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IN 2023, UTC CELEBRATES ITS 50TH ANNIVERSARY!

Each month, a number of events will celebrate UTC's anniversary year : a series of lectures on sustainable development and social responsibility with leading figures, projects, press interactions, etc. Follow us on the social media networks and on our dedicated page to find the programme:

www.utc.fr/50-ans



FROM THE PRESIDENT'S DESK



The challenges we face in a sharply changing world are numerous and inescapable. Everything is accelerating rapidly, from the ongoing climate emergency to the ageing of the population, to name but two. These profound changes raise major socio-ecological issues on which we must get our act rightly now. We need to make a gearshift upwards, change the paradigm and envisage and implement new solutions to deal with the increasing scarcity of resources - water, energy, minerals, etc. together with declining biodiversity and the impact of climate change. - the decline in biodiversity and the resilience of our ecosystems, to name but a few vital issues. They reveal the need to move towards greater sobriety and this requires the mobilisation of everyone: the academia as well as enterprise, companies, public and private institutions, citizens, we are all concerned and we must all of us act duly at our level.

Since 1993, UTC-Compiègne has set itself the objective of reconciling technology and environment related issues. Designing a technology, a product, a service or a process by minimising its overall negative impact implies working in a systemic way, one of the great strengths of the UTC's way of thinking.

Recognised equally well for the quality of its research as its training, UTC is capable of making its contribution to building tomorrow's world, one that is more equitable, more sustainable.

Today, UTC is 50 years old and asserting its ambition to go further by becoming even more agile. It is by carrying out a transverse and in-depth transformation of all of its missions that the institution will be able to set an example for its own community as well as for its partners, whether they be academics on a national or international level, or industrial or regional partners. Recognised equally well for the quality of its research as its training, UTC is capable of making its contribution to building tomorrow's world, one that is more equitable, more sustainable. To achieve this, the UTC must clearly position itself on strategic training and research themes linked to socio-ecological issues such as the scarcity of resources, their valorisation or our health of tomorrow, as certain world-class universities and schools have done: the Institut de technologie et d'études supérieures (aka Tec de) Monterrey

in Mexico, the École Polytechnique in France, certain European technological universities, etc.

If we take the example of water, renewable water resources in mainland France have fallen by 14% over the last decade compared with the previous decade. This trend is set to accelerate if we do not respond vigorously to the climate emergency. Reusing treated wastewater in agriculture - a major consumer of water, accounting for 57% of the fresh water consumed in France* - or industrial cooling could provide a solution. Today, this practice is marginal in France, around 1%, whereas Italy and Spain recover 10%.

Energy is another area where a transition is needed. A transition that involves developing renewable energies, particularly solar energy, biogas and clean hydrogen gas.

Finally, the health of the future, to cope with an ageing population but also to provide better treatment for diseases such as cancer, heart and kidney diseases.

With its wealth of lecturer-cum-scientist research staff from a wide range of backgrounds, the UTC has a high number of sure assets. The latter should be multiplied by moving towards more interdisciplinarity, developing cross-disciplinary projects, implementing original solutions and promoting them as quickly as possible to companies. This will not only benefit companies that have a long-standing relationship with the university, but also revitalise its image in the eyes of new players, particularly the many SMEs in the Region.

Finally, the UTC should strengthen itself and seek to gain greater visibility both at the heart of the Region Hauts-de-France and within its alliances: the cluster known as Sorbonne University Alliance and the group of Universities of Technology, without forgetting to consolidate and increase its international presence, one of the key features marks of UTC since its creation.

*www.statistiques.developpement-durable.gouv.fr

RESEARCH





... aimed at securing a Sustainable Future

When we think of sustainable development, we almost certainly think about the environment. But in order for the objective of sustainability to be achieved, other dimensions come to bear, in particular economic, technical and social issues.

It was back in 1993 that the UTC set itself the goal of reconciling technology and the environment. Designing a product, piece of equipment, process or method whilst minimising pollution or identify its source is the approach adopted by the University. Thanks to the complementary skills of its various laboratories and the quality of its research, UTC-Compiègne is well placed to assess and control the risks that technological development can pose to the environment and to find technological solutions to environmental challenges.

From the design of a product that can be easily recycled, to optimisation a manufacturing process to make it cleaner and/or less energy-greedy, to the implementation of an efficient end-of-life waste treatment and recovery system, or even the detection of pollution using biological methods, a global approach is favoured.

Problems that also involve economic and social issues. Hence the emphasis on including the teaching social sciences and humanities. In all these areas, UTC has a lot to offer in terms of education, research and innovation.

