Music Painter" was defended by Camille Barot and Kevin Carpentier. This is an artistic creation that received a prize at the Laval Virtual exhibition in 2010; it is accessible to all and uses an infrared (IR) laser. In the dark, one only needs to move the laser to draw light rays and produce music simultaneously. Users can then be immersed in their musical/light creations.

'Embodiment'
digital programmes

"Capturing movements using data processing devices allows you to have feedback, vibrations, sounds, 3D images …" underlines Indira Thouvenin. "These interfaces are increasingly connected to the human body and in a sense digital processes are becoming "embodied" or "embedded". The next step (after movement capture) will focus on emotions. In the project managed by Loïc Fricoteaux, called OSE which is financially supported by the Picardie Region and the European Regional Fund, FEDER will lead to a system that will register stress and corporal inattention with users who are learning to pilot a virtual canal barge. "The more of a beginner the user is - an emotional state picked up by pulse recording, eye direction, tiller-rudder movements, etc. - the more the system will provide aid and advice about the right route to follow", details Indira Thouvenin. She is interested in this family of systems that adapt to human beings and allow the latter to evolve in retroactively. "It is a concept called 'enaction' in English", adds Indira. "Its applications concern notably projects for driverless vehicles of the future, and this will necessarily need some augmented virtual reality".

UTC: benchmark
notoriety

In another thesis supervised by Indira Thouvenin, called Light'n'Gadgets, we have a video game that take players into the world of lights. The player is invited to guide laser beams to certain targets, suing mirrors, lenses, filters, etc.,

to solve the puzzle. This game won a prize at the Laval Virtual Exhibition in 2011 and the IVRC prize (a Japanese competition for innovative projects). Another game that won a prize too at the Laval Virtual Exhibition called Daïdalos is a mix of virtual reality and augmented reality: the player is placed in a labyrinth that other players change as a function of the players movements. All these projects are proposed by students in the RV01 course mentioned above. Given that all these students are top-notch competitors, they regularly win prizes at a national level and also take place, successfully, in international VR venues. This is the case of "The Wonderland Builder: using story-telling to guide dream-like interaction" directly inspired by 'Alice in Wonderland'. This is a joint project managed and directed by a mixed team of PhD students and undergraduates, the heroine of which is 'Alice' who can build her own wonderland and move round it. "This is a very successful project that won the 2nd Prize at the 3DUI Contest, in the framework of the IEEE VR2013 international scientific conference, a major event in VR", underscores Indira Thouvenin. "This is the first time a French team has won a prize at this conference event". UTC's expertise and know-how are recognized at both academic and industrial levels. "Students trained in this field are highly attractive for companies inasmuch as they fully master the technologies and demonstrate their talents in creativity: they have dared to present really novel ideas, relying on very solid scientific base-lines". ∎
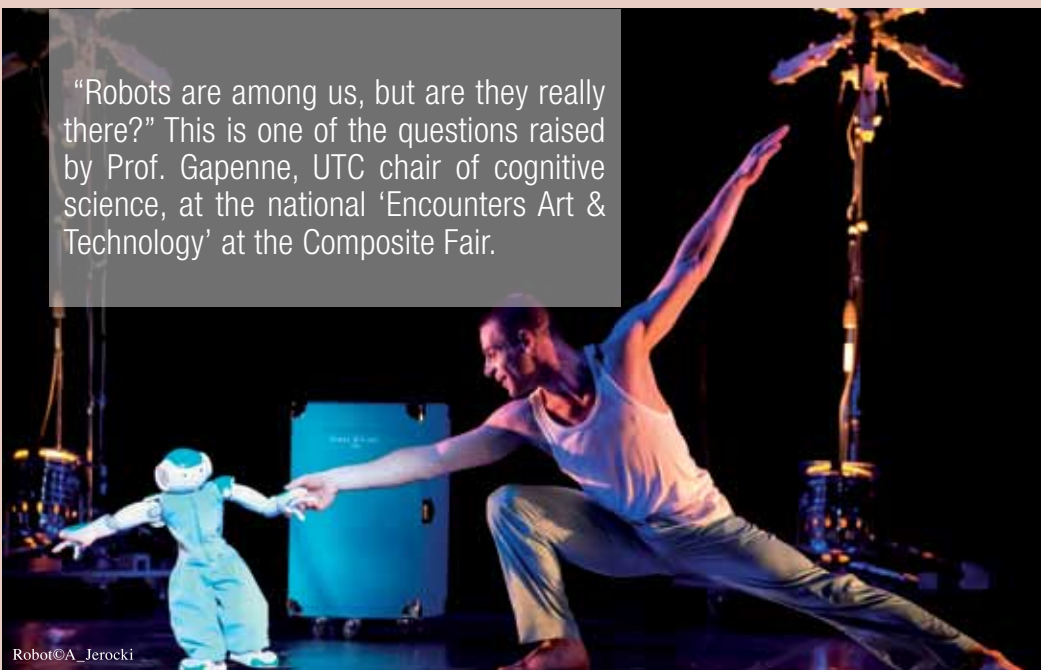
LECTURE

Could we
really trust robots?

"Robots are among us, but are they really there?" This is one of the questions raised by Prof. Gapenne, UTC chair of cognitive science, at the national 'Encounters Art & Technology' at the Composite Fair.

Robot©A_Jerocki

They go by different names, avatars, cyborgs, search engines; they come in various shapes and sizes, humanoid, animal, mechanical or can remain invisible: robots have left the laboratories and are now pervasive. "Robots can be spectacular or insignificant and have come to serve Mankind, in a purely utilitarian instrumentation vision. For example, their role aiding senior dependent or otherwise handicapped citizens will certainly grow in the near future. Beyond their usefulness in terms of providing company, they are now getting really close, almost intimate. Robots are already capable of engaging in sexual relationships or serve as robot brides! Stresses Olivier Gapenne. We are currently taking the new technologies involved on board, and robot companionship should lead to asking new questions such as robot sociability and its nature".

Recognizing and reacting to a smile

On a purely technological level, development of robots is far from over. A lot of progress is still expected in terms of their "humanoïzation". "Robot architecture, mechanization and automation are now so evolved that we can now "appropriate" them. Our objective is not necessarily to make robots more efficient, but more like us and with enhanced capacity to recognize and process information coming, for example, from a smile", adds Olivier Gapenne. If robots are physically omni-present today, they do not seem to be present to the extent that they do not react to their surroundings the way we humans do. "In general terms, they are not affected at all by the events round them. They have no 'personal' autonomy and the very feature of their presence in the real world makes them easy to detect as made of non-living matter", adds Olivier Gapenne. Thus, the space probes we send to Mars or the Moon have a degree of autonomy but do not have any organizational independence, differing here from animals or human beings. They have no "concernment", empathy and have no emotions. "To access these states, there must assuredly be an awareness of death, a notion of one's fragility in life", surmise Olivier Gapenne.

Are men machines like other machines?

