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Interactions

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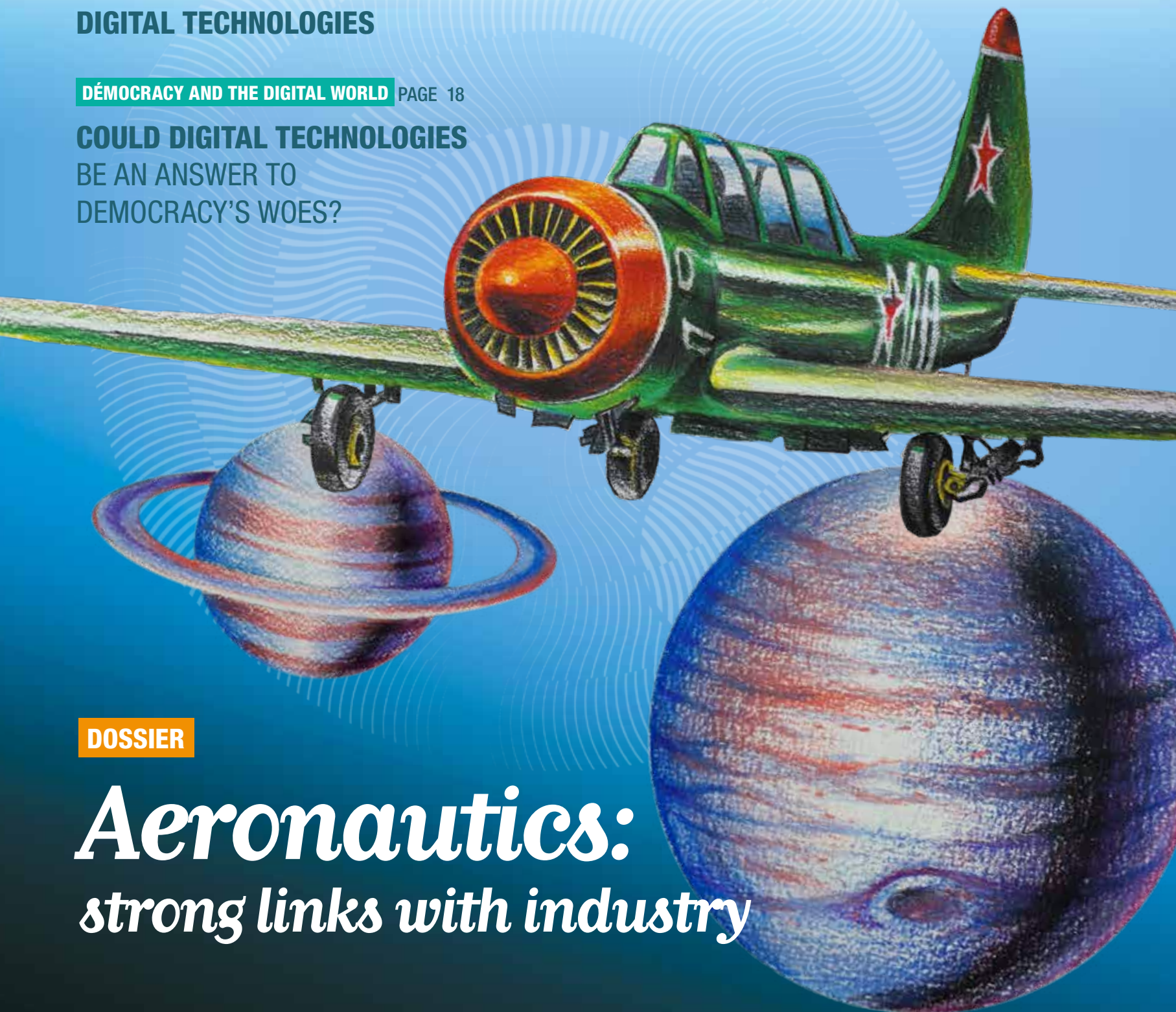
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DOSSIER

Aeronautics:
strong links with industry





**FROM THE
PRESIDENT'S DESK**

The aero-space industrial sectors in France represent 60 billion euros/ annum 86 % of which is exported, according to Business France. UTC trains engineers for these sectors, and the prime employer of our young graduates is the Safran Group. Noteworthy also are the numerous partnership research agreements signed between UTC's laboratories and the socioeconomic world, which proves intense and varied as readers will realize in perusing the Dossier chosen for this issues of Interactions.

In order to bolster UTC's notoriety in this fields and to better respond to the employers' expectations, UTC created an aeronautical label of excellence, in order to help our students build their personal training cursus to be better in line with the expectations,

Cranfield University, UK (formerly Cranfield Institute of Technology), has been a major academic partner of UTC for a long time now and indeed it was with this British university that UTC signed its very first Double Degree agreement. It represents a strong and strategic partnership and we shall be more than pleased to welcome their Vice-Chancellor, June 19, 2019 on the occasion of the 53rd International Paris Air Show (le Bourget).

Let me just mention how much our students have been involved in restoring some old planes in the framework of a "Circle of Flying Machines". Today they are very actively engaged in a project to rebuild the mythical Latécoère 28. Enjoy! ■

**Prof. Philippe Courtier,
President & VP, UTC**



The front page of this issue was designed by Marie-Léa Hupin, a student engineer at UTC.

Your current level in studies?
I'm currently in first year of the core programme and I would like

to register for the Industrial Design Engineering (UTC-IDI) elective specialty. I have always been interested in art, science and industrial design work seems an ideal activity that brings these two worlds together.

Tell us why you like drawing aircraft?

Well, there is the technical challenge to represent fuselage curves or aircraft wing profiles. Moreover, I have already successfully passed my first level aeronautical license and aeronautics is a field where I see myself securing a professional job.

And your next project?

With the help of the association «Tous Unis pour la Cité» [Let's pull together for the City] we have a project to create a colored mural on the Philantrophe university café terrace.

www.instagram.com/alinate.art

The plane represented on the front page is a Yakovlev a training and acrobatic model, better known as the « Yak 52 », from Soviet Russian days, and now belongs to the Cercle des Machines Volantes [Circle of Flying Machines]

PRIX DE THÈSE

When PhDs top the bill

Friday April 5, 2019, seven UTC PhDs presented their thesis work to a special Guy Deniérou Jury, sponsored this year by the steel making group Arcelor Mittal.

As each year, UTC's research scientists topped the bill on the first Friday of April. This 14th edition of the Thesis Prize, combined as it is with the PhD Forum, provided a platform where students could inform themselves about the possibilities to pursue doctoral degree studies, and for the PhDs and PhD students, an opportunity to present their thesis work in public.

The morning session was given over to a special steel lecture by the sponsor Arcelor Mittal after which the seven finalists had ten minutes each to

present their research work to the Thesis Prize Jury. As ever, the subjects were varied: biomechanics, virtual environments, mechanical engineering sciences, humanities ... and the finalists did their very best to defend their thesis, for example Claire Danet: "I decided to take part, to communicate about my subject matter and about a qualitative research protocol which currently is not well known, nor extensively used. Indeed, I did not at all expect to be awarded the sponsor's prize at this 14th edition. As I see it, this denoted a marvellous vista and impartiality displayed by the members of the Jury". ■ MB

TEA RUKAVINA, CLAIRE DANET & DORIANE VESPERINI



The 2019 Thesis Prize laureates

THE ARCELOR-MITTAL PRIZE

Claire Danet, UTC-Costech.

A creation in writing techniques – the case for sign languages
Long term objective: in pursuit of a way to write sign languages

THE ARC PRIZE

Doriane Vesperini, UTC-BMBI.

A biomechanical study of microfluid cell flows: application for selection and production of bloodstream platelets

Objective: to develop a cell sorting protocol for the cells the precede blood platelets and to understand the mechanisms whereby these platelets stretch, for the purpose of improving platelet production in the future.

THE UTC FOUNDATION PRIZE

Tea Rukavina, UTC-Roberval.

A multi-scale model for fibre-reinforced concrete with parameter identification

Objective: to study fibre-reinforced material damage (e.g., fibre concrete mixes) and to develop models enabling prediction of cracks.



THE POSTER PRIZE

Franck Li, UTC-Heudiasyc.

Fail-safe estimation by vehicles when selecting (and keeping to) their traffic lanes with data aggregation

MY THESIS IN 180 SECONDS FLAT

Lilandra Boulais and Augustin Lerebours also presented their thesis work, but with just 3 minutes to do so. They were among the finalists at the Sorbonne University Group's competition "My Thesis in 180 seconds". This was a real challenge, as Augustin confirmed: "Putting together a speech and delivering it in such a short time, given the importance of each



word we choose, the order of the presentation of the sentences, even how we look and how we move and manage body language. It seems easy at first sight, but the real, live exercise is totally different!" They were not selected for the national final but did not at all regret their participation. As Lilandra underlines "the competition was a tremendous experience for us; I, for instance, learned how to make my thesis subject understandable more widely and also how to address the public, doing my best to capture and keep their attention and to deliver a maximum amount of information in a very short time-frame".

Doing things to better understand them, understanding to take action

Charles Lenay is titular Professor of Philosophy and Cognition Sciences at UTC, posted to the UTC-Costech Lab (Knowledge and technology-intensive systems and organization). This year, June 5-12, he co-organized the 'Journées de Cerisy¹' conference on the theme "Social sciences and humanities in technological research". In January 2017, Prof. Lenay received the insignia of Chevalier of the French Order des Palmes académiques.

It was when he was engaged – “with no specific problems” – in molecular biology studies (virology control mechanisms), that Charles Lenay read a book by an Ecole Polytechnique graduate, lecturer and philosopher, Prof. Jean-Pierre Dupuy entitled *Ordres et désordres. Enquête sur un nouveau paradigme [Order and disorder ; investigating a new paradigm]* Ed. Seuil, 1990 and which made him change heading and set out for new horizons.

“My background training was mixed, so to say”, notes Charles Lenay, who prepared and presented in 1989 a thesis in history and scientific epistemology on the explanatory role played by chance in 19th Century biological theories²; Spurred with his PhD, Charles added two degrees, one in philosophy and the second in logic.