By Meriem Sidhoum-Delahaye

Environmental issues and industry

Prof. Jérôme Favergeon, Director of UTC's Roberval laboratory since 2015, describes the research projects linked to environmental issues.

80% of Roberval's activities are carried out in collaboration with industry, and there are some links here that go back a long way.

"Within the laboratory, we place a long-standing focus on mechanical engineering. We have been working for over 20 years to lighten structures, particularly in the transport equipment, aeronautics and automotive sectors, viz., structures do not compromise safety, but do reduce fuel consumption over the same distance, and so cut CO2 emissions considerably. This is excellent for the environment per se, even if, historically, it was not the reduction in CO2 emissions that motivated manufacturers but rather the reduction in fuel costs, a strong incentive for consumers. Of course, things have changed since then, and the environmental issue has become crucial for companies," underlines Jérôme Favergeon.

Fusemétal



What are Fusemétal's areas of research? "We have two main areas of research. The first is additive manufacturing techniques, considered to be among the leading technologies for reducing the ecological footprint of manufacturing processes. The second concerns the assembly of high yield strength sheet metal. For many years now, ArcelorMittal has been



JÉRÔME FAVERGEON

developing high-strength sheet metal for vehicle structures, mainly for the automotive sector. This performance makes it possible to slim down various components. On the other hand, these new-generation steels are more complicated to assemble. If we want to optimise weight, we need to be able to assemble different steels, putting the right steel in the right place, for example. Today, this represents a kind of technological bottleneck in terms of applications, one that needs to be resolved and to which we are providing an academic perspective through this joint laboratory. It's also worth noting that these steels come from recycling channels", explains Jérôme Favergeon.



concerns composite materials, where new performance parameters can replace certain metal alloys, making structures lighter and thereby reducing aircraft kerosene consumption. This also is good for the environment. However, a major issue is the recycling of these materials, since the material itself is mixed with the structure being manufactured. As a result, we need to move away from traditional recycling methods, such as those we use for metal alloys. This should be a key subject of future projects", says Jérôme Favergeon.

Other areas of research, in addition to projects carried out in collaboration with mechanical engineering manufacturers, include:

Asian hornet detection

"We have some rather atypical projects, particularly in the 'acoustics and vibrations' team. The team is working on the development of acoustic antennae that would make it possible to recognise Asian hornets, which, as its full name (Vespa velutina), also known as the yellow-legged hornet suggests, comes from elsewhere and harms local ecosystems, particularly bees. The technological idea is to install these listening systems on drones so as to detect the hornets more easily, and possibly track their movements in order to find their nests and destroy them," he says.

Recycling composite materials

While the collaboration with ArcelorMittal goes back a long way, there is an equally strong link with Safran in the aerospace sector. "The work carried out by the Roberval Lab with Safran mainly

Ongoing projects are not stopping the Roberval Lab research teams from looking to the future. They are working on their roadmaps and are particularly interested in two major areas: the reuse of materials and eco-design.

Reusing materials

In this field, we are witnessing the development of concepts, skills and knowledge, as well as tools. However, these tools remain incomplete. "Today, we can certainly find software to help with the eco-design of products, but it essentially integrates issues relating to the upstream stages of the product - which materials, ores or recycled materials, what type of assembly? - but



also downstream - recycling or not, reclaiming or not - each stage having a CO₂ emission impact. I can therefore calculate the carbon footprint of the finished product by adding up the carbon footprint of each stage. However, they have one limitation: they don't look at what happens in between, i.e.; the product's lifespan.

We believe that the real impact of a product is not just its design, manufacture and recycling, but also what happens during the entire period of use. Let's take two products with the same functions but different carbon footprints. If one has a greater impact upstream and downstream but lasts 30 years while the other lasts 10 years,

which one should we choose? Today, we don't know how to carry out this overall assessment using existing tools. Developing new tools that can integrate the entire life cycle from the design stage is therefore a major challenge, particularly for manufacturers," he concludes. ■

Micro-grids powered by photovoltaic panel arrays

Professor Manuela Sechilariu has been Director of the UTC Avenues research unit since 2016. Since the laboratory was set up in 2006, microgrids, in particular those powered by photovoltaic panels, have been one of its major areas of research.



"Whatever the nature of renewable energies (RE), they require multi-source systems, whether they be autonomous or connected to the grid. In other words, an electrical microgrid. For our part, we are working on microgrids powered by renewable energies, in particular photovoltaic arrays (PV), equipped with on site storage, loads and connected to the national grid", explains Manuela Sechilariu.