Despite the aforementioned key difference between men and machines, Olivier Gapenne asserts that humans are in fact machine too. "In a mechanistic vision of humans, they can be reduced to a set of mechanisms – even if there is no mechanism to date that allows a machine to behave exactly like a human being. Moreover, the most sophisticated drones, such as Big Dog or those sent to overfly military target zones can use their programmed initiative. To the extent that they are fully controlled, they can rapidly access situations that are symmetrical to those in which humans can find themselves – in this respect, they can be viewed as partners". Robots can also provide support intelligence for humans. The latter are characterized by their 'technicity', design and development of instruments and artefacts that transform relationships with the world outside, their interactions and activities. "Robots embody technologies that provide intelligence support for humans, a new field of experimentation, stresses Olivier Gapenne. "Without going as far as the 'post-evolutionist' theses nor envisaging a full review of human status, robots are announcing a new 'relativization', not in terms of a God, or the animal reign but with respect to technical machines and devices". Questions like these are all the more acute that robots will rapidly move from the status of a slaved object to that of companion and/or colleague, and will therefore access managerial and authority functions thus implicitly gaining our trust.

Rethinking our social status thanks to robots

"It will be all the more difficult to place one's trust in a robot than in another human being, because this presupposes a 'common, shared history … with a reciprocal commitment to 'the others'. We could appreciate and trust a robot's regular and efficient service, but how could we tell if the robot cares about what happens to us? surmises Olivier Gapenne, and this opens two prospects in the change of our attitude and relationship with robots: 1° moving towards biotechnological robots and not just to bio-mimicry and 2° endowing robots with empathy. How, for example, could robots manifest resistance to what we desire? "Robots represent an opportunity for humans, to the extent that there will be new experiments in terms of social existences, new opportunities to rethink our social status, with which concept we have a great deal of difficulty today. Via robots we could re-build an intergenerational relationship, new solidarities that are falling apart today. ■
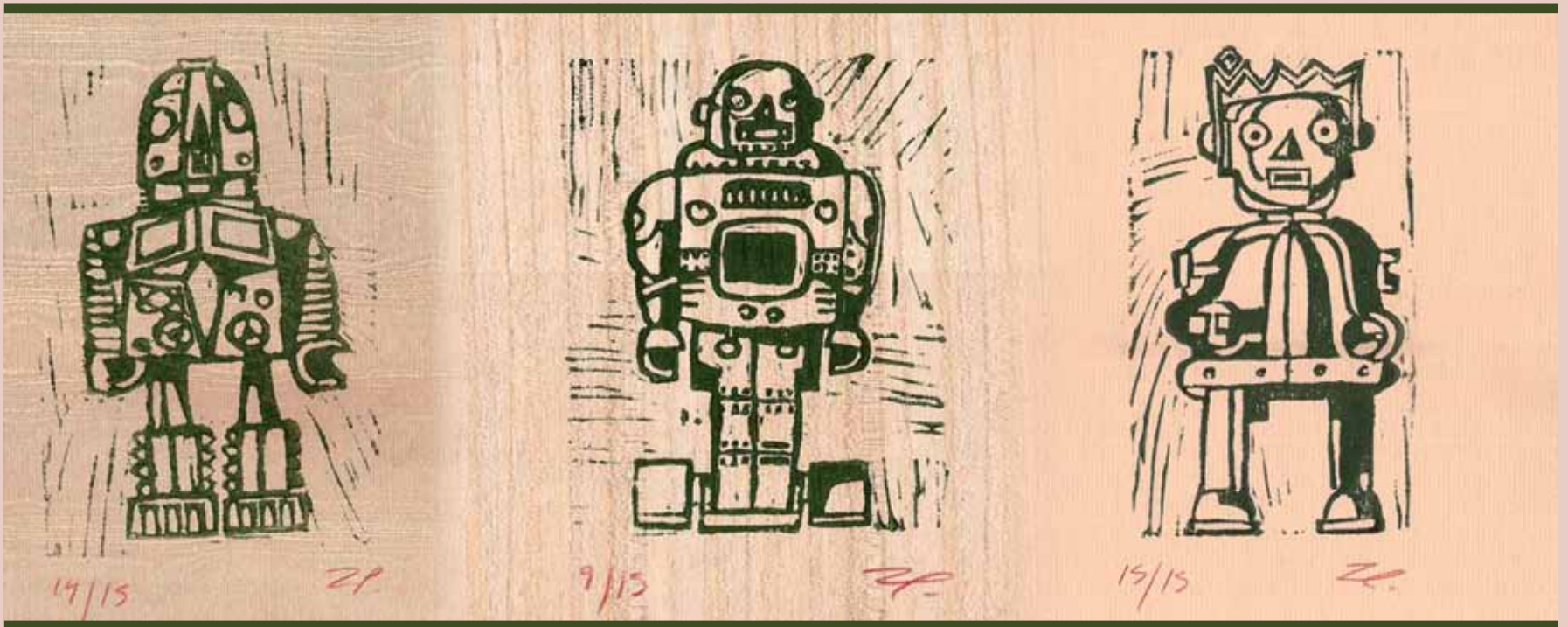
Suggestions for a soul

Zaven Paré's artwork was exhibited at the Composite Fair. As of the 1990s, he designed electronic marionettes "the missing link in robotics" according the famous Japanese professor Ishiguro, whose robots are very, very "human". Zaven Paré is no stranger when it comes to this striking, almost anguishing, similitude.

Zaven Paré has been working with Professor Ishiguro's research teams since 2009, at his intelligent robot facility near Osaka. Japan is the cradle of modern robotics, and it is a field that is considered to be a future trade sector, especially when one considers the inevitable ageing of the Japanese population. "In some 16 years, the estimate is that there will be 8 M Japanese aged over 80. Instead of seeing this as a problem, Japan considers these seniors as an economic opportunity, a sector for scientific research, investment and innovation. More than just an economic choice, robotics represents a societal option", analyses Zaven Paré. But before robots can carry out care, hygiene and companion functions, they must be given a resemblance to humans, including all the small feature that denote a conscience (or unconsciousness). "Japanese culture differs enormously from Western culture. In their robotics laboratory, I sometimes had to wait for hours. Just like the robots around me! I was identified as one of them. My work consists of developing presence by the very small aptitude unconscious moves w make, such as scratching ourselves, expressing our impatience, showing a potential for interaction or a predisposition to engage in a relationship", explains Zaven Paré.

Staging the inner lives of robots

Zaven Paré has an excellent reputation for his marionettes' theatre work and he collaborates with the scientific lab. In the framework of Robot Actors Project ». His work consists of raising relevant questions in terms of use and 'feelings' by the public at large. The artist is far more concerned with how spectators 'receive' and interpret robots than the scientist – the aim being to move the robots out of the lab environment into real life. "The representation we have of robots is full of projected ideas, form science-fiction and myths. We must integrate robotics into trivial situations, take a step back from man-meets-robot face-to-face situations. The lab also employs a make-up assistant to add the finishing touch to the androids, or a stage-manager: 5 pays have been written and they led to questionnaires about how the audience 'felt', their impressions seeing humanoids on stage", says Zaven Paré. The objective is to generate empathy. Post-industrial robots are now leaving the work areas and taking over a changing environment but they must now generate empathy to go beyond the man-machine communication barrier. "Even if the robots are very similar and even pretty, a machine will never generate empathy if it does not suggest some form of intelligence, unconsciousness to the point that we can consider them as "other" minds. How can we confer a degree of consciousness? This is the observation work that the artist is undertaking, and it calls for apparently unprepared behaviours, micro-movements that suggest that the robots have a conscience".