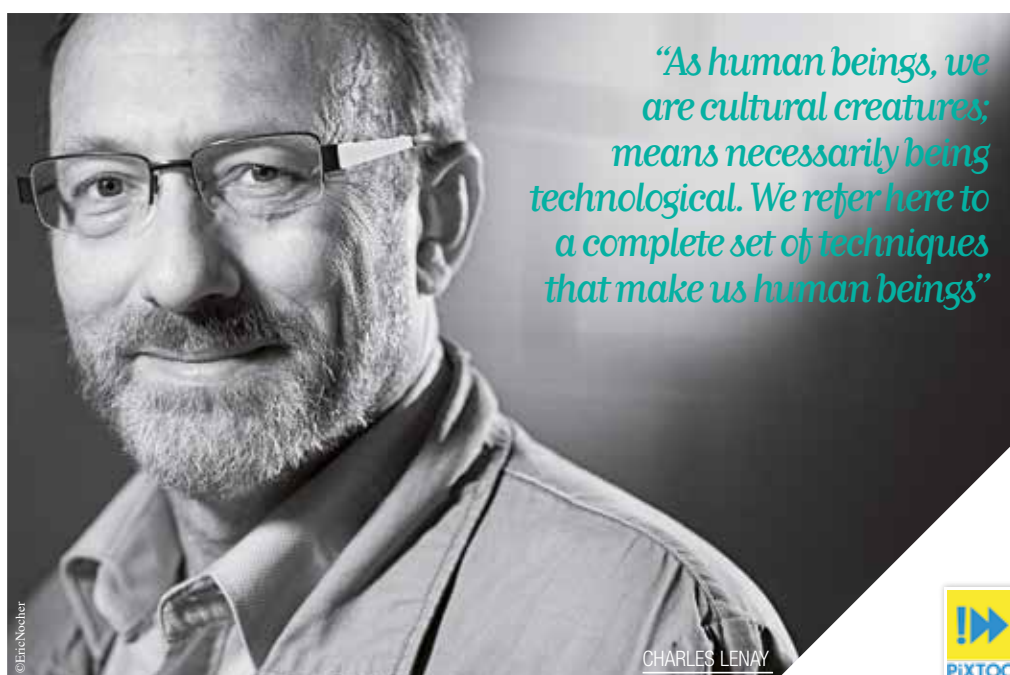
“What is the act of knowing? What does it mean to ignore and/or to know when and what you ignore?” these are among the questions that guided Charles to move towards then field of cognition sciences. Those that underpin our thinking processes.”

« What always fascinated me (and continues to fascinate me*), are technology-related facts? Asking myself questions such as: what is technology doing with/to us? How does a technological environment forge us into human beings?” explains Charles Lenay.

When he was recruited by UTC in 1990, these questions and others were going to concretely serve this objective, leading on to the idea of “Developing social sciences and humanities, in their full gamut of possible themes – running from philosophy to the economy, from cognition sciences to ICTs ..., including more sociological, anthropological, management, connotations ... - within a technology-intensive environment” he stresses. Remember Johann Beckmann, was it not he who in his book entitled *Entwurf der allgemeinen Technologie*³ subtitled *Projet de Technologie Générale*, 1806, was the first to coin the dual concept of science and technology? Is this not similar to geology and biology belonging respectively to earth sciences and to biological sciences?

“What is the act of knowing? What does it mean to ignore and/or to know when and what you ignore?”

Hence the challenge accepted by UTC, even in its infant days, to set up a training curriculum with 30% of the engineering courses devoted to social sciences and humanities. This is a distinctive feature which, in the field of emerging cognition sciences



became known as “the Compiègne school”. It is a specific feature which forces us to “seriously question the bases of technology. We must no longer try to understand it as an applied science, but rather see technology as an object in its own rights, suitable for basic scientific research. In short, understanding how technologies are transforming the way we live and act in today’s world”, adds Charles Lenay.

“As human beings, we are cultural creatures; means necessarily being technological. We refer here to a complete set of techniques, such as language skills, writing, plus other techniques that help us think, interact, perceive and interact in society ... that make us human beings”, he insists. The first hominids possessed and used tools daily, didn’t they? “One of the remarkable ideas offered by Prof. André Leroi-Gourhan, a renowned ethnologist and historian, is that from the very earliest times, Mankind and techniques have always progressed together”. So, what are the consequences on today’s human beings of ongoing technology-related transformations, in particular those that accompany the digital revolution? “At this point in time, we simply do not know”, admits Prof Lenay. Hence his unfailing commitment to work at the UTC-Costech Lab. “What we are trying to do in the Lab”, he insists, “is to valorize an original approach to technical questions at a university of technology or also in the way we investigate and practice social and sciences and humanities in a technology-

intensive environment, all of which led to the setting up of a science interest group (GIS) in 2011”.

This GIS –aka UTSH (Unit for Social Sciences & Technology), is a conjunction of contributions from the 3 French universities of technology – UTC, UTBM-Belfort Montbéliard and UTT-Troyes, plus UniLaSalle (Beauvais). One of the objectives assigned to the UTSH is “to make this specific approach better known and to promote it, inasmuch as it is a really novel way to engage in social sciences. Hence the organization of the Journées de Cerisy Conference”, adds Charles Lenay. Participants are invited “not to look at technology from the outside, in a sort of cliff-overhang exercise, but to get involved in technological research. We must endeavour to get to the heart of technology and innovation”.

Serge Bouchardon, Director of UTC-Costech reportedly said “We do things to understand them and we understand things to act accordingly”. Prof Charles Lenay has adopted this motto. So, to conclude, what do we discover among his concrete achievements? Development of aids for purblind persons where the key idea is to implement systems that enable these persons to “touch and feel shapes on a screen”. ■ MSD

¹ <https://cerisy-colloques.fr/recherchetechnologique2019/>

² Lenay, C. « Enquête sur le hasard dans les grandes théories biologiques de la deuxième moitié du XIXe siècle ». Doctorat de Philosophie et Histoire des sciences, Université de Paris I : Panthéon-Sorbonne, 1989.

³ <http://www.pur-editions.fr/detail.php?idOuv=4464>



THE ENGINEERING SCIENCE OLYMPICS

For the past ten years, UTC has played host to the final round of the Engineering Science Olympics. Thursday April 25, 2019 saw some 200 participants (from Lycées in the Amiens Education area), gathered at UTC, trying to earn a place in the national finals, May 28. Three lycée teams were selected for the final at the EDF Lab premises at Saclay. These laureate are from:

- Lycée Pierre Méchain, Laon (02) for their « smart-bin » project;
- Lycée Jules Verne, Château-Thierry (02) for an automated greenhouse aka "Seed life driver"
- Lycée Paul Langevin, Beauvais (60) for a software musical initiation package. ■

ADNAN IBRAHIMBEGOVIC ELECTED MEMBER OF THE ACADEMY OF SCIENCE AND THE ARTS, BOSNIA-HERZEGOVINE

Prof Adnan Ibrahimbegovic, titular holder of the Chair of Digital Mechanical Engineering at UTC and a Senior Fellow of the prestigious IUF (Institut Universitaire de France); was elected Member of the Academy of Science and the Arts, Bosnia-Herzegovina, March 7, 2019. As a member of the "Engineering sciences" Section, he will take part in the organization of events sponsored by this Academy, notably ECCOMAS MSF 2019 co-organized with the Faculties of Civil and Mechanical Engineering of the University of Sarajevo, Sept. 18-20, 2019. ■



EXHIBITION – FACTORY VIEW FROM THE SKY

End March 2019, UTC welcomed the editorial staff of the magazine Usine Nouvelle to inaugurate its exhibition of aerial photos that decorated the walls of the UTC Pierre Guillaumat Building. It provides an opportunity for their Chief Editor, Ms Christine Kerdellant, to discover part of the research work ongoing in the UTC-Heudiasyc Lab and to enjoy her first ride in a driverless vehicle! ■



INNOVATION

Territorialised thematic aggregates

In his capacity as Deputy Director of UTC, Prof. Olivier Gapenne is behind a large-scale project known as "Territorialized Thematic Aggregates. There are seven such (ATTs) in the Oise Metropolitan Pole (PMO). Our Interactions journalists interviewed him.

Can you explain for our readers what the expression "Territorialized Thematic Aggregates" (ATT) covers ?

We often use the example of the Silicon Valley in California, created a little more than 60 years ago. What this means is that all projects must be "long-term". As we see it, we wish to move away from the concept Science for Society – whereby scientific actors become increasingly aware of societal and economic problem areas in situ – to that of Science with Society, which implies getting concretely involved in complex collective collaboration. Hence this idea of the ATTs – which was included in the UTC strategic plan in 2017 when Prof Philippe COURTIER was appointed Director of UTC.

The underlying dynamics has territorial innovation at its centre, the area here being the PMO which includes the urban areas of Beauvais, Compiègne and Creil, various business enterprises and research establishments – those, for example, at UTC or at the Institut UniLaSalle, par exemple. Obviously, the ATTs are not at all 'closed shops' for the territory in question. The key point is that it generates and fosters innovation in the territory albeit occasionally relying on external resources for the local actors, their competitiveness, local wealth creation, employment and territorial attractiveness.

What are the main stakes and issues related to development of aggregates for the PMO?

Let me give just two examples to illustrate. The objective is to stimulate innovation and to



OLIVIER GAPENNE

accompany industrial mutations in this territory. ATTs cannot exist without a positive entrepreneurial context (primary beneficiaries) nor in absence of political will displayed by the territorial authorities. The main objectives of UTC are to train engineers, and to engage in the development of research and development. It is via innovation that this mission can be offered to help to improve the level of competitiveness of all regional actors, which is a costly, complex process and necessarily collective in essence. Hence the decision made by UTC to carry out an aggregate type experiment in our territory, for the benefit of the enterprises and with the enterprises and likewise with the local authorities and various research and innovation sites (R&I)

What are the seven aggregates today?

The « seven » refers to seven priority themes: 'naturalness', resilience, future industry (4.0), health, aeronautics, energy and bio-sourced products and water. Each aggregate is developed in a specific and singular manner depending on which actors are involved, on the history of the theme, its technological maturity, the density of industrial actors in the field, on societal urgency, etc. The work produced within each aggregate represents a precious form of 'raw material' and is used to beef up tenders to call for projects, which is a direct gain! Our objective is to see each aggregate, with a concrete project ready by end 2019 for deployment in order to prime the "project pumps" of the various aggregates and to densify the networks of actors involved ■ MSD

"The underlying dynamics has territorial innovation at its centre, the area here being the PMO which includes the urban areas of Beauvais, Compiègne and Creil, various business enterprises and research establishments"

GET YOUR DIARIES OUT!

Naturalness, resilience, future industry (4.0), health, aeronautics, energy and bio-sourced products and water

Come and exchange views with the project managers at

RENDEZ-VOUS AGRÉGATS

TUESDAY, OCTOBER 1, 2019

2:00 - 5:30 pm at the Pierre Guillaumat 2 building, UTC

Seating limited; admission by preregistration only.
Check Rendez-vous agregats at www.utc.fr





Aeronautics : *strong links with industry*

When the UTC-Roberval Lab was created, back in 2000, by the merger of the LG2mS (Mechanical engineering and for Materials and Structures) and some other research units, it was placed under a joint hierarchy: UTC and the CNRS. So, what are key features of the Roberval research Lab? Firstly, we can cite the noteworthy, excellent reputation of the research scientists' teams and the strong links they have built with a variety of industrial sectors.



Following another, recent merger, with UTC-LEC, the 5 research teams specialized to cover the domains: computational mechanical engineering, acoustics and vibrations, materials and surfaces, mechatronics, energy sources and uses, electricity, system integration and, last but not least, industrial systems: products/processes. Let us look at the team for Computational Mechanics, to illustrate their scope and scale of their activities.