At an early stage, the team began to consider how to optimise these technologies, or how to achieve minimum energy costs while at the same time maximising the use of renewable energy sources. Two areas of application were identified: building supplies and recharging of electric vehicles (EVs).

What about the buildings? "We opted to use PV energy sources, associated with a micro-grid integrated into the building and aimed at energy efficiency. To maximise the benefits of energy from PV, we proposed DC power supply networks for buildings, and we optimised the energy cost and stabilisation of this micro-grid, either autonomous or with a connection to the public grid", says Manuela Sechilariu.

What choices were made for EVs? "We had to adapt our concepts. In this particular case, there is the question of the user, given that the EV

involves intermittent and random arrivals and departures depending on the driver's needs. In a building, on the other hand, it's the client who defines the criteria for load shedding, operation or minimising the use of a certain number of energy loads," she explains.

These are useful technologies in the face of the climate emergency, but they nonetheless require an in-depth analysis of their own carbon footprint. "We have created a set of methodologies and tools - some of which are simplified and can be used by economic players - for sizing these microgrids, whether they are integrated into buildings or EV charging stations. Sizing that

meets environmental, economic and technical constraints. Thanks to these tools, we can analyse the life cycle of the various components, both PV and microgrids, from their creation to their final destruction or recycling. This analysis enables us to calculate the carbon impact of these technologies over thirty years, as well as their overall cost", she points out.

These technologies certainly produce clean energy, but they require operating and utilisation operational conditions that encourage a form of sobriety on the part of the user. "In a building equipped with a microgrid powered by PV, for example, energy is of course produced, but the user who should be made aware of the need for a form of sobriety in consumption. As for EV owners, they should adopt habits for charging their vehicles that enable them to minimise the cost of energy and maximise the use of PV. For example, rather than quickly charging their EVs once a week, which means drawing on the national grid, drivers could charge a little every day using renewable energy. The latter would also be less costly for them", says Manuela Sechilariu.

Another area for research? "As part of a scientific programme launched by the International Energy Agency, we are going to study a specific field of application: the impact of the electrification of public road transport. In particular, we need to study the impact on the network of battery-powered electric buses and evaluate the most efficient solutions that incorporate renewable energy sources," she concludes. ■



MANUELA SECHILARIU

Phobars, An eco-friendly solution for Industry

University professor Khashayar Saleh is director of UTC's research unit TIMR, whose activities focus on green chemistry and processes. These activities are reflected in projects such as Phobars.

This is a project funded by the ANR, involving UTC-TIMR, the project leader, NEU-JKF Process and IFP Energies Nouvelles. "We are working on the recovery of unconventional solids from plastic waste or second-generation biomass. This may involve energy, thermal or mechanical recovery, or recycling as a raw material. In the case of thermal recovery, for example, the heat can be used directly. Conversely, in the case of converting plastic bottles, which are essentially made up of hydrogen and carbon, the idea is to return this material in the form of synthetic gas, in particular hydrogen. So, after decades of manufacturing plastics from oil, we are taking the opposite route by transforming plastic into energy," explains Khashayar Saleh.

The project represents a real challenge for the partners, particularly in terms of transporting unconventional products. "The main problem lies in transporting the powder from these materials to the reactor. Conventional processes, such as pneumatic transport using a current of air or mechanical vibrations, are ineffective and are also

likely to entail risks, particularly of explosion. So, how can they be made more efficient and safer? The idea is to study both the hydrodynamics of the conveyor system and the electrostatic phenomena that occur in this system with a view to understanding and modelling the behaviour of the solids being transported in order to improve the control and efficiency of pneumatic transport. Once all the laboratory tests have been validated, the ultimate aim is to optimise the operation of industrial installations," emphasises Khashayar Saleh.

Hydrogen storage

Other areas of research? "We are working hard on gaseous energy carriers such as hydrogen, ammonia and methane, which have very high energy capacities, as well as liquid energy carriers such as methanol and biofuels, even if their capacities are lower. As far as gas carriers are concerned, one of the main stumbling blocks is their storage. Storing hydrogen gas in a car tank, for example,



KHASHAYAR SALEH

would require a pressure 200 times greater than atmospheric pressure. That's why we've decided to explore another option, that of solid storage, i.e., fixing the hydrogen in a condensed form in a solid matrix or metal hydride. We can use aluminium hydrides, for example, or any other metal hydride depending on its safety, accessibility, availability, etc.," explains Khashayar Saleh. ■

Futuroleaf, a European project



KARSTEN HAUPT

Karsten Haupt is Professor of Biochemistry at the UTC and has been Director of UTC's Enzyme and Cellular Engineering (GEC) laboratory since 2012. A specialist in molecular imprinting, he is taking part in the European Futuroleaf project launched in 2020 and due to run until the end of 2023.