Talking to a robot as if it were a woman

And it works! Ever since the first lab-made humanoid, the number of servo-motors has dropped from 56 to 12, but the degree of empathy continues to increase. "The latest robot is a woman, and this is not an ordinary event. She has an archaic smile, like that of Buddhist statues or the Joconde painting in the Louvre Museum and this helps generate empathy. You tend, for example, to talk more gently to a woman than to a man and this allow the robot more time to understand what is being said, recognize the speaker's face, and process a multitude of data incoming from the environment … Robots are fragile and if they look like a woman, we can hope that the speakers will pay more attention to how they address them!" According to Zaven Paré, Professor Ishiguro is a visionary with a global perception of robotics, hence the usefulness of artistic talents to stage the inner lives of robot. "We the artists provide our special questions, our doubts our fragility. In the laboratories and research projects, we question the very concept of humanity and on the relationship between Mankind and Society, and on our usefulness. The robot helps us frame our thoughts", adds Zaven Paré. He also gives a warning: neither the artist nor the scientist should demystify their work for the public at large, and should not suggest that something is artistic or scientific when it is only commercial or marketing. "Robots open up an extraordinary world for artistic creation and certain laboratories are engaged in truly transdisciplinary approaches that combine and science, and these are the only approaches that bring with them an incredibly high level of poetry and a great deal of humanity to our robots". ■

Exposition à l'Espace Jean Legendre 25 mars au 17 April 2014

THINK TANK

Understanding

culture-intensive industries

Professor Andy Pratt, City University London is a world-class expert on culture- economies with a special focus on culture-intensive industries. He has authored a hundred or so papers and books and regularly advises politicians (from the UK to UN and European institutions) in regard to strategies to attract and encourage culture based industries. He enthusiastically answered our questions on the theme "art and technology".

How can culture-intensive industries conjugate Art and Technology?

The so-called culture industries are at the interface between the arts and technologies, such as we see in video-games. Games combine state-of-the-art technologies, as need for high quality displays, while 'telling a story' must strongly attract and rivet players. Both aspects – which normally are in opposition – are absolutely necessary for video games. The creative artist and the engineer must not just be happy to work together: their respective skills must serve the other side, revealing, as in photography, all the potential across the way, to tell a story or animate an event… companies who specialize in special effects – now used in 75% all films – are themselves conjugating technology and 'story telling'.

What is specific about these companies compared with more traditional companies?

Our 'social and market markers' are reshuffled, if only because now there is a conjugation and not an opposition. From a social point of view, the enterprises here are becoming more and more free-lance, working on for example a 6 month or a one year project in a very flexible manner – and this leads to new challenges on the job market, social security, access to bank loans, etc. Such companies run high economic risks – only 20% of their created product are finally purchased, but a "success story" will largely offset the losses. They tend to favour failure, opening up fields of possible without a priori giving the solutions, contrary to traditional sectors, which again generates new management problems and issues.

How much do these companies weigh economically speaking?

Over the past 2 decades, in global markets, video-games have become economically as important as the cinema. In the USA, it is now one of the main export sectors and the US Army has placed contracts with the game companies for better video war simulation packs. In the UK, a specific fibre optic cable has been laid to vehicle special effects to the US film business. The implications here largely go beyond the framework of video games or special effects. Production here will change the way we see the world, create wealth, interact with others … opening up an extraordinary field of possible cultural and social modifications that will call for in-depth analysis.

How do you set up the conditions for Art and Technology to come together?

Faced with the loss of a large number of video game-businesses, who have left the UK for Canada, among other destinations, which offers a more attractive and innovating environment – there is a strong debate here about the links between public policies and culture industries. Unfortunately, the terms of the debate do not rest on a precise understanding about these industries, characterized as they are by a capacity to manage largely opposing skills and create the environment to host them. There are enormous needs to better understand and analyze how they work. This field of possible research should be explored by the Universities and, as I see it, UTC would be in a good position to do so. The findings should be made available to policy makers, who, because they do not understand the issues or facts, do not know how to attract and keep such industries. Moreover, the financial support from public authorities is focused more on technology than on artistic achievements and projects. The end-result here is a domination of technological solutions over creativity, and technology was never good at writing stories!

Capacité à manager des compétences quasiment opposées et à créer un environnement apte à les rassembler

Do you think we should train engineer-artists?

Heaven forbid! (laughing). You cannot be both and engineer and an artist without losing some expertise or artistic sensitivity. On the other hand, we must bring the engineers and artists together to encourage and enhance creativity, which is the result of meeting and debate. Engineers must be trained to pay attention to artists' needs and to understand their vision of the world. He (or she) must create appropriate locations for the meeting: an office, or a building will not suffice if they are not irrigated by interactions with the technological, artistic, intellectual, etc., milieus. At UTC, you are addressing these issues, those that mark the 21st century, especially through your work in your local ecosystem for innovation and associate academic analyses. ■

A new look at
International student mobility

Hélène Conway-Mouret, minister-delegate for Foreign Affairs, in charge of French abroad, was invited to inaugurate a joint course between UTC and the Lycée Jean d'Alembert in Chile. As she sees it, student mobility is primordial for France's reputation in the world and for the performance expectations for French enterprises in the international scene. An interview with Interactions.

DID YOU KNOW THIS ?

Young French people who go abroad to enrich their experience return to France in 80% of the cases observed. Government has now deployed a mobility strategy for Europe and in the world at large, the aim of which is to increase and diversify the beneficiaries, so that more young people from lower social classes can access this privilege, notably through an rise of over 40% in the budget allocated to the European mobility programme, 2014-2020, "Erasmus Plus" and a democratization of the system, singling out and focusing on technological and professional training streams.

For 14 years, you directed the foreign language department at the Dublin Institute of Technology: what does international student mobility represent for you?

Our younger generations are the most mobile category of our populations. It was for that reason that I decided to organize a Round Table on: "International youth mobility: opportunity or necessity" during the Encounters I also organized April 3 on the thematic "The French abroad, an advantage for the country". It is obvious that young people who go abroad to complete/pursue their studies or enjoy their first professional experience have fully integrate the notion of globalization. They well know that in an international, competitive market-place, it is important for them to have acquired certain personal, human qualities, such as simply being able to master foreign languages, learn to be flexible and open-minded, in a word to be able to adapt to situations as they arise. These 'add-ons' can be acquired abroad, as and when they meet other cultures and values. For the potential employers, expatriation is an advantage inasmuch as it identified those people willing to take risks and adapt themselves.

Why do you think these young people could be an advantage for France?