Prof Jérôme Favregeon – who has directed the UTC-Roberval Laboratory since 2015 – explains, “What we do is to develop robust test phase computational techniques we use to elaborate methodology with some original, specific digital models for the purpose of optimizing complex multi-physics problems. Our Acoustics and Vibrations team is investigating all sorts of unwanted noise and/or vibrations found building structures and in vehicles

that first need to be identified, then characterized and finally treated using digital models and experimental setups to optimize vibro-acoustic behaviours”. In regard to the Materials and Surfaces team, « they essentially examine three families of materials: composites which prove to be of great interest to the aeronautical sector, metallic alloys and nano-charged polymers which in short is equivalent to integrating nano-materials into polymers. The aim here – whatever the materials involved – is to better understand their structures at various scales and to determine how they will behave through time. In fine, we predict expected operation life span for them”, he details. Next we have the Mechatronics team, in full Mechatronics, energy, electricity and integration with two main lines of activity: “on one hand, miniaturized, small mechatronics systems with low power ratings, and on the other machines that require powerful electric

supply – such as we find in all-electric vehicle power propulsion motors and the Industrial Systems team who do research into product/process thematics as found in manufacturing lines and associated design work and develop “tools and methodologies used for integrated robust design work on products and processes to ensure manufacturing line-design-industrialization assembly digital continuity, as well as multidisciplinary collaboration all of which research works is in line with the concept of Industrie 4.0”, adds Prof Favregeon.

As far as the links between UTC-Roberval and industry are concerned, they go back a long way in time, plus being numerous and varied. To begin we can cite the CIFRE industrial theses defended at UTC-Roberval, i.e., which are financed by an industrial host partner. These PhDs are supervised by several of the Robert research scientists and can be found in a number of fields, first among



PROF. JEROME FAVERGEON WAS APPOINTED DIRECTOR OF UTC-ROBERVAL LAB. IN 2015.

He successfully completed the merger with UTC-LEC in 2018. UTC-Roberval now has a staff of 170, i.e., making it the largest research unit, out of eight, at UTC. The new structure has 5 research teams (see above).

which is transpiration, with a number of sub-themes – automobiles, aeronautics, railroad, naval... followed by energy topics (which of course is a contributor to transportation) for example for propulsion units in all-electric vehicles and finally we have health-care sector technologies, in a collaboration with another UTC Lab – BMBI (Bio-mechanics and Bio-engineering).

Some of our industrial partnerships are more formal, notably in the framework of the 15, or so, Government vetted Institutes of Technological Research (IRTs) that exist today in France. As Prof Favergeon underscore, “UTC is a partner to Railenium, a rail-road IRT (notably working for the French SNCF national railway company). Other partnerships are signed outside pre-established structures. For example, there is a project underway with the Paris region “metro” consortium, RATP,

to investigate rail wear phenomena and other projects are being discussed with SAFRAN for the inclusion of composites in aeronautics. And a final from of partnership – and maybe we can see this as reflecting the high-profile image UTC enjoys from the industrialists’ point of view – the setting up of joint laboratory structures with objectives to carry out “academic research whilst serving the needs for innovation of the industrialists”, he explains. “A case in point here is the creation of a joint lab set up with Deltacad, in a close liaison with the Roberval Industrial Systems research scientists. This lab is devoted to “the whole area of digital mock-ups and general digitization of industrial enterprises. There will be a similar case for a joint lab we plan to launch with ArcelorMittal in Autumn 2019”, concludes Prof Jérôme Favergeon. ■ MSD

Aeronautics : a ‘certified’ passion

A great many students choose to do engineering studies in order to work in the field of aeronautics, which is a passion for them. And it is an area with plenty of professional recruitment opportunities! UTC’s aeronautical certification allows its graduates to valorize their skills on this attractive and promising market-place.



“I have always had a passion for aeronautics and aerospace activities”, explains Coraline Arzelier, a UTC student engineer majoring in Mechanical Engineering. “And, since I completed my CCs in mechanical engineering, I am now fully convinced that this is the field in which I want to work later”.

It was the very attractiveness of the field, with its ever increasing industrial demands that prompted UTC to instate an “aeronautics certification”. “French aeronautics industries rank second in the world”, states Patrice Simard, a lecturer-cum-research scientists in the UTC-Roberval Laboratory and in charge of this certification process. “It is therefore important to continue to offer a competitive level of training, because the demand is enormous in terms of needs for engineering



ACCESSIBLE CERTIFICATION TO DOUBLE DEGREE SCHEMES

For UTC students registered for a double degree » this certification is also an excellent way to valorize skills acquired at Cranfield University (UK). Diane Nguyen, a UTC student majoring in Mechanical Engineering and for a double degree with Cranfield, immediately perceived the interest of this certification for a future career in the aeronautics sector.

“My personal training route at UTC, given the pluridisciplinary nature of the CCs, the sheer diversity of the projects we are assigned, the placement opportunities all enabled me to orient my professional aspirations towards aeronautics. I took part, to illustrate this, in the flightworthy reconstruction of the famous Latécoère



DIANE NGUYEN

28 – [NdT 1927 Model flown in 1930 across South Atlantic by Jean Mermoz] , with the association aeronautics CCs in a partnership with the le Cercle des Machines Volantes association. Likewise, most of my project work was on aeronautical structures, such as fuselage vibration, wing profile studies ... and I also obtained my pilots license via the association UTCiel.

My double degree with Cranfield now allows me to specialize in the calculations and design needed for various aeronautical structures, with continued training on theoretical aspects (aerodynamics, composites, aircraft systems ...) all directly applicable to any internationally scaled aircraft industrial projects.

My dream to work on and with aero planes came true recently when I was hired by Safran Aircraft Engines, as a design engineer working on the M88 jet engine that equips the French Rafale fighter.

qualifications”. The future certification will be launched in Autumn 2019; and will match the demand. “No supplementary training commitments will be requisite, but students’ choice of course modules will be oriented to as to enable future graduates to valorize their UTC diploma and skills”, adds Patrice Guillaume, also matriculated in the major Mechanical Engineering. He is sure of the outcome: “The certification will give me a better personal visibility and enable me to secure the job I want more easily”. The process will also help to attract highly motivated students like Coraline, to UTC, who adds “A lot of my university activities revolve round aeronautics; the

certification will now allow me to demonstrate to possible recruiters that I do have experience and a relevant knowledge and skills base”.

Several well-known industrial companies have accepted to oversee and accompany this ambitious project: Ariane Group, le CNES (French space agency), Safran-Zodiac, etc. As Patrice details it – “We have the support of the local aero-club and we have a good working partnership with the aviation ‘old wings’ association Cercle des machines volantes, With our involvement in the “conservation plan for former aviation”; we are contributing actively to the regional aeronautics aggregate”. ■ MB



Hydraulic drones

With 25 years' experience behind him in industry, notably with Dassault Aviation and the Renault Groupe, Éric Noppe was appointed in 2010 to the Chair of Hydraulics and Mechatronics. He is currently working on a project for a hydraulic transmission drone in a collaboration with the UTC-Heudiasyc lab, the CETIM, and ARTEMA (professional trade union). The plan is to have a demonstrator flying within a year.



Why create a Chair for Hydraulics and Mechatronics at UTC? “The basic reason was to “dust down” and spruce up some old technology, viz., hydraulics, a technology going back to the 1920s with the arrival of new technologies, notably Computer sciences and EDP”, explains Éric Noppe. The creation also matched needs expressed by mechanical engineering industrialists. The developments due to computer science and EDP are enormous, and it is the case in mechanical engineering. That indeed led to the coining of the word mechatronics. “First used in Japan in the 1980s; this term embodied the idea that mechanical systems are not just assembled mechanisms and parts but they also integrate a control system, with automation, sensors and electronics”, recalls Éric Noppe.

Does this industrial chair have any special feature? The Chair holder was recruited for his expertise in a specific field, viz., hydraulic power transmission systems and has two assigned missions: one lies in a teaching commitment and the other in R&D. “The Chair is ‘piloted’ by an ensemble of committees and by the industrialists who finance operations whilst fully respecting the university

missions, i.e., the academic teaching and research. Our job is to teach the students, to develop their knowledge base and to explain new concepts even if the general chair orientation is provided by the industrial partners”, underlines Éric Noppe, who also cotes the Chair of Glass Windows, totally financed by the Saint-Gobain Group. In the case of the Chair of Hydraulics and Mechatronics, and because there is no major company in this field, the funding came via several actors: the Region Hauts-de-France, UIMM (professional sector trade union for metallurgy ...) and the CETIM –technical centre for mechanical engineering industries). This technical centre, created in 1965, was set up in 1971, in the nearby town of Senlis and with UTC, created in 1973, has have collaborated seriously at a constant level of interaction, ever since they both came on the scene in the early 70s. This collaboration which is both pedagogical and in partnership contract research continues as well as ever before, witness the fact that their framework agreement will be renewed in 2019.

One of the stakes and challenges today? “Well, notably to give young people the desire to train for this technology in order to meet the needs

of industrialists and professionals of power transmission systems. Hence the project to build a hydraulic drone”, he adds. As he sees it, a drone project had two lives. “The first step consisted in capturing the students’ attention by proposing an innovative design; that was a success. The second step, ongoing today, is to collaborate with UTC-Heudiasyc, the CETIM and ARTEMA the professional trade union for mechatronic industrialists, to develop a service-oriented drone employing a hydraulic power transmission system”, he says.

After envisaging a 4 propeller-driven drone in the 300-500 kg range – a sort of taxi drone for a Smart City setting – with a payload of the same order – they had to reduce their ambitions in order to comply with flight regulations for this sort of machine. The model will now be a 25 kg one and the demonstrator should be ready and flying within a year. What could be its concrete applications? Monitoring of sensitive sites, events or buildings/bridges, etc. Hence the clear and keen interest shown by numerous industrialists. ■ MSD

Three major research priorities

Zoheir Aboura, full Professor since 2007, heads the Materials and Surface research team at the UTC-Roberval Lab. The team comprises 42 tenured staff (plus PhD and post doc students).



So, what are your research priorities? We have there essentially – first, assembling and analyzing the behaviour of composite materials and polymers, second, investigating mechanical behaviour and operational resilience and sustainability and third, all issues involved in surfaces, in particular contact mechanics and tribology (science of friction). Of course, in

reality, these three areas overlap and interact. Prof Aboura explains: “The first mentioned priority is especially oriented to analysis of the relationships between processes/ properties. The second looks notably at material behaviour, whatever the origins, in connection with the micro, or mesostructures of these materials. The final priority theme looks at surfaces, in particular at problems arising



SAFRAN is an international high-tech group engaged in the designing and assembly of aircraft engines, aeronautical, space and defence equipment.