So, what is the aim of Futuroleaf? "The aim is to use porous nanocellulose-based structures that can specifically sequester the cells of certain photosynthetic bacteria, thanks to the molecular imprinted polymers (MIPs) incorporated into the structure. The idea is to create a 3D cellular bioreactor to mimic

the structure and function of plant leaves, an exceptional but natural process. The idea is to mimic the way in which plants function, and thanks to photosynthesis, energy from the sun and CO₂ captured from the atmosphere, we could synthesise molecules of interest in chemistry", explains Karsten Haupt.

What makes Futuroleaf so original? "The answer stems from the fact that we are creating synthetic sheets that can transform sunlight and carbon dioxide into high added-value products", he points out.

What exactly is the UTC-GEC's role in this project? "We are essentially working on the MIP, components which enable the specific capture of

a given protein on the surface of the cell. In an artificial leaf. We can also have two different cells that can help each other to carry out a specific synthesis", he adds.

Can you cite some areas of application? "Possible applications could involve active pharmaceutical and cosmetic products, or even basic chemical products such as flavourings, with considerably

improved efficiency levels compared with current suspension culture systems," says Karsten Haupt.

The project is being carried out in collaboration with international industrial and academic partners including VTT, Aalto University and the University of Turku in Finland, Graz University of Technology in Austria and Cyano Biotech; GmbH; Germany. ■

Biobased polymers

Aude Cordin is both lecturer at UTC and lecturer-cum-research scientist the Enzymatic and Cellular Engineering (UTC-GEC) laboratory. Her research field lies at the interface between bioresources, biomimetics and polymers.



AUDE CORDIN

changes in their environment using molecularly imprinted polymers (MIPs). While these polymers are usually petro-sourced, my work involves developing this type of material using bio-sourced monomers or polymers and manufacturing methods that are much "gentler" and more compatible with the environment", explains Aude Cordin.

This is an issue of interest, since Aude Cordin has been chosen to coordinate the EcoBioPlast project funded by the French agency, ANR. Launched in October 2022 for a four-year period, EcoBioPlast is being conducted in partnership with Antoine Fayeulle from UTC-TIMR.

What is the aim of the project? "The aim is primarily to understand the environmental fate of micro- and nanoplastics in order to develop new, more eco-compatible encapsulation systems for the release of biopesticides, set

to replace synthetic pesticides. To date, these biopesticides are not very stable. They can also have solubilisation problems when it comes to formulations. Hence the objective of encapsulating them to facilitate their use, but the matrix must be compatible with the environment, such as polysaccharides from algae, fungi or vegetable oil derivatives, for example", she explains.

This project follows on from the successful production of molecularly imprinted polymers from vegetable oil derivatives. "The aim was to encapsulate polyphenols, antioxidant molecules. In this particular case, we succeeded in showing that this type of matrix was sensitive to enzymes and was therefore degraded in their presence, allowing the active ingredient to be released", concludes Aude Cordin. ■

One of her main areas of research? "I'm looking to design biodegradable encapsulation systems that respond to

Amaranthus, a squalene reservoir



ADRIAN TRONCOSO-PONCE

Adrian Troncoso-Ponce is a lecturer at UTC, specialist in plant metabolism. He is also responsible for "sustainable development" and the "sustainable engineering" label within the Enzymatic and Cellular Engineering (UTC-GEC) laboratory.

One of his research areas? "We're trying to understand why amaranthus, a particular plant, produces large quantities of squalene, a lipid molecule used in dermatology and pharmacology, particularly in vaccines.

Currently, the main source of squalene (as indeed its name indicates) is shark liver oil. The idea is to be able to substitute animal squalene with squalene from amaranthus", explains

Adrian Troncoso-Ponce.

In practical terms what does this imply? "To produce amaranthus squalene in quantity, we are adopting a biotechnological approach. One of the avenues being explored would be to incorporate amaranthus genes into yeast and put the solution in a fermenter", he explains.

Enrico Magnani, a researcher at INRAE, is collaborating on this research project. ■

Antifungal action

Sonia Rippa, a research engineer at UTC, is responsible for the 'Biocontrol and Neophytosanitary' course in the Biotechnology of Natural Resources Master's degree. In the Enzyme and Cellular Engineering (UTC-GEC) laboratory, she works in particular on rapeseed.

Rapeseed is grown in France on more than 1.5 million hectares, or 5% of the French agricultural area, making it a major crop.

As Europe's leading oilseed crop, it can be contaminated by sclerotinia, the dominant disease, from the start of flowering and throughout the flowering period.