Even those who go abroad and settle there – or for sentimental reasons – remain closely attached to France. I have never yet met an "expat." who left France because he/she deeply disliked the country; they are our young ambassadors and they contribute to our international image in terms of culture, economy, language, etc., and their higher education skills. When our national companies answer call to tender in foreign countries, the fact that there are French 'expats' there can play in favour of the contract. The Encounters I organized offered an opportunity to make an unusual poll with the question - What do the French think of Expats? to straighten the records. I met literally thousands in two years; I listened to their testimonies, their expectations. This is a little known community as seen from France and they are stigmatized with negative images: when the word expat comes up, the clichés are 'brain-drain', 'tax evasion' … but in fact the plane truth is quite different: These expat French represents a chance for our national economy. They embody France's qualities, at a time when every effort possible must be mad to create jobs and attract investors in and to France.

What can be the role of the Universities in this context?

Each year we welcome 288 000 foreign students in France but we send less than 60 000 French students abroad. We still have a lot to do to increase their presence on the international scene. All our Commercial Colleges propose a year abroad in their curricula, but it is an opportunity that is reserved for an elite group. The Erasmus Plus EC programme should help here, given that the programme in France will be endowed with 4.6 billion € between 2014 and 2020 to enhance international student mobility for scientific, technological and professional streams. The role of the Universities, as I see it, is to set up double degree structures, recognized in France and in the partner countries, to facilitate mobility both ways. I was in Brazil recently where we launched a grant programme called "Sciences sans Frontières" that plan to attract and register 10 000 students exchanges/yr.

> For the potential employers, expatriation is an advantage inasmuch as it identified those people willing to take risks and adapt themselves.

Why do you feel that the inauguration of a joint course agreement between UTC and the Lycée Jean d'Alembert in Chile is important?

The President and his colleagues at UTC believe in student mobility and encourage these actions. It is a great opportunity for UYTC students who can benefit from a positive, open-minded international policy thrust that accompanies the undergraduates as they explore new horizons. Apart from the traditionally attractive Anglo-Saxon destinations, the emerging countries are becoming increasingly interesting. These countries need skills that they simply do not have locally. The French are generally most welcome, given the high level of their studies in France. Chile is one of these countries. In a word, developing and promoting international student mobility is a development for France's reputation abroad. ■

NETWORKS

AIP-Primeca :
designing tomorrow's factories

What will tomorrow's factories look like? Benoit Eynard, Director UTC Innovations and Partnerships, is Chairman of the AIP-Primeca network for the next 4 years and hopes to include in his term of office an analysis on "Tomorrow's Factories", an initiative of the French Minister in charge of Productive Rehabilitation.

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The AIP-Primeca network, covering from IUTs to PhD levels, federates 80 higher education institutions and research establishments throughout France. UTC was one of the founding members of the network, the aim of which is to encourage and support training in mechanical engineering and production-automation among the network members. The topics addressed include the life expectancy or life cycle of products, from its design phase through to ultimate disposal of recycling, including use of robots and mechatronics. "We should prepare engineers and the associate technological tools to accompany the digital transformation of our industries", summarises Benoit Eynard. There are industrial representatives on the network Board, for example, from Dassault Systèmes and Airbus Industries. "By improving our engineers' training and facilitating research for the benefit of DSMES in our network of sub-contractors, AIP-Primeca represents an attractive academic ecosystem", underscores Bernard Boime, Programme Manager for Airbus Group Innovations.

Sharing knowledge and know-how in France

Thanks to AIP-Primeca, for example, the course contents are now able to integrate the latest 'progiciels' (dedicated software), explains Xavier Fouger, Director of academic studies at 3DS (Dassault Systems). "Before they adopt a new version of a software package, the establishments and institutions have to understand what may be the impact of doing so; we, for example, use AIP-Primeca to test our new 3D life cycle management platform, called PLM-V6. Sharing the assessments proved very efficient, for a network like 3DS". Today, PLM-V6 is an important tool for engineers in many specialties and sectors (automobiles, aeronautics, etc.). "Being able to master PLM-VG is a strong factor for employability throughout the world", assures Xavier Fouger. Hence the importance of training tomorrow's engineers on the most recent versions. "UTC has always had a small headway in its pedagogy and has begun to train its engineers in PLM-V6 even before AIP-Primeca has chosen to follow suit", notes Xavier Fouger.

International representatives

AIP-Primeca has 9 regional poles or clusters. UTC is a member of the Paris Région (ile de France) cluster, as are ENS Cachan, Arts et Métiers Paris Tech, Centrale Paris, etc. Networking here provides a far better international visibility for the institutions. "3DS manages the PLMCC programme, acronym for Product Lifecycle Management Competency Center, in liaison with the ministries in charge of Education and Higher Education. The aim is to open up training Centres to study and use our software packages in countries seen as priority targets by these ministries. To discuss, for example, with our Chinese partner, we sent an AIP-Primeca lecturer representing a number of students equivalent to that of the TsingHua University, Beijing", details Xavier Fouger, who is working with two UTC graduates. "The students come from the AIP-Primeca network of schools often have excellent course profiles", he asserts. "Moreover, we shall soon be proposing a pedagogical novelty to AIP-Primeca that will enable us to valorise France without creating an imbalance of treatment among counties, which is necessary when you are a multinational group, like Dassault"

Interoperability of digital tools?

AIP-Primeca also supports research activities. "The network is working on the concept and feasibility of interoperability of digital tools, which have now become essential in almost every industrial process and in all the phase of a product's life cycle. Mastering these tools is conducive to better competitivity. So how can we assure interoperability? Implementing common interfaces has become a real challenge for industrialists and financiers, and is a concern shared by numerous sectors of activity. We are working here in the framework of research assignments with various engineering schools in the Paris region cluster", details Bernard Boime, adding "There will be plenty of work for engineers and technicians in this field, both with the industries as users and at the software editors". In the framework of the thematic of Tomorrow's Factories, AIP –Primeca is studying the concepts of Eco-design and virtual reality (VR). "We shall accompany the theme of industrial rehabilitation with ANR at the national level in France and with EFFRA in Europe", underscores Bernard Eynard. "We shall prioritize high added value and high level technical content and will develop factory-training centres so that young people can see just how attractive a factory may be tomorrow. For example, AUP-Primeca will be contributing some 50% of the VR equipment to be installed at UTC". ■

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Digital humanities :
hybridizing computer and social sciences

Syntec Numérique recently published a detailed analysis [1] on skills and recruitment levels needed in computer sciences and digital applications up to the time horizon 2018. Jérôme Valluy, sociologist and research scientist at University Paris 1/UTC-Costech describes the contributions this Report will make, commenting on the implications in terms of "digital humanities".

What are the main contributions you see in the Syntec Numérique study?

The authors have presented a cartography of professions, compared evolutions, job creations and training offers. Out of 36 000 job creations over the next 5 years in computer sciences and digital applications, a growing fraction – already a majority today – are digital-technology-based: web designer, community manager, web and mobile "app" developers, big data analysts, cloud computing architects, cyber security analysts, web referencing consultants, etc. The skills related to the ways computer science interact with the human and socio-economic environment are new necessary if staff wish to evolve from their current professional status. Now they are required to understand social uses of technologies, clients and the applications, web sociology, data analysis, writing and editing skills as well as a grasp on the vocabulary specific to Internet practice, to changes in management policies and marketing in a web environment, in 'interdisciplinarity'...