Corporate annual turnover 2018: 21 billion euros

R & D budget: 1.5 billion euros, fy 2018

Number of patent claims lodged in 2017: 850

Number of personnel: 92 000

Ranked N° 1 in the world for short and medium range civil aircraft jet engines

Ranked N° 1 in the world for helicopter mounted turbine engines

Ranked N° 1 in Europe for tactical drones

More at:

www.safran-group.com/fr/groupe



due to friction, parts rubbing together. We also examine the relationship process/properties for metallic materials as assembled using 3D additive fabrication" (3D printing), he adds.

The Material and Surface research team's partnerships go beyond purely academic work. This is borne out by the strong links with the Safran Group that started back in the 1990s. That was when the Group began considering using composites – a combination of fibre strengtheners in a polymer matrix– with 3D reinforcement, in their new engines. "This led to an ambitious research programme being launched by Safran to gain expertise in the

assembly of 3D woven reinforced composites. Once the Group had identified the various laboratories in terms of their specific skills, both nationally and internationally, the Group then set out to understand the mechanisms that can trigger material damage and to draft scenarios for possible catastrophic failures occurring. Three families of reinforcement were chosen for testing and analysis: stitching, or tufting, orthogonal weaves or interlocked woven layers", emphasizes Prof Aboura.

This turned out to be a highly rewarding collaboration, since the SAFRAN GROUP finally opted for this architecture, given its extraordinary level of damage tolerance, for the intake compressor blades and the cowlings shield of its LEAP engine. So how successful is it? It was introduced in 2016, equips all Boeing 737 Max, 50% of the Airbus 320 NEO and a Chinese passenger aircraft, the Comac C919. What are its advantages? 15% reduced fuel consumption and CO2 emissions, close to 50% decrease in NOx emissions and a significant drop in engine noise. It gradually replaces the CFM56, the most sold jet engine in the world, developed by Safran Aircraft Engines and General Electric. ■ MSD

Key-word : Weight-saving structures



Full Professor Salima Bouvier is Director of the UTC Engineering Department, which was created following a merger of two UTC course majors: Mechanical Systems Engineering (GSU) and Mechanical Engineering (GM). She has been working personally since 2015 in the Material and Surface Research team (UTC-Roberval lab) on a project Optimum, financed by the national research funding agency ANR, in a partnership with Airbus Industries and the Region Hauts-de-France.

On what sorts of materials do the UTC-Roberval Material and Surface research scientists work ? "Well, they focus mainly on three classes of materials. 1° metallic alloys, 2° polymers and 3° 3D composites. In the special field of material optimization, as needed for transportation, the key word is to identify, assemble and use weight-saving structures, to comply with

the European targets for reduced greenhouse gas emissions", explains Salima Bouvier. Where aeronautics is concerned, these environmental concerns have motivated the setting up of several materials-intensive research programmes.

What are the paths you explore to find and develop weight-saving structures? "Certain metal parts can be replaced by composites with organic matrices, and these are lighter. This proves possible when the systems are operating in a cold zone. When, however, we move to a hot environment, in regard to material properties, we need to revert to metallic alloys and even ceramics", underscores Prof Bouvier.

The drawback to these new materials is their cost. So, you must think about reducing costs as much as possible? "Indeed, the cost of procuring, preparing, assembling and installing certain alloys such as

nickel-based alloys is high to the point that certain segments can be replaced by titanium alloys, even though this entails bi-material assemblies", she details.

Evolutionary trends today in of material solutions for aeronautics marks the outset of current research into bi-material assembly processes, for example titanium and nickel by welding, or, a composite and titanium which calls for a mechanical assembly. This is a major challenge for the aeronautics sector. Witness the Optimum project with welding of titanium and nickel. It is a long term projects financed by the French national research funding agency (ANR), FRAE (the French Research Foundation for Aeronautics and Space), the Region Hauts-de-France, Airbus Industries and ACB, one of the equipment manufacturers specialists in material welding techniques for the aeronautical sector. ■ MSD



Digital continuity

Senior lecturer-cum research scientist; Dr Alexandre Durupt is the science officer in charge of the LabCom DIMEXP at the UTC-Roberval Laboratory and co-supervisor, with Dr Julien Le Duigou, for a thesis presented by Émeric Ostermeyer on the project Lucid, with some noteworthy aeronautical partners.

The team made two observations. Remind us, please, what was the first? “We realized”, explains Émeric Ostermeyer, “that fabrication processes generate enormous amounts of data. We decided, consequently that we should examine the question of how best to reuse, accumulate and build onto the knowledge encoded in the data”. And your second observation? “The programmers, in this instance those who create parts machining programmes spend a lot of time doing basic routine activities and thus less time on the higher added value work”, he adds.

What is the guide-line idea behind the project? « It consists of analyzing all the data collected during the fabrication phases using data mining techniques, and what we call machine learning” processes so as to automate - wherever possible - the routine work in fabrication and to spend more time on the more complex issues”, he insists .

Who are the partners to this LUCID FUI 21 Project, launched in 2016? There are 4 partners: Safran Group, Hexagon Group NCSimul (software editor), Ventana Taverny, who work mainly for aeronautical and aerospace and UF1, a more ‘general scope’ company. These aeronautical partners have expressed a very strong demand for “traceability in respect to the parts that structure an aircraft engine today, for example, the compressor fan assemblies or turbine blades. It is of utmost importance that we know which machine, which programme was used to fabricate every single engine part, with total compliancy in the digital continuity, as we say”, recalls Alexandre Durupt. “We use the expression “digital continuity” when we make an information transfer from software A to software B in an automated manner – the human operator only being there to ensure and certify correct transfer” details Émeric Ostermeyer.



Let us take the case of the Safran Group. “They have some 500 machine tools in operation. The vert organization of the machining programmes becomes very complex. A great many software packages are involved. Firstly, we have the fabrication packages which are computer-aided (CA) which prepare and edit the parts fabrication programme; then we have the software that transfers and converts the programme into executable machine language and lastly we have the programme test simulator which is run before fabrication is actually launched”, concludes Alexandre Durupt. ■ MSD

From a “more electric” aircraft to an all-electric aircraft

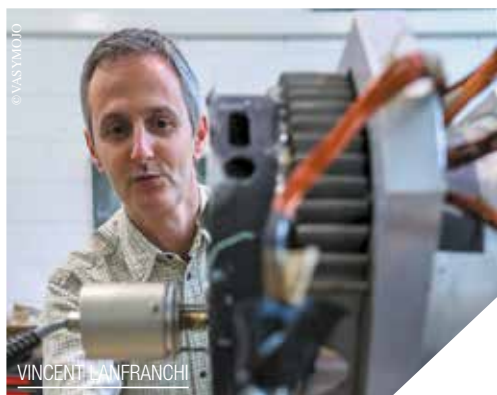
Full Professor Vincent Lanfranchi – who has already received several « ‘Best Paper’ awards – is a senior lecturer-cum-research scientist at UTC. He heads, M2EI (Mechatronics, Energy, Electricity and Integration) one of the 5 research teams at the UTC-Roberval Laboratory and is currently examining, notably, the feasibility for an all-electric aircraft.

“The Roberval M2EI research team, with 35 staff, comprising both tenured scientists and PhD students, is focussed currently on “everything to do with energy, electric and mechanical physics. In short, issues with energy conversion processes, as embodied in actuators, generators or sensors but

also questions of energy storage”, explains Prof Lanfranchi. This sort of activity is to be found in macrosystems, such as locomotives, aircraft ... but also in microsystems, where, indeed we can be faced with micrometre scaled movements. Another strong feature of the M2EI team is its pluridisciplinarity, notably with it possessing additional proven skills in magnetic and thermal engineering, e.g., Alstom in railroad engineering, Safran Group in aeronautics and the Renault Group in car-manufacturing. Renault is one of the historic partners in particular in regard to projects for all-electric cars with some ongoing “joint theses” but also collaboration in the past. “I myself was one of the co-inventors with a patent claim registered for the Zoë electric propulsions unit” recalls Prof Lanfranchi, who now, with his scientist colleagues at M2EI is turning his focus to electric aircraft. In the beginning, we talked a lot about “more electric” aircraft, “where the actuators that move and position the flight surfaces were fully mechanical devices. As aircraft bodies grew in size, the mechanical control systems becalmed

increasing difficulty to maneuver for the pilots. At first we naturally turned to hydraulically assisted activators. But when electric technologies had become mature, the aircraft assembly companies saw a way here to benefit from increased safety factors by backing up the hydraulics with electric actuators”, he underscores.

Today these aircraft companies are faced with a new challenge- designing and assembling tomorrow’s airliners. The first question that comes to mind is – should we continue with the same geometry as today’s classic wing-borne aircraft or could we shift to drone designs, for example. Prof Vincent Lanfranchi sees this later solution as valid in the mid-term prospects but other solutions are already on the drawing boards, because “we can divide the power needed to fly the machines, through an appropriate choice of the number of electric motors and propellers, battery-connected”, he explains, adding enthusiastically “with an all-electric aircraft on the near horizon, we are in the same phase of exploration as the Wright brothers”. ■ MSD





Mufflers for helicopters



Full Professor Emmanuel Perrey-Debain since 2015, heads the Acoustics and Vibration research team at the UTC-Roberval Laboratory. He also co-supervises, with Prof Emmanuel Lefrançois, a CIFRE industrial thesis financed by Airbus Helicopters on the noise generated in air conditioning systems.

The team on Acoustics and Vibrations, with 17 staff members comprising both tenured scientists, postdocs and PhD students is the smallest of UTC-Roberval's five research teams. "We train and graduate some 20 engineers each year. We have our own specialty slot. Besides UTC and its Roberval Lab, there are currently two other acoustics and vibration schools in France: one in Le Mans, the other in Lyons", explains Prof Perrey-Debain. More will doubtless follow since "the offer today falls clearly short of demand expressed by the industrialists", he adds. All the more so that collaborating with industrial sectors is an integral part of UTC's DNA, and particularly so at the UTC-Roberval Lab, who show the largest annual business turnover of all the units at UTC, via UTEAM Compiègne – the in-house contract research company and ESCOM (Organic and



Mineral Chemistry). One specific feature that Emmanuel Perrey-Debain enjoys hollering about, "loud and strong". "We work with real matter and o problems that face the industrialists and our remit is try to find solutions to their problems whilst continuing to enrich the associate academic knowledge base", he emphasizes. A case in point is the HEXENOR project that began in 2012, under the European Clean Sky Programme aimed at making aircraft cleaner and less noisy. What is the objective shared by UTC and its partners? It consists of designing and assembling a muffler/ silencer unit specially aimed

at helicopters, in order to reduce the noise level generated by the engine. Also worth mentioning, the themes of several PhD theses that have recently been presented (or which are ongoing). One, now completed, is about "aero-vibro-acoustics", viz., how to predict and prevent (minimize) noise and vibrations due to turbulent fluid flows. The results here are applicable to other areas, among which buildings, automobiles, aeronautics ...

Another ongoing thesis, financed by Airbus Helicopters relates to the air-conditioning units that produce high frequency noise that is highly disturbing for the flight crew. "Wouldn't the Grail here, for helicopter and also for airline pilots, surely be to be able to work in the cockpit without having to wear earphones?" surmises Prof Emmanuel Perrey-Debain, to conclude. ■ **MSD**

Five rockets for UTC

Fluid mechanics, trajectometry... the members of the UTC students' association, UTspaCe plan to maximize the benefits of their engineering training to serve a somewhat madcap project – the successful launching of no less than four different rockets in July, 2019!

A cylinder by the name of Prométhée [Prometheus], almost 2 metres long, standing on its test bed near the UTC Fab'Lab, is one of the five rockets developed by this Association UTspaCe.

"While at UTC we learned a lot about mechanical engineering and UTspaCe allows us to apply these skills and knowledge to the space technologies, asserts Guillaume Buron, President of UTspaCe. "Our UTC students are totally invested this work and have spent lots of time and energy to understanding and applying some very high-tech engineering", adds Emmanuel Doré, a lecturer-cum-research scientist working at the UTC-Roberval laboratory.

The students involved have benefited from help offered

by Jérôme Blanc and Philippe Pouille, both lecturers-cum-research scientists also at the Roberval Lab. "Their help came in the form as advice based on their experience and expertise in design and assembly engineering", explains Emmanuel. "They also made some of the rocket parts and did some machining alongside the students".

Building a rocket requires some cutting edge technological skills. "The students learned about rocket design, communication, creativity, rigorous work and above all how to work on their own", declares Emmanuel Doré. "In the UTC engineering core programme we set the students to work on some mini-rocket assemblies, where they are supervised by elder, majoring students", adds Guillaume. The experiment rockets here required more skills and they were set aside and reserved for the majoring students themselves".

What is the target for the projects? C'space, an international get-together proposed by the CNES (national French space agency) with assistance from Planète Sciences and the French Army on its Tarbes military base (South West France in July, when

MINI ROCKETS

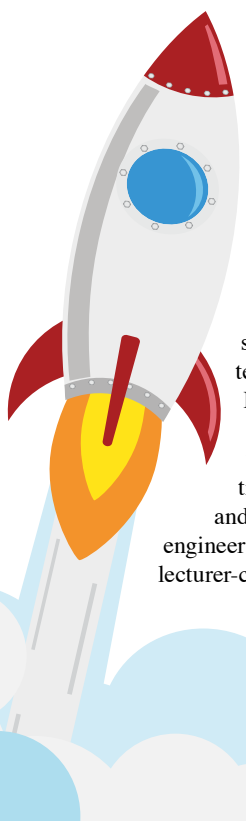
- **Poppins** : with a decent braking system using a rigid ribbed parachute
- **Flash** : nominal flight planned
- **Hermès** : will release a drone that will return and land on the launch pad

EXPERIMENTAL ROCKETS

- **Prométhée** : equipped with an inertial disk to enable release of a module at a pre-established angle with respect to the horizon.
- **Phoenix** : capable of reaching a speed of Mach 0.9 (launch planned for 2020)

UTspaCe will be able to proceed with the planned launches.

You can follow the 4 launch sequences on Facebook and Instagram! ■ **MB**





LECTURE

Co-operation enhancing research progress

March 2019, UTC organized a lecture on "Biology and the functions of living tissues" with research scientists from the Mayo Clinic present. Dr Richard Ehman, Dr Peter Amadio and Dr John Hawse travelled to Compiègne from the Mayo Clinic Campus in Rochester, Minnesota (USA) where their scientific discoveries are converted into therapeutic protocols. Interactions zoom into 14 years between, UTC, Mayo Clinic and the CNRS.

Co-operation between UTC, Mayo Clinic and the CNRS enabled Sabine Bensamoun, a CNRS research officer seconded to the UTC-BMBI (biomechanics and bio-engineering) Lab to continue her research initiated at the Mayo Clinic on muscle fibres and functional factors and thereby to enrich the CNRS and UTC in regard to the new techniques she learned there.



PETER AMADIO, SABINE BENSAMOUN,
RICHARD EHMAN ET JOHN HAWSE

Productivity in this cooperation also allowed the CNRS and UTC to develop a unique knowledge base in analyzing muscle tissues and to receive international recognition. "This know-how is now disseminated in various clinics and laboratories round the world. I am highly grateful to Drs Ehman, Amadio and Hawse who have taken on their personal time to come over here to tell us more about their research fields and I'm also very happy that UTC and the CNRS were able to attend these very high level presentations", she adds witnessing the March 11, 2019 lectures given at the UTC Innovation Centre.

Several years at Rochester (MN, US) for our Picard scientist

Sabine Bensamoun herself is a product of the Mayo Clinic Foundation (Rochester, MN, USA), a world reference in medical research. The years she spent there turned her into the scientist she is today? "I



RESEARCH WITH GUARANTEED APPLICATIONS AND MARKETS

If a muscle is "ill" because of a pathology, or shows sports-induced damage, the techniques that have been developed enable us now to monitor the situation and adapt the treatment accordingly. There are multiple possible applications and market outlets: medical domain (elastographics for face and leg muscles...), the pharmaceutical sector (links between the TIEG gene and certain muscular pathologies (using muscular feedback data to simulate walking/ambulation modes and to model muscular behaviours)).

enjoyed an exceptional training scheme and I can only underscore the high quality features. One point I recall especially was that when we were developing protocols and when the results were not satisfactory, the support, the encouragement, the presence of a team, a family at the difficult times" she concludes. "I shall always remember the constant, positive spirit, picking you up, pulling you all the way, all the time. As a high-level athlete I know what these values mean and how they are very close to the world of research". ■ **KD**

INTERNATIONAL

Launching the UTseuS Master's degree

March 8, 2019 saw the signing, by the UTseuS steering committee, of a Sino-French protocol agreement in relation to the launching of the UTseuS Master's degree.

Oriented to mechatronics, in its wider connotation "cyber physics systems", this UTseuS programme is designed to enable dual award of a Master's degree from the University of Shanghai et the Master's degree of

the group of French universities of Technologies (UT). This Master's programme recruits 100 Chinese and French students each year.

New agreement in 2019

The French party to the signing ceremony was composed of President & Prof Philippe Courtier UTC, accompanied by Étienne Arnould, Director of Pedagogy UTC, his counterpart Emmanuelle Rouhaud at UTT-Troyes. Prof Liao Hanlin, UTBM-



Belfort Montbeliard and Dr Pierre Koch, Director of UTT-Troyes participated via videoconference. The Chinese party was led by Prof Jin Donghan, Party Secretary and President of the University of Shanghai (SHU) with several Vice-Presidents (Pedagogy, International Affairs...). The agreement to be signed in respect to launching the new Master's degree programme will be signed in July 2019 and current plans call for a full-scale cooperation agreement to be signed by end 2020 between the French UTs and SHU. ■ **PS**



LEAVING SOME DAY



GATIEN NICOT, A UTC STUDENT MAJORING IN MECHANICAL ENGINEERING ON AN EXCHANGE PROGRAMME WITH CRANFIELD UNIVERSITY (UK).

Where did you go Gatien?

I went to Cranfield in the UK.

And what are you studying there?

I'm registered for the Aerospace Materials MSc. This Master's degree looks at all the materials used in the aerospace sector with lots of industrial guest speakers giving talks and lectures on the course.

Why did you choose Cranfield?

I personally want to work in aerospace activities and this university is high reputed in this field internationally. The teaching courses are concentrated in aerospace, especially in this MSc which I chose. I really appreciated the fact that the courses are specialized and I acquire some very precise skills in a liaison with aerospace industrialists.

What did you get out of the exchange?

Beyond the skills I was able to develop my professional English and that is most useful all round the world. And I was able to do my "networking" meeting future aeronautical professionals from all round the world..

Why choose the aerospace sector?

I have always been attracted by this sector and I built up my experience round this objective.

What courses are you following?

My course ranged from an introduction to material sciences and engineering, to surface analysis and science, and designing material system components. The training modules are taught from October to February. For the following three months, we do project work either alone or in groups.

Did you see any significant pedagogical differences between France and the UK?

The way our class modules are marked is very different. I only took two exams in my year. Everything else is done at home and marked 'on line'. In a sense, that gave me more time to get interested in the subjects and to waste less time in cramming.

What do you plan to do after this MSc?

Well, I'm currently looking for a job in Canada (or the USA). I would like to discover the world outside Europe and these two countries offer the most job opportunities in my sector. I think my stay and studies at Cranfield will be valorized. An initial contact in Canada told me that Cranfield would prove to be a great asset. ■

GO



TELL ME ABOUT YOUR PROJECT

How I set up a food distribution service with the social Samu

For several months now, UTC student engineers – with an association "Compiègne en transition" - distribute meals with the social Samu. Interactions zoomed into this student initiative.



would be far more beneficial for the down-and-outs of Compiègne.

They contacted the Samu social service at Compiègne to organize a soup distribution, just 4 litres to start with. But gradually the rhythm built up and the students developed their initiative. "We thought to ourselves, why not open the collection to more food merchants in Compiègne?" Super-markets, bakers' and other small shops were approached to ask them to offer their unsold items. And if at first the initiative surprised some people in this 'Imperial City' of Compiègne, the echoes coming back were increasingly positive.

Since those early days, two Saturdays per month, we see the same ritual. "Each member party to the project is assigned a task, like: go get the raw materials, do the cooking, or do the distribution" adds Julie. "We arrange for the members to have a different assignment each time". All told there are close on 40 students available each Saturday. "We would like to enroll more people", she adds. "Not only more students, but also citizens of the town of Compiègne to be able to offer more distributions, notably during the coming winter period".

Beyond this race to recuperate waste food, the association Compiègne en transition has several other projects running, in line with the "cities in transition" concept launched by the Irish-based British born lecturer and self-proclaimed activist Rob Hopkins, founder of the 'Transition Movement', in 2005.

Sharing manure, waste collection... are projects that federate students round themes such as sustainable development and lead to a better involvement of students in the City.

As Julie Kociánová sees it, managing all these activities lends meaning to what she has in mind





for a future professional occupation. “Ever since I began my studies, I wondered what path to follow for a choice of career”, she details. “I really wanted something

that would allow me to contribute positively to the environment”. And her association work, whether it be in cooking or in waste collection made her see things in perspective and more clearly. “The fact that I was constantly in contact with industrialists in the region allowed me to discover the various actions already under way in favour of

the environment. I would like to be employed in a special theme area: pollution of our RD systems.

But till that time comes, Julie will continue to cook meals for the down-and-out, every second Saturday. ■ GO



MY FIRST YEAR AT UTC

“I was formally admitted to the second semester at UTC”

In this 50th edition of Interactions, we catch up with Pierre Gibertini in the middle of his second semester at UTC. Class-work, projects, the annual ‘Public Speakers’ competition, involvement in student associations: witness his busy day-to-day schedule.