Is this an incentive to resuming the debate on digital humanities?

This study confirms that there is in fact a need for dual skills and mixed training in computer and social sciences. A good level in standard computer sciences is the prerequisite, but the fraction at this level will decrease as new digital jobs are created, inasmuch as they call for digital data, methodology and 'reflexivities' in social sciences, as well as the ability to interpret "big data" files which calls for a specific training in analysis of digitized humanities

How would you define digitized humanities and what are the challenges?

The framework is all the more successful when the contents are ill-defined. The initial definitions become marginal faced with the scale of current convergences in France and elsewhere: "digitized humanities" are prospering round the world and are becoming a major axis to harmonize Europe. France's authorities are showing their determination in the developing field and are very present in the calla to tender in the university milieus as well as in research and training schemes. This category of activities is opening up: this alone is a factor that contributes to the success story. The partners are contributing via their own skills and specialties – inducing new configurations and adapted situations.

What are the corporate expectations?

Knowing your clients well is primordial to any business. The Report and the UTC debates with the Conference of French University Vice-Chancellors and Presidents, January 31, 2014 on the theme "Digital Innovation and Creativity" [2] highlighted this aspect: characteristics,

perception, habits, needs … all call for skills in social sciences. Public authorities and their services are finding it increasingly difficult to finance innovative projects when there is a low user rate. Even if there are not just these expectations that are important for training schemes and research work, technological creation would stand to gain considerably by better knowledge of users. This in no way should stymie creativity, but is an encouragement to see it oriented to take account of the rest of the world outside (, clients, users, citizens, consumers …).

What are the challenged in training via digitized humanities? Can UTC play a special role here?

The central challenge is to hybridize computer and social sciences. In most HE establishments, these two subject areas are distinct. The French Universities of Technology have a great advantage here. For decades now, computer sciences been exchanging with social sciences and humanities. Synergy here between the areas should be valorized by intermingling course titles, and by creation of an integrated specialty, running from UTC's freshman (1st) year up to and including the PhD courses. At UTC, the Social Sciences and Technology (TSH) Department, which is a bridge between digitized humanities and technological epistemology, could lead on to a specialty

that valorizes all its component credits, with numerous partners in the UTC staff and laboratories. Opening up a section "Social Sciences and Technology" in 2012 was the first, pioneering step. It would also prove interesting to set up a Master's degree integrating digitized humanities with associate research activities and could lead on to awards of PhD theses in these fields. This joining of forces between digitized humanities, research, a digital writing/AV editing unit, connected to the local lycées, tied to continuing education courses, would be in a position to offer the baccalaureate holders), HE students and salaried personnel a unique and viable framework that could be set up faster in Compiegne than anywhere else. ■

(1)   Contrat d'études prospectives du secteur professionnelle du numérique [Contract for prospective analyses in regard to digital professions], August 21, 2013, 189 p.: cf. http://www.syntec-numerique.fr/sites/default/files/related_docs/cep_numerique_rapport_final_2013.pdf

(2)   UTC/CPU, « Innovation numérique et créativité » [Digital Innovation and Creativity], Seminar held January 31, 2014, Compiegne : cf. http://interactions.utc.fr/seminaire-innovation-numerique-creativite

CARTOGRAPHIE CONSOLIDÉE DES MÉTIERS DU NUMÉRIQUE
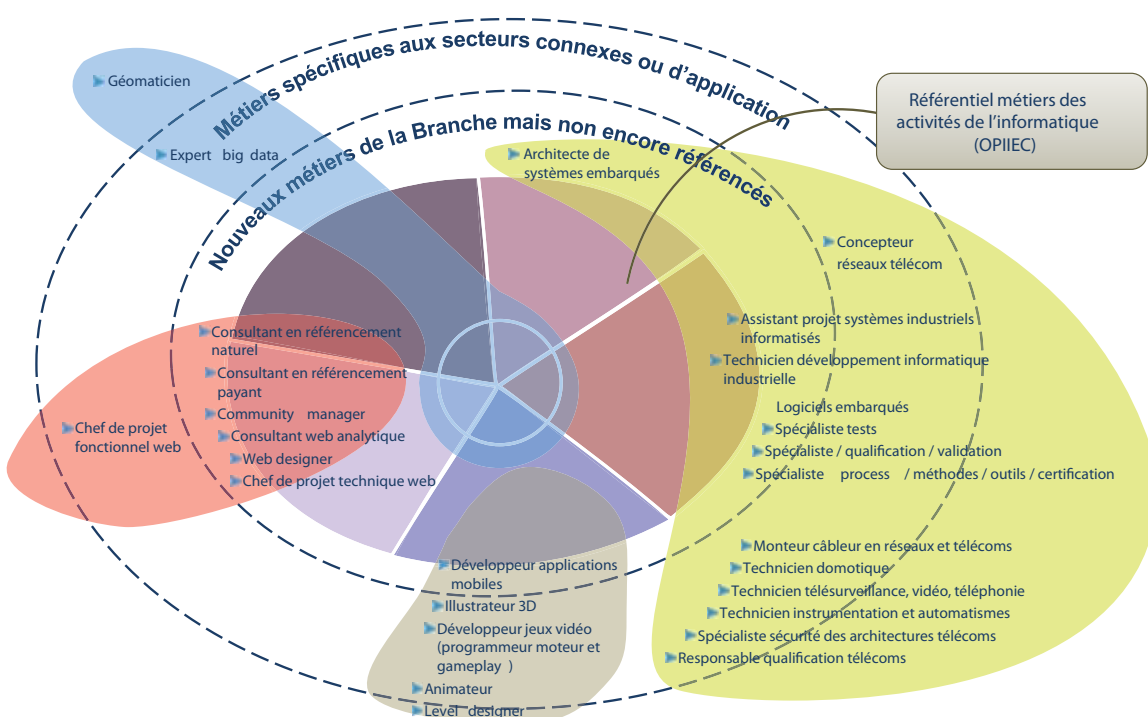
PhD Forum • April 4

The 9th edition of the Guy Deniélou Thesis Prize took place Friday April 4, 2014 under the auspices of SAFRAN Group, with support from the Picardie regional and the Greater Compiègne authorities. Jean Audouze, senior research scientist with the CNRS and Vice-President of the National French Committee for Unesco will be the guest speaker.

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Workshop on Stochastic Modelling and Risk Management • April 07-08

A seminar organized as a follow on to the May 2013 similar event, organize by the Mathematics Laboratory at the University of Reims. The objective of the two day seminar is to reinforce collaboration between the University of Reims Champagne Ardennes, the University Paris 7, the Picardie Jules Verne University (UPJV) and UTC, and to update on the theme "Modelling and risk assessment". Professor Huyên Pham, University Paris 7, will give a course on «Applications of major financial drift phenomena".

President Storck takes part in the Innovation Conference on the theme "Going from innovation to growth ecosystems" • April 11

President Storck will be member of a Round Table on "What future role for Universities and Research Centres? What challenges for the French Model? « during the conference on "Going from innovation to growth ecosystems", organized by the Pays de la Loire Region by the advisory agencies CMI and DMS Conseils and the Regional Pays de la Loire Office for Innovation. The conference will take place April 11, 2014 in the Regional Hall's Council lecture-hall.

Stun the Gallery at the Château of Compiegne • April 23

As each year, the UTC students and the École du Louvre have joined forces to offer guided visits to the Château. Numerous animations are programmed for the evening session, under the banner of Art and Science

the Monde's 'French Grandes Ecoles et Universities', special edition " the Challenge" • May 24

Saturday May 24, the newspaper Le Monde in its publication "Grandes Ecoles and Universities" will be organizing its 6th edition of the "Challenge" at the Charlety Athletics' stadium in south Paris. Students will be taking part in numerous sports activities and competitions, but at the same tile will be able to meet Manpower Resources managers present on the "Job Fair" next for to Charlety

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Save the date !
June 5: Second edition of the Digital Spring

June 5, UTC will be hosting the 2nd edition of the Digital Spring, organized by the Oise Department authorities. The national forum for digital practice aims at promoting new uses of digital techniques in day-to-day life and digital innovations where the usefulness is obvious for both private and public spheres. On the programme: encounters and lectures on the digital theme workshops for local government personnel and guided tours of the UTC Innovation Centre, etc.

INTERNATIONAL CAMPUS

A promising
core-course inauguration in Chile

It took 2 years to bring this unique, novel pedagogical project to maturity. The engineering core courses between UTC and the Lycée Jean d'Alembert, in Chile, has now been inaugurated and will induce its first class of students in 2014.

It is a « "first" in Chile. As of school-back in 2014, the students at the Lycée Jean d'Alembert in Chile will be able to follow the UTC core programme, before deciding whether or not to come to France to pursue their studies. "This is an innovative project that aims to encourage pursuit of higher education programmes in France and to publicize our universities of technology", explains Pascal Dumoulin, Headmaster off the Lycée. It is a solution that is reassuring both for the students and for their families: Chile is over 14 000 km from France and naturally it is not an easy thing to decide to leave home at the age of 18 and pursue 5 more years of studies in France, even if their baccalaureate is grated under the French education system. "The core programme leaves the possibility to mature their project by seeking admission to a prestigious university like UTV, with the added possibility that after 2 years they can return to the Chilean partner university who would accept and certify as equivalent the 2 first years at UTC. In a sense, it is their parachute. The students can choose to complete their studies at Compiegne or in Chile, if that is their preference". The core programme will also be opened for French students who wish to spend a semester studying at Viña del Mar.

Chile lacks qualified engineers

The project was initiated by the Franco-Chilean Chamber of Commerce and Industry. President Jean-Marc Besnier explains "What we wanted to do was to import of technological know-how to Chile and to help French business export to this country. Our higher education seemed relevant an opening for Chile given that globally speaking Chilean students do not travel much, or far. UTC declared a high interest in the project". We have not, as yet, agreed to awarding a double degree, but the core programme at the Lycée will set the stage for later co-operation, appropriate as seen from the Chilean economy's point of view. "Chile is a developed country but lacks qualified engineers. It is a good market opportunity which totally recognizes and admires the French HE system both in terms of the training packages offered and also for the inherent moral and ethical values", underscore Pascal Dumoulin.

UTC can be a source of inspiration

Patrick Bosdure, advisor to the Chamber in charge of co-operation and cultural activities and Director of the Institut Français du Chili, totally agrees: "Our know-how in France in engineering training is seen very positively here. The Chileans want to reduce their current 6 year engineer courses to 5 years, as is the case in France. The course packages here are somewhat monolithic and are not very open to non-technical subjects (such as foreign languages). The UTC model with its 'a la carte' course programming could serve to inspire the Chilean faculties.

By proposing an important opening towards social sciences, UTC can also be a source of direct inspiration". The partnership is registered in a wider framework of university co-operation, recalls Patrick Bosdure: "University level relationships between France and Chile ex back a long way, with a high degree of mutual trust and exchanges. There are over 350 university level agreements and 235 double degrees to date. We propose mobility grants for Master's degree and PhD applicants and a scheme to mutually certify the national diplomas is under study for drafting. UTC would be party to a more specific framework to promote mobility in engineering. The former Chilfitec and Chilfagri programmes were terminated and will be soon replaced by two new programmes to reinforce this sector. UTC is therefore participating in a prime area for development of our University level co-operation and is also engaged in Chile through a competitivity cluster in connection with the Picardie region authorities".

A partnership worth duplicating

However, despite these efforts, the influence of France locally is on the downturn; the UTC/Lycée Jean d'Alembert core programme will hopefully contribute to halt the decay, says Senator André Ferrand (representing French nationals settled abroad). "The UTC/Lycée Jean d'Alembert partnership will provide one solution to preserve and develop our visibility and repute in Chile. This is a "first" and I am most pleased with the result; UTC has carried a remarkable piece of work here, corresponding to one of the priority thrusts of the AEFE in regard to the need to keep a maximum number of 'bachelors' (i.e., with the French baccalaureate) in our HE system for further studies. If these students can receive French training, our examples, our references … they will surely keep a "proximity" with France during their professional career. The partnership must be supported, indeed must be duplicated! It is very important and I hope sincerely that the Minister in charge of HE is convinced of this".

GDZ-Suez Chile partnership

Now we must convert the try and make the core programme a success. "We shall be presenting it to companies that can support and encourage it. Many French companies located in Chile consider the partnership as interesting, since UTC is capable of providing qualified engineers who are not at all afraid to get their hands dirty together with university -enterprise relationships that are innovation-intensive –a prime need in Chile, explains Jean-Marc Besnier. The first company to join forces here is GDF Suez Chile involved in financing of study grants. "Lecturers from partner universities ensure the courses, who thereby benefit directly from the presence of UTC students: the latter are working with the company in the framework of ab APP (Pedagogical Pilot Action) on the thematic of renewable energies, with support from GDF-SUEZ Chile that we had requested", proudly says Pascal Dumoulin. "Here we have an excellent case-study of co-operation between a Lycée, a University of technology and a private sector enterprise".» ∎

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Reframing Society *in terms of the digital revolution*

Following on to the UTC's 40th birthday conference "Innovating Innovation", UT again, in partnership with the Conference of the French University Principals and Vice-chancellors organized a seminar January 31, 2014 on the theme "Digital Innovation and Creativity", UTC's Prof. Yann Moulier Boutang (economics) delivered a lecture on the question "Can digital technologies create economic and social wealth?" Here is an English version transcript.