So what is on my menu today ? I have classes in maths, in industrial draughtsmanship (similar to what I did in my final SSI year at the Lycée, a technical project (I’m supposed to prepare and present a name-banner for one of the UTC associations) and a lecture on social sciences on the theme culture-intensive industries. To tell the truth, this has been the best course I’ve had since last September. The lecturer addresses interesting and topical subjects: digital evolution and practice and we have project assignments. The key advantage though is that the lecturer is great to listen to and he has the ‘gift of the gab’, so to say ... and while on the subject of eloquence, I took part in this year’s Public Speakers’ competition, co-organized by the Sorbonne Universities cluster and UTC. There are three rounds, with 80 candidates, each having to make a 10 minute speech. Unfortunately, for me, I

My mid-term results are fairly satisfactory, but do know I’ll have to work hard ...

was eliminated in the first round, but nonetheless the experience was left interesting. There are 20 hours speech training by professional actors, a philosopher and a former UTC graduate who took up journalism for a career. I learned a lot here and really made progress. I pursued the experience a bit, by taking part in the casting for the UTC TedX local association, for a possible selection for next year’s edition. We were 8 candidates and the theme was “going beyond our limits” and then Jury liked

the original way I handled the subject ... however, that again was not enough for me to gained one of the two slots offered.

My finals will take place end-June and I will admit, I’m a bit worried about this prospect... last semester I was 8 CCs behind; consequently, I do not have much room to maneuver. My mid-term results are fairly satisfactory, but do know I’ll have to work hard ...

For the time being my motivations lie in planning the coming summer holidays, just round the corner! I plan to spend a week in Spain, with a class mate from UTC and almost two weeks in Montreal with some “summer” friends. I also want to work a bit, to earn and save some money- not sure where, nor how ... Anyway, having said all this... rendezvous when class is back in September! ■ GO



MORE TO COME

OPENING A DOOR-LOCK WITH A SMARTPHONE LIGHT BEAM – THIS IS THE MADCAP PROJECT OF SIMON LAURENT AND ALEXANDRE BALLE, TWO UTC GRADUATES, WHO LAUNCHED THE START-UP.

Their entrepreneurial adventure began in 2017 when the two friends thought of inventing a connected lock. After several ‘long weeks, they developed a lock code-named The Brightlock and its smartphone App. What is the concept? Generate a single code for each lock, using an encoded on-off flash light in the phone. The system is reliable and cannot

be hacked or copied. “With our startup HAVR we have succeeded in bringing a truly new technical change to a day-to-day, familiar object”, adds Simon Laurent, one of the company co-founders. Success followed quickly. “We presented our product to several companies and they found it very interesting. There is the hotel sector, for bedroom management”, explains the CEO Laurent. “Likewise, we also had some industrial companies who wanted to make access to their control cabinets secure”. To push even more the development of the startup, the company founders have been accompanied over

the past few months by Plug and Play, a US based start-up accelerator. “The accelerator helped us with the marketing/ commercial”, added Simon Laurent. “It was not a coaching operating as many incubators propose many incubators, but rather having us meet the right partners”. The ambitions of HAVR are clear and wide-spread: they plan to sell 100 000 units next year. There is a team of 18 with 6 different nationalities, “and we are continuing to recruit personnel”, adds Simon proudly.

Within the company, the chief executives plan to go even

further. “I have the feeling”, says Simon, “that light will also lead to a new revolution in the way we live. Today we can note that the available radiofrequencies are immediately saturated and this raises some serious problems. “Tomorrow, we can assuredly see light used to transmit information”, says Simon. Cédric Lewandowski, an executive director at EDF Group Stratégie shares this vision, going as far as publishing an assessment in Linked In : “The connected lock proposed by HAVR represents a real technological breakthrough: light will someday be an essential vector in communications and in transmission of information”.



SIMON LAURENT ET ALEXANDRE BALLE

In the meantime, a major challenge awaits the students – producing the 5 000 units in pre-sales orders to the industrialists. “We have three months’ production planned with French manufacturers and that makes us very proud indeed”, concludes the young entrepreneur “. More to come... ■ GO



ENTREPRENEURSHIP

Lecturer-cum-research scientist and entrepreneur



For the past 15 years, Jean-Pascal Foucault, a lecturer-cum-research scientist and startup entrepreneur lives a full-speed life, hopping professionally between Compiègne, Paris and Montreal. An internationally admired expert in management of physical assets (buildings and urban infrastructures) began implementing the PACKiT method he developed and which led to the creation of the company tbmaestro & Co. Here is his portrait.

for investment and operations”.

In short, the PACKiT method consists of placing use-value parameters at the core of the decision-making process (concrete utilization) and to minimize the exchange factors (financial stakes). “It is what we call a fully recursive method: we begin by identifying the use value and consecutive loss of value on an assets portfolio that we audit to assess the criticality of renovation projects. The circle is complete when we come back to the starting point with partly renovated assets”.

Very soon, Jean-Pascal Foucault was invited to present this method, in publications/papers/books and/or in international lectures. It was following one such lecture that the then Director, of UTC,

François Peccoud approached him. He proposed to Jean-Pascal that he could come to Compiègne to teach and set up an entrepreneurial project to implement his method. “From the very start, I has support from UTC”, recalls Jean-Pascal. To accompany him, the University made available all the tools of Uteam SA, a UTC spin off company via which the lecturer-cum research scientist was able to engage his first commercial missions. “I took on board a number of young UTC graduates, inasmuch as I really wanted to encourage them with a promising future”.

In July 2011, Jean-Pascal Foucault decided to set up a Paris based limited company with several UTC graduates, including Claire Duclos (a UTC ‘admin’ officer) and Cyril Chateau, both among his earliest and ever-faithful associates.

Eight years down the road and the tbmaestro adventure has turned out to be a full success. Indeed, this year it was on the Les Échos hit-parade for “2019’s growth champions; with a business growth rate of 45% over the period 2014-2017. This success story on something that J-P Foucault dedicates to his team members. “I have always adhered to a reality principle: placing the right persons in the right functions. I myself have never wanted to be in the executive driving seat – my position is elsewhere”.

He personally continues doing what he likes best – his activities as lecturer-cum research scientist and providing expert support to tbmaestro where and when needed. Over the coming years, Jean-Pascal Foucault foresees a very bright future for his company: “We are going to continue to grow, opening our business to operate in other languages and with other cultures, relying for this purpose on the exciting progress in artificial intelligence”.

But underscoring this work is his intimate conviction and ambition: to change the world. “I place tbmaestro in the framework of a wide-ranging societal project – that of an economic transition” ■ GO

We had our appointment with Jean-Pascal Foucault at his Paris offices – where 254 people work.

Two complete floors, only a stone’s throw from the Montparnasse skyscraper. The walls are covered with large technical maps of the Paris airports. The company’s leitmotiv – better assessment to better evolve, through analysis of existing buildings, construction and maintenance work and renovation plans.

The tbmaestro adventure began in the early 1990s. With his Ecole Polytechnique Montreal diploma, J-P Foucault started working for public employers, with responsibilities in building construction, operation and maintenance. “I soon realized that the methods used then for that kind of work were totally out-of-date”, he recalls. “The approach was entirely based on curing/fixing problems – the buildings we had were not easy at all to renovate”. Thus and in parallel, our young engineer began thinking about new ways to do the job.

“My first observation was that the logics underpinning uses of physical assets face three life cycles that, in essence, generate a form of dialectics: the policy governance cycle lasting about 5 years; operating uses that last some 20 years and the technical systems and components that span something like 2 generations. There is a real conflict between these time-scales”. This led onto the creation of the PACKiT model – standing for four Process on Asset for Criticality and Knowledge by Inspection and Testimonies. “What we were seeking was a more metadisciplinary approach, one involving not only the technical factors but also taking into account the financial and social-manpower strategies that underpinned the decision-making phases”, details Jean-Pascal Foucault. “My aim in all this was to see all the various actors talk together and to prioritize needs

“My aim in all this was to see all the various actors talk together and to prioritize needs for investment and operations”.



JEAN-PASCAL FOUCAULT





MANOËLLE MARTIN

A new look at **Digital technologies** in schools in the Hauts-de-France Region

The so-called 'digital transition' is under way in schools. Interactions invited Manoëlle Martin, VP in charge of Lycées and Student Orientation for the Hauts-de-France Regional Council, to share her vision of this digital revolution in schools and where we see the gradual advent of new technologies in the classrooms.

build up a single ENT for the entire Region Hauts-de-France, i.e., covering the secondary school colleges, the lycées and perhaps even extending it to primary schools. It would be designed as a single, overarching tool, evolving throughout a pupil's/student's scholasticity. Project is currently being analyzed and assessed and will be presented when school returns in September", announces Manoëlle Martin, who also envisages creating EIPs (acronym in French, standing for Shared Innovation Area). These would be very much akin to Fab'Labs, installed in certain lycées, transformed into

publicly accessible areas where various tools could be made available, notably advanced 3D printers. The EIPs would be open for students and education officers but also for entrepreneurs and DIY fans, plus various associations. It would become a real meeting and focal point for collaborative creative work. "41 EIPs are currently open and 25 more are being finalized. Our aim is to see 70 EIPs working hopefully in close collaboration with school and lycée teachers and with their head teachers". ■ KD

All young people today have their Smartphones. They literally live with them. I-pads and other digital tools have become necessary to study and even in their search for future employment. How can we ensure best use of digital technologies in schools, as close as possible to users, viz., those we call the "digital natives". "Well it is already happening in our best equipped establishments, notably those with an optical fibre provider service connection. As the term says, optical fibres transmit data at the speed of light. There are now over 100 000 adapted computers, plus the appropriate licences and software packages", says Counsellor Martin (Oise), who was also the instigator of the Génération #HDF card. This card is free but reserved for lycéens and apprentices in the Region. It offers lower price purchasing of school-books and equipment, for both schools and apprenticeships schemes.

ENTs and EIPs

The acronym ENT stands for Digital Work Areas (in French) but it has been noted that they are not homogeneous throughout the ex-Picardie Region. "What we are doing, via a call for proposal, is to

MANOËLLE MARTIN REFERS TO UTC

"UTC-Costech Lab research scientists were the original designers behind the tactile Cre@tion table (cf. article p17 intra). It is a remarkable initiative. I was fortunate in that I came across this piece of equipment and we could imagine the incredible possibilities it offered. That is the future, as I see it. I can only stress my encouragement to such exploratory work at UTC, always a step ahead in many areas, for instance the driverless car or drone. This combination of basic research and innovation is an integral part of what we must develop for our Hauts-de-France Region and for France. Moreover, as you know, UTC trains high quality engineers for international posts and markets. It is now part of the reference HE establishments in the world".





3 QUESTIONS FOR...

BÉATRICE CORMIER,
RECTOR OF THE AMIENS REGIONAL
EDUCATION AUTHORITY, CHANCELLOR
OF THE UNIVERSITIES.

How do you see schools evolving in the digital revolution?