Questions such as the nature of Progress and Machinism are very commonplace in political economy. They were analysed by John Hicks in "Ricardo and Machines", and revealed a dual issue of technical progress: jobs destroyed and jobs created are not the same – peasant farmers are not industrial workers – and a time lag between the destruction and the creation. Between 1790 and 1820, the deleterious effects of technical progress on employment were almost instantaneous, accompanied by revolutionary movements, and the rehabilitation of the country was only observed as of 1840. Here we have a time lag of 60 years! Could we draw a parallel with what we observe today?

Is Digital the new credo?

Let us compare: the advent of digital technologies is an innovative breakthrough, not a muscular substitution but one that relates to our basic left hemisphere cerebral functions, which are more complex (extending form pure logic to understanding, etc.) par computing devices. Effects are not on simple services or muscular-based task, but on knowledge-based jobs. The advent of digital technologies revolutionizes substantially the role of knowledge including scientific knowledge. Our concern now is not to be engaged in "pluri-" or "multi-" disciplinary studies but rather to adopt a "trans-disciplinary" approach. In projects where a large number of specialties are involved, how are the actors supposed to speak the same language? Social sciences have an opportunity here to recover a non-negligible role and indeed can no longer be hemmed in to the role off public relations and communication of "hard, material sciences"; they can and should be involved, like any other artists or creators, in transdisciplinarity industrial and technological projects. Since 1973 and the first oil crisis, with the associate apathetic slump of employment, growth – when there was growth – was characterized by low recruitment and creation of low value jobs. The labour market was bipolarized and the middle classes were evicted. The most striking illustration here is the case of Germany with, on one hand, its extraordinary performance in manufactured goods, in chemistry and in nanotechnologies and, on the other, a labour market hiring and employing Romanians at 3.5€/hr. As a result, we see chickens and hens being road-hauled to German slaughter-houses and their carcasses returning to France, all of which is, of course, 'excellent' for our balance of trade. This bipolarized market and the strong economic pressures on the middle classes are not exactly conducive to building a harmonious Society. When a 'fordian' salary compromise becomes systematically systematic, macro-and micro economic problems arise and are followed by people out in the streets, behind barricades. France has a lot of experience in this logical succession of events.

Specific features of a digital revolution

The digital revolution brings with it a large number of fundamental differences compared with a Ricardian model. Basic worker positions have not decreased, on a global scale. There has been no reduction of working classes in emerging countries. Digital innovation is a long-term process and will not diminish, contrary to the arrival and impact of steal engines and railroads, which took some 30 years to mature. From computers to superconductivity, and optical fibres, the impact of new digital technologies is on a much longer time scale, relayed by a parallel thrust in uses of nanotechnologies that have brought phenomenal amplification to technical progress per se. Moreover, it is probably a phenomenon that runs counter to an older theory about circulation of information and goods, which stipulated that innovation is a form of slow digestion by Society of the lightning-swift and overwhelming discoveries we owe to scientists. Today, in contradistinction, the acceleration is rapidly growing apace. The phenomena observed are concomitant with an ecological urgency. They are occurring in a framework where resources are becoming rarefied, for example the sources and now depleted sites of rare earths needed and incorporated in every tactile digital device today. This differs from the situation that happened during the industrial revolution who simply did not care a damn about destroying the countryside inasmuch as there was endless coal, iron ore and other resources to be collected and used. The ongoing revolution is taking place in a context where industrialization and circulation of services and goods are having to face constraints that are not only organizational or economic, but also must comply with very stringent ecological demands. Our era must now deal with these specific problems that hitherto did not exist in and after the industrial revolution.

Engineers caught between marketing and finance

Moreover, the relationship between the production sector and Society has been reversed. The previous model complied with a simple form of logic, starting with the notion of the advancement of science, followed by dissemination in Society which is the outlet, a not a fundamental design of the products. Society discovered railroads once the underlying technical innovation was well established. Today we are witnessing 'downstream revenge' – it is now impossible to design products without first considering 'downstream' in a renewed, reshuffled, marketplace. The digital era is heralding the arrival of consumer-actors who are paying increased attention to non-market factors, such as trust, co-operation, and customer "care". Those who now order products from engineers are the persons in charge of Sales divisions, which previously were in low esteem compared with R&D and Methods services. Financial staff have also put the engineers in a corner, so to speak, in terms of returns on investments (ROI). The digital revolution, as distinct from the industrial revolution, contains in its DNA the hurdles for classic business models. To gather data related to direct marketing we must now have contributive platforms for design and utilizations, and access to these must be free. This alone raises new problems: the digital revolution is sapping the merchant goods model that had been comforted through the industrial revolution. It is generating a dual crisis, not only in terms of intellectual property rights (IP) but also about the interface between public and private sectors.

A cognitive, intellectual proletarian class

The fraction of manufactured goods value in the added value and national GDPs is falling sharply. Numerous European industrial sectors are under the threat extinction. The tertiary service sectors are now rationalized, as manufacturing industries were before and, indeed, we now can observe a 4th or quaternary sector. We must now include corporate subdivision break-downs and globalized work forces. Jobs in our local territories must be preserved, but the innovation eco-systems only deal with a small part inasmuch as production tends to go to locations and countries where labour costs are lowest. The digital revolution necessarily induces a reinforced mental taylorism, additional stress as to job security and the arrival of a new, cognitive, intellectual proletarian class.

Reframing questions about growth and employment

The digital revolution also has its positive side: it is leading to democratic dissemination of education and to activities in 'open' knowledge, 'open' data, 'open' innovation which more than ever before have multiplied our access to knowledge. It encourages inventiveness and creativity through collaborative platforms, search engines, social networking. It has generated new and growing market models where huge corporations have emerged such as Google® or Facebook® in the tertiary sector. These groups are now able to branch out into others domains, such as transportation or health. Public policies are profiting too, to the extent that they can be better fine-tuned. Following directives from the EC in Brussels, public services are now invited to provide open, real-time data and also to make the data accessible to third parties. For example, changes can radically transform certain traditional actors. The French national rail operator SNCF have concluded that by making all their train time tables easy to access, a company lie Google can become the prime gateway to ticket sales, thereby depriving the SNCF of its partnerships with car-hire companies, hotels, etc., and consequently leading to loss of revenues. Questions like these must be addressed. We must manage the digital transformation of our economies in a manner compatible with societal objectives and hence reframe the questions of growth and employment. It is outside factory structures and salaried jobs, taken in their precise connotation that societal and economic answers are to be found. This, in fact presupposes an institutional revolution related to our redistribution system such that we can build new models to partly substitute for the concept of the salaried job position, today in total disarray. ■