In a similar manner as all other Society sectors today, schools are being profoundly affected by ongoing digital changes, leading us to rethink all the classic, traditional bases of our organization and our pedagogy; course contents, resource and services. This evolution in methodologies also comes with a modified 'working space' for teachers: classrooms are being adapted to new approaches, with more parallel modularity. Digital work areas are being multiplied, thereby reinforcing and facilitating the connection between school and the student's family. There appears to be one leitmotiv that sums up perfectly the ongoing movement – to enhance and encourage all interaction's that portend success for all students.

Teacher training in digital techniques seems a huge task: what is your vision for the Amiens Education Authority?

Teacher training here reveals several priority thrusts: coming to grips with the new equipment, diffusion and circulation of the new resources and development of new pedagogical utilizations. This latter thrust is the most complex to implement, inasmuch as it often implies far-reaching changes in the way teachers teach. Consequently, what we propose are teacher training modules that are based on new school configurations and allow the teachers to experiment various added-values in terms of student motivation and the way they adopt the new technologies and knowledge sources coming 'on line'. Training is no longer time-limited and takes the form of a long-range accompaniment, thus enabling response adapted to each teacher's situation and needs. These training modules use then new equipment in a collaborative manner and even in virtual class configurations, with of course a set of face-to-face sessions. The objective assigned to training modules is to see the teaching staff become the key actors of their own adaptation. In parallel, we multiply exchanges among peer groups to enrich the largest number of participants possible via return and sharing of experience.

How are we to bring the better of two worlds together, combining paper & pencil and the digital, for children who know are already "digital natives"?

This is the real challenge of the ongoing evolution we are seeing in pedagogical, classroom, practice: to seek the best in each method, from the most traditional to the most modern and to vary experimentations to improve overall learning performance levels. Cognition sciences help us in this field: students learn all the better as and when they adopt new knowledge, manipulate it and become actors themselves in their learning process. This way, schools represent mutually beneficial ground for paper-pencil and digital worlds to meet. Children are comforted in their position as 'learners' and we see ourselves as contributing to higher levels of self-confidence. ■ KD

SCHOOLS MEET THE DIGITAL WORLD

What will teaching be like tomorrow?

Alongside the major technological changes, the way we educate our children and the way teachers intervene are changing too. The entire pedagogical relationship needs to be accompanied, if we are to successfully hand on knowledge and new life-style behaviours to the younger generations.

School is changing as the digital revolution progresses. The digital strategy implemented by the Amiens regional education authority covers several concrete priority thrusts in the policy to accompany changing pedagogical practice. "And to this end, we need to go out into the field, observe experimentations and provide for high-quality digital environments. Teachers today no longer intervene in the same way they did, say 20, 15 or even 10 years ago. We are now light-years away from those days", says Emmanuelle Jacquier, the academic delegate for digitized education at the Amiens regional education authority, who in a sense, write the rules for training "in" and "by" digital techniques.



The teacher's role in being transformed

For any teacher, the question of rethinking the way he/she teaches raises several questions in terms of class preparation work, learning methodologies and even new pedagogical strategies. "Since digital tools and techniques allows you change the school format which will be less and less face-to-face, or top-down, we need to help teachers as they modify their classroom practice. We do not intend to revolutionize uses, but rather to accompany the teacher teams from where they were - to progress and gradually but definitively integrate new pedagogical practice as offered by the digital world," she adds.

Tools available

Computers, printers, i-pads, robots, ENTs (see above) and interactive whiteboards are now available in every school, but it takes some 5 years on average

EDUCATION, IN AND VIA DIGITAL TECHNIQUES

At the Jacques Monod Collège secondary school in Compiègne, the entire teaching community is involved in education in and with digital tools and techniques. Witness this vision offered by the Deputy Head Thomas Grados, 33 years old "Although we are not a pilot scheme school in the digital field, we did catch up very quickly. Our efforts began two years ago, when we received some language and music kits, then we made an assessment of our network capacity and since then have fully wired up the school. We set up a COPIL (steering committee), with a DANE (an academic delegate for digital education), our two ICT officers, plus "reps" from the territorial Department (Oise) and from students' and parents' associations. Today, we are launching a new digital educational scheme so that out students at Jacques Monod can follow a real course till such times as they move on to the lycée. The students are given primer courses on robotics, computer science and even some software programming and for this they have full access to the digital techniques via various "apps" (Tactileo, Padlet ...) or document sharing and sourcing new skills and increased knowledge bases".



to really develop a really interactive utilization of the new tools. "Tools must meet needs, and not the other way round", goes on to explain Emmanuelle Jacquier. "Our need is to educate/train students, the future citizens of the land. The tactile table Cre@tion used in collaborative work developed at UTCV is a very fine project, all the more so because one of the research scientists involved was able to assess the device. And this, indeed allows us to envisage evolving practice". Co-operation group working, collaboration,... these are notions that encompass schools and the new learning processes. "With new ways to learn, teachers must now work further upstream from their classroom preps and, at the same time, must leave more time and 'space' to the students to enjoy monitored autonomy. This presupposes that we prepare the overarching framework. And this in turn leads to the question of how to assess students' responses. The digital world allows for rapid answers too", concludes the Delegate who foresees numerous advances that accrue through introducing digital techniques in today's pedagogical changes. ■ KD



Tactile tables for collaborative work

Cré@tion is the code name for an innovative research project in collaborative work (among students). The field observations are made in a specific collaborative work area at the UTC Digital Hall. There are 5 sets, comprising the tactile tables, multipoint screens and specific, associate software packages. The equipment is designed to be used in simultaneous group formations.

The research project code-named Cré@tion (acronym in French for Collaboration, reflection, activities and innovative digital work began at UTC in its Costech Lab. “Project Cré@tion focuses on collaborative work and learning patterns in this mode which calls for some large-scale tactile pieces of equipment where several persons can interact simultaneously on the same, shared surface. Our general hypothesis is that the introduction of devices like these will change the way we collaborate and lead to exploring and adopting specific collaborative practices and thus induce a specific form of pedagogy,” explains Thierry Gidel, senior lecturer in management studies in the Department of Social Sciences and Humanities (THS) at UTC and in charge of the Digital Hall infrastructure and the CRI team (Network complexities and Innovation) at the UTC-Costech Lab. This work is a

collaboration in partnership with the University of Lille, the CIREL laboratory and is financed by the French ministry in charge of Education, Higher Education, Research & Innovation, via the Regional Educational Authority based at Amiens.

Encouraging and enhancing interactions...

Cré@tion aims at developing collaborative pedagogical practice using novel, tactile tools that embody digital technologies. “In the project”, underscores Andrea Tucker, an American PhD student in education sciences, “the digital tools do not replace humans; they serve them, sometimes facilitating the work, sometimes acting as a memory as the project work progresses, or again as a methodological aid, inter alia. What is observed and analyzed is the sequence of interactions

among the table actors, verbal and non-verbal exchanges, crossed perceptions, creative conflicts, negotiations for the purpose of seeking a consensus, a co-constructed solution to the problem at hand”. Andrea comes from the University of Lille where she presented her thesis in the framework of Cré@tion and the influence of digitized devices on collaborative processes and the development of associate skills.

... making way for pedagogical innovation

Project Cré@tion also innovates in the way it associates the teachers. The idea here is to see methodologies co-evolve, in a close relationship with the digital tools and software as they become available. Upstream of the table-side session with students, the teachers also participate or to organize team projects and prepare the pedagogical exercises. Accompanied by Andrea Tucker, they learn how to adopt the approach and the collaborative practice as they prepare for sessions with their students. “The question is not to see an overinvestment in digital tools and the role of the teacher must remain central and primordial but it will evolve too. With tools like these, we can facilitate learning and collaboration. You can manipulate ideas and concepts in a game-oriented, intuitive way”, concludes Thierry Gidel. The advent of digital tools paves the way to the future - we must just make sure that it is serving the needs of Mankind. ■ KD



Digital post-its by Ubikey

The days of paper-base management or white boards or wall pasted schedules in meeting rooms and corridors are over, replaced by truly collaborative work – witness what is proposed by Ubikey inside UTC.

Ubikey firstly was an idea launched in 2009 in the context of the UTC-Costech tactile table project. The observation made was that existing digital interfaces did not lend themselves to collaborative work. In 2013 a collaboration with Airbus Defence and Space began. They wanted to develop a tool to meet their specific collaborative needs. The project Ubikey was supported financially by Bpifrance and the company officially registered in July 2015. Today the startup has 10 staff and has some major French industrial/commercial customers in its portfolio, e.g., EDF or Sanofi. “In essence Ubikey is a digitized version of traditional brainstorming that we used to do with paper, pencils and post-its. We imagined the most natural tool

we could so as to take on a project at a glance on a large tactile screen”, explains Pierre Chiquet, technical manager for Ubikey. This interactive tool retains the flexibility of paper but has the added advantage of digital techniques, such as traceability and accessibility of all data and an optimization of occupation of work spaces and meeting rooms; “Our solution was highly attractive to the companies we approached, especially the major industrial groups, inasmuch as it enhances creativity, project managements and problem-solving in a entrepreneurial context. Visual Management is now becoming widespread practice in the major groups. The key idea is to use a very visual tool that enables colleagues to share the level of advancement of a

given project, to improve their communication and collaboration and to simplify the decision making process.” ■ KD





DEMOCRACY AND THE DIGITAL WORLD

Could digital tools be an answer to :

democracy's woes?

The digital world offer many opportunities in terms of citizen participation and local democracy. An ever-increasing number of digital tools enables citizens to take part more easily in public debates. Interactions invites its readers to discover the work of Clément Mabi, a lecturer-cum-research scientist at UTC, focused on this essential question for the city dweller we are.

As the world around us is increasingly engulfed by digital techniques and collaborative working, the question of citizen participation has to be reconsidered.

Firstly, the expression covers a whole set of tools. Indeed, as of 2018, over 74 digital citizen local participation tools were inventoried. This gave plenty of food for thought to Clément Mabi, senior lecturer-cum-research scientist in ICTs at the UTC-Costech laboratory. His research work focuses on 'on line' political participation and how citizens actually use digital tools. Recently, he analyzed various topics such as the opening of access to public data (Open Data), and use made of digital tools in concertation, in the development of Open Government and "civic tech". "The digital tools enable so-called "collective intelligence" to operate as a source for innovative solutions, as happens in participative financing. We can observe a wide diversification of the tools, with mobile "apps", and a diversification of resources, such as local petitions. Local authorities are no longer alone. Other actors such as change.org provide tools directly on line top citizens. The next phase will be to break down the 'walls' between institutional and non-institutional practice. For the time being, what we see is a form of hybridization", explains Clément Mabi.

VIRGINIE JULLIARD ET CLÉMENT MABI



"Civic tech"

The new digital tools for citizen participation are also called civic tech, designating a wide range of "apps" and platforms to enable use to be made of collective intelligence protocols and

to reinforce the democratic links among citizens, local authorities and the State. It therefore comes as no surprise that civic commitments and citizen participation have become a favourite playground for digital world entrepreneurs. Also, we now see a number of institutions relying on citizen participation to rehabilitate public life and to generate a "new democratic spirit". "What we can observe, nonetheless, is that the offer to participate largely tends to defend a "change nothing" stance and to democratize inequalities as it develops by favouring certain social groups to the detriment of others", adds Clément Mabi, who goes on to warn us that: "digital participative tools favour inclusion of certain public categories whilst excluding others. A key factor and challenge here is to avoid recreating a "digital fracture" if we wish to see citizen participation succeed". Let is not forget that the overarching ambition of these tools is to transform the ways in which democracy works, to improve efficiency and organization thanks to renewed forms of citizen commitments. ■ KD

THE DIGITAL WORLD AND PUBLIC DEBATE

Twitter® tends to intensify controversies by enhancing their propagation and circulation. Virginie Julliard has been studying tweets that make reference to "gender theory" and "marriage for all". She observes these new forms of expression transformed into torrents of hatred.

Virginie Julliard is a senior lecturer at UTC, appointed to the UTC-Costech Lab and to the research team EPIN (acronym in French for 'Writings: practices and digital interactions').

She analyzes how controversies spread via Twitter®, notably when it comes to societal debates on topics like "gender theory" or "marriage for all". "Basing my work on the case study of "gender theory", I present an analytical method that combines a quality approach (such as semiotics) with a more quantitative approach of the corpus to see how a controversy

spreads in this unique digital form of writing", explains our research scientist Julliard, whose work focuses on public debate, media production and digital forms of writing. "To do so, we analyzed 107 209 tweets collected between Oct.5, 2014 and July 17, 2017, following a protocol you could call "tool-aided semiotics". The tool I developed takes into account some hitherto unexploited data collection functions among those that exist in the Twitter analytical world.

I was notably able to collect images attached to the Tweets and to recover exchanges in which the tweets were taking place. In this manner, I observed how the exchanges could take conflictual subjects on board and that the subsequent 'sharing' of the images enables identification of various communities who are not exactly in phase, politically speaking, but who nevertheless share the same stance in the ongoing debate", underlines Virginie Julliard, who also authored a book, entitled "De la presse à Internet : la parité en question [From the Press to the Internet; parity called to question], Ed. Hermès-Lavoisier, 2012.



START-UP

Bleisable* travelling Jack and Ferdi

Making the most of professional trips to discover a city and/or its local culture, is what 'Jack and Ferdi' - a start-up created in 2011 by Anne-Fleur Andrle, a UTC graduate who majored in Bio-engineering (UTC-GB) - proposes.



“I used to work for AMA XpertEye, developing their branch office in Boston, and I was always literally hopping on and off planes”, says Anne-Fleur Andrle. “But the rhythm of my trips became increasingly tiring and was frustrated inasmuch as I “saw nothing” of this city. So I started to think about a ‘healthier’, “saner” way to travel”. With a former colleague, Romain Aubanel, Anne-Fleur started looking for a way to optimize business trips. “Working with friends who themselves travelled a lot and with our own well-heeled business travellers’ acumen. In 2017, she quit her job with AMA XpertEye to devote all her time and energy to the Jack and Ferdi startup, which she co-founded with Romain. The “app”, downloadable on i-phones since December 2018 (the Android version is coming soon) is free.

“We do not sell the data we collect, but just take a percentage cut on the bookings made via the “app”. For the moment, no less than 85 cities are on the data base. “Bleisure”* comes into its own right when you are travelling on business trips far from home, so we privilege destinations potentially attractive to travellers who come mainly from North America and Western European countries. We are now present on all continents”.

The key parameters of the app are “authentic high quality content”, checking out the information and recommendations with the help of local ambassadors, taking into account the constraints and preferences of the user (via Artificial Intelligence algorithms). Local culinary specialties, adopting proper manners and attitudes to doing business in far-flung cultures... the app is diversified, as Anne-Fleur confirms: “Bringing home magnets for the refrigerator is fun but you soon want to have something more authentic to talk about!”

Jack and Ferdi is already a success story and the startup will soon be opening offices in Paris and developing B to B version for the business companies themselves. “It is an innovative way

for them to generate adhesion of their employees”, underscores Anne-Fleur. ■ MB

* A combination of business and leisure, defined as “the activity of combining business travel with leisure time”. The term “bleisure” was first published in 2009 by the Future Laboratory as part of their biannual Trend Briefing.



ANNE-FLEUR ANDRLE & ROMAIN AUBANEL

A THREE-SHOT « APP »

- 1. Explore :** A list of things to see, to see and to bring back.
- 2. Care :** A list of local charities worth supporting, suggested walks or runs
- 3. Work :** Advice to help integrate local business cultures and contexts

A humanist entrepreneur



Christopher Belliard, co-founder of the startup Coddity in 2016 is a specialist in Web development and Data sciences. A logical step for a 2008 UTC graduate who majored in Computer science and their applications (UTC-GI) and who likes to prospect in technologies and innovation

UTC trains ‘humanist-oriented technologists’, as Étienne Arnoult, Director of Training and Pedagogy at UTC, in Interactions #48.

Lessons in social sciences and humanities that Christopher Belliard is proud to have followed ever since he set up Coddity. “While I was at

UTC, I learned a lot in social science, economics, marketing... and in ‘what makes other people tick’, which is absolutely necessary when you are coordinating and managing a business team”, says Christopher. “Moreover, managing innovative projects allowed me to step back a bit in terms of the technologies and the innovation involved. This was fundamental for me to really understand (as an engineer) what can be put on the market-place, and how to overcome existing brakes and stumbling blocks so that the public at large will adhere to and adopt a given innovation”.

Christopher has retained from this experience a definite taste to identify and hire new skills. “We have our own in-house training unit, we call it the ‘Manufacture’ where we train our staff in respect to both technicalities and what we call transverse skills, such as how to recruit, how to enhance entrepreneurship, etc.”. Coddity also has its own R&D unit and one day per month the

company employees can work on their own personal projects; such as developing an AI (artificial intelligence) based search engine or face recognition starting with a LinkedIn profile photo.

Christopher sees these “side-ventures” as necessary to stay competitive in advanced areas such as Web development or AI applications, to maintain a high degree of creativity in the team and to come up with business proposals that closely match the customers’ needs. “We mainly develop tailor-made products for our customers”, notes Christopher. “Recently we developed a Web “app” to visualize data related to a fleet of driverless cars for an automobile manufacturing group”.

Next step? Opening a Coddity branch office outside Paris, probably in the Lyons area. ■ MB



CHRISTOPHER BELLARD

CONTINUOUS STRONG LINKS WITH UTC

- Four UTC ‘developer’ staff graduates, out of twenty.
- A partnership with Data Venture, UTC’s data science association and the UTC Junior (Enterprise).
- The Coddity Grant: a competitive grant system addressing all computer science students with an emphasis this year to promoting women in technical areas and professions.





ISABELLE PY

Irrepressible will-power

Isabelle PY graduated from UTC in 1987, majoring in computer sciences and applications (UTC-GI) (elective specialty automated production), and, after a short initial professional period with SESA (forerunner of CAPGEMINI), is now a fully qualified airline pilot, now Flight Captain with Air France. Here is her portrait – a woman with clear ideas, strong passions and irrepressible will-power.

Clear ideas? Isabelle PY demonstrated this as of the age of 10. “I knew I wanted to pilot an aircraft, ride horses and go scuba-diving. I succeeded in doing all three”. Her taste for aeronautics? This came from the female side, her great grand-mother and her mother. The first mentioned was employed by UAT (aero-marine union). The second was with TAI (intercontinental air transportation). “Well, to be honest with you, there were no pilots in the family. But when I was very young I loved travelling, I loved taking the plane and was often allowed in the cockpit when there were no seats left in the passenger cabin. All of which seemed marvellous to me: ATC exchanges in English, of which I understood nothing! and all those little lights in the cockpit”, added Isabelle.

Clear ideas? She also showed this when applying for admission to UTC. “I was a student doing a DUT (university diploma of technology) and to pursue studies in an engineering school you had to rank in the top ten of your class – which I did!” She also showed her grit and resolve in choosing her major and selective specialty at UTC.

She was admitted to UTC in 1984, à l’UTC, “an open university that offers students a personalised “à la carte” training course, where you learn to be autonomous and top work in a team”. She chose the major Computer science and its applications (UTC-GI) with as her elective specialty, automated production. “I wanted to take up a technical profession and above all to avoid any jobs with a distinctly feminine connotation”, she adds. By chance, falling off a horse’s back made her change from riding lessons to gliders and that was an eye-opener, ‘love at first sight’ moment. “As of my very first glider take-off from the airfield at Margny-les-Compiègne, I decided that flying was what I really wanted to do”, she adds assuredly. As of that day, a passion was born and which was to be nourished by every means possible. Taking flying lessons is expensive, but Isabelle manage to be appointed to a long

internship with Dassault Aviation (at their design office in Saint-Cloud) where she was able to gain her Basic License (Brevet de Base). But she did not stop there. Next target? Private Pilot’s License (valid at aero clubs). Again the target was met, via another long placement with Dassault Aviation, with another in-house service. After 50 hours certifying flight training and with her Pilot’s license, she set off to fly across the Mediterranean with some friends in a small 4 seater plane.

On one hand the passion and, on the other, an irrepressible will.

After graduating from UTC in 1987, Isabelle PY was recruited by SESA but soon realized that the world of computer sciences and applications was not “her cup of tea”. “I spent all my free time and my wages flying”, she adds. To live out her dreams, she registered for the competitive exam giving admission to ENAC (national civil aviation school) in the option “airline pilot”. Continuing to work with SESA, in a period of 12 months she successfully completed her theoretical certificates for the airline pilots’ license and stated her practical flight training at the SFACT, Montpellier in 1989. Four

days after resigning from CAP-SEA, early in 1991, she was recruited by Air France, a company that employs numerous UTC graduates, to the point that Isabelle entertained “the idea of creating an Air France UTC alumni Club”, she adds jokingly.

Isabelle PY was recruited by Air France first as a co-pilot, followed by promotion to the rank of Flight Captain (for long-haul flights) in 2007, since which date she has never stopped crisscrossing the skies. Do she have a wish to share? “I would like to see young women stop self-censoring themselves and start living out their dreams: where there is a will, anything is possible” says Captain PY. ■ MSD

BIO-NOTES

1984: Admitted to UTC

1987: Graduated from UTC

1989: Admitted to ENAC

1991: Recruited by Air France

2007: Promoted Flight Captain (long haul flights) for Air France



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AGENDA

“TUC” DAY ALL TOGETHER FOR THE CITY

Thursday, September 5, 2019
in the courtyard at the UTC Benjamin Franklin centre

assos.utc.fr/tuc

2ND ÉDITION OF THE INAUGURAL LECTURES* FOR NEWLY ADMITTED UNDERGRADUATES

September 3, 4 and 6, 2019

* Programme to be defined later

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October 10-13, 2019

At the UTC Pierre Guillaumat 1&2 Centres

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