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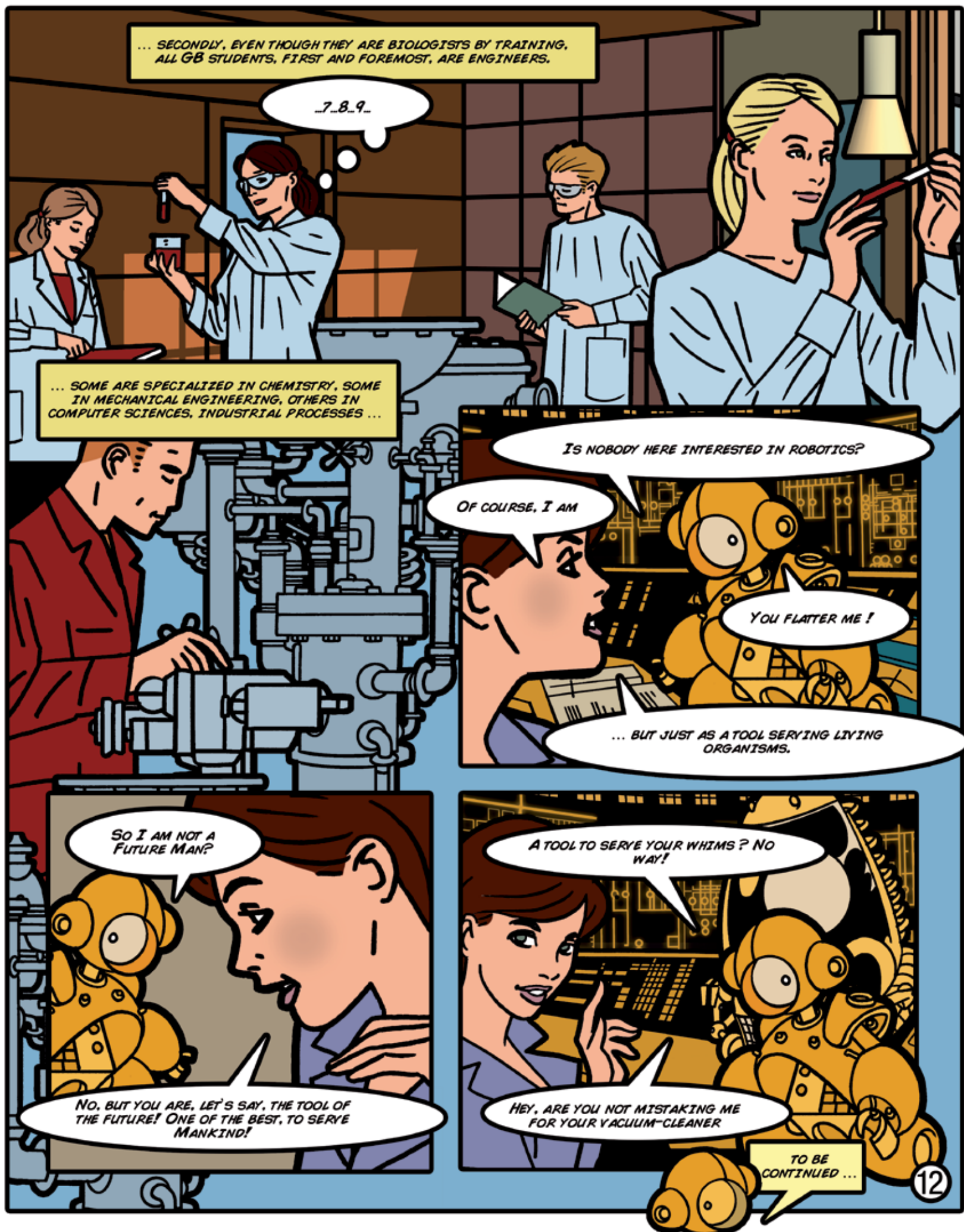
Open-minded and ambitious

Hailing from Calais, Timothée Tronet was admitted to UTC in 2003. It was when he was doing his university exchange programme with the University of Pennsylvania that he discovered burritos, a typical Mexican dish. Since that period, he has set up the brand Fresh Burritos that proposes Mexican flavours and tastes for lunch and dinner venues.

After his stay in the USA, Timothée headed for the Argentine for his last semester of course work and his final project. With his UTC diploma in the major specialty in Mechanical Engineering where he was recruited by Kraft Foods, in their marketing, financial and corporate planning departments. "I always wanted to be an entrepreneur and I met a lot of business managers in the Argentine. I decided to come back to France and set up Fresh Burritos. The idea grew and took form after his experience in the USA and the Argentine, where there are many 'Mexican' style fast-food outlets – but in France, opportunities were wide open. "Yet, when you think about it, Mexican food comes second in the ethnic food purchases in food-malls, after Japanese products and fast-food outlets have been growing fast over the past decade", adds Timothée, 28 years old.

The first restaurant in Lille (North France)

At the time, Timothée was a bachelor and had no children. The ingredients were assembled for a business launch: he returned to France in 2010 and opened his first restaurant a year later in the city of Lille. This was his pilot scheme, enabling tests for numerous modifications. In terms of house decoration, products, etc., Timothée Tronet did not hesitate to make the changes he felt necessary till he was satisfied. Early 2013, he opened his second restaurant in Lille and started looking at the concept of a franchise development. "My first two franchises are now in operation in Valenciennes and Limoges. My objective is to sign 5 to 7 more franchise agreements in 2014. In parallel, I would also like to set up my own restaurants, one each year" details Timothée, perfectly aware that two hurdles lie ahead: to buy or rent the right locations and to collect sufficient financial support.

Mature and crafty

Timothée is of the opinion that if his basic course in Mechanical Engineering is not directly of use in the restaurant business line, UTC did bring him maturity and self-dependence and a sharp sense of craftiness – if only in the freedom at university he had to choose and build his UTC curricula. "UTC allowed me to travel abroad, without which I would never have had the idea of training in Mexican food. The entrepreneurial management courses I followed at Penn opened my ambitions to do just that. The UTC engineering diploma confers credibility when I'm talking with the bank managers with my project file on their desk before them. Add to this that most of my friends are also UTC graduates".

"Move it - forward!"

Timothée Tronet now employs 13 staff and has two franchised shops with 10 staff. His turnover for 2013 was 1 M€ and his objective is to double or even triple this in the current fiscal year. "You need to be able to choose your collaborators. I thought I was able to do the 'deco' myself but to be honest, the results didn't come up to expectations! So, I called in a decorator to do the job the way I wanted. You have to recognize your weak spots: I'm a good business negotiator and staff manager but communications and PR are not my cup of tea". Another piece of advice for graduates who want to create their own business: you must talk openly about your project and not be afraid that someone will steal your ideas. "Discussing matters openly helps test project viability, the way it will be perceived, its relevance in the market-place. Then you must "move it - forward"! You might be tempted to raise and answer a thousand questions, but the right thing to do is to progress from the idea to the real enterprise." This is exactly what the boss of Fresh Burritos did: his ambition is to open 50 restaurants by 2018! ■

BIO EXPRESS

2003: Admission to UTC

2005: Exchange programme with the University of Pennsylvania, USA;

2007: Exchange programme with the Instituto Tecnologico de Buenos Aires, Argentine;

2008: Graduated from UTC (major specialty in Mechanical Engineering);

2008: Recruited by Kraft Foods Latin America in their 'High Potential Programme' »;

2011: Opening of pilot restaurant Fresh Burritos;

2013: Start of franchising operations and opening of three new points of sale (POS) two of which are franchised;

2014: 5 to 7 new franchise signatures envisaged.