One of the areas of research focuses on the antifungal action of rhamnolipids and fengycins, natural molecules produced by bacteria.

Two PhD theses are currently underway on this subject. The aim of his research? "Both rhamnolipids and fengycins have properties

that stimulate plant defences, as well as direct antifungal properties. With this work, we're trying to understand the mechanism that makes a particular fungus more sensitive to one or other of these molecules, and why", she says.

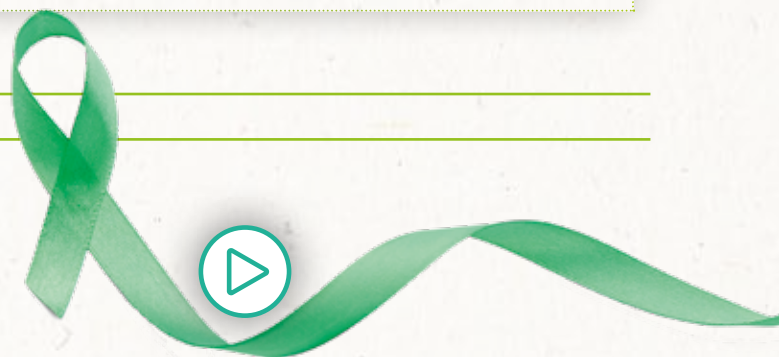
Which plant pathogenic fungi are we studying? "They are sclerotinia, the dominant disease of oilseed rape known as white rot, and botrytis, or grey rot. These are two fungi belonging to the same family, but we're realising that what works on one doesn't work on the other. So we can only propose effective solutions if we understand why", she explains. ■



SONIA RIPPA



Green dialysis



More than 50 000 people suffering from kidney failure in France require haemodialysis or artificial kidney treatment. As a nephrologist, Hafsah Hachad has come to question the environmental impact of certain techniques, particularly dialysis, in terms of both carbon footprint and water consumption.

These are issues that she wanted to explore in greater depth by starting a PhD thesis at UTC in autumn 2022, funded by the Institute for Environmental Transition at the Sorbonne University cluster. But before that - with the help of Cécile Legallais and Maryvonne Hourmant from the SFNDT's green nephrology working group - she had to spend a year establishing the state of the art in the field in order to propose "an original, relevant and coherent project, as well as proving the concept", she says. "We had to show that this project made sense and that it was of interest to nephrologists and dialysis centres alike", she adds. Support on the ground is essential for a project like this.

As far as the carbon footprint is concerned, her field studies in three dialysis centres proved to be in line with existing literature. "The carbon footprint is 9 tonnes per year for a haemodialysis patient in a serious case centre. In comparison, the average annual carbon footprint of a French



HAFSAH HACHAD

person is estimated at 9 tCO₂. That's 18 tCO₂ per dialysis patient per year. If we want to respect the Paris Agreement and limit the rise in temperature to below 2 degrees by the end of the century, we

need to reduce our greenhouse gas emissions, and in particular to 2 tonnes of CO₂ equivalent per year per inhabitant by 2050", she stresses.

Furthermore, in a world where water scarcity will require rigorous resource management, the issue of water consumption in haemodialysis is crucial. "During each session, nearly 400 litres of water are used to produce the dialysis fluid. In the end, each patient, with three sessions a week, consumes 75 m³ a year. However, pre-treatment of mains water in a reverse osmosis loop results in a large amount of waste (up to 250 litres per session), which is currently being wasted. With a view to conserving resources, this relatively constant quality water, which has never been in contact with the patient, could be recycled for a variety of purposes", she explains.

With this PhD, Hafsah Hachad hopes to find solutions to reduce the carbon footprint of dialysis and recover the concentrate for other uses. ■

Maths and complex issues



SALIM BOUZEBDA

Professor Salim Bouzebda has been Director of the Compiègne Applied Mathematics Laboratory (UTC-LMAC) since 2021. He explains how mathematics can help find solutions to environmental, economic and social challenges.

More concretely? "Mathematics plays a crucial role in understanding, modelling, measuring and optimising complex environmental, economic and social systems. Developing and modelling simple models from complex systems is a real challenge", explains Salim Bouzebda.

In particular, how do you model environmental

systems that are inherently complex? "We use a number of mathematical techniques, in particular simulation models that reflect reality as closely as possible. These simulation, regression and differential equation models have a huge advantage over real experiments in terms of cost", he explains.

Examples of the application of these methods?

RESEARCH

"Take, for example, the case of the carbon footprint, which a large number of universities are tackling. How can it be calculated? We can; to illustrate, model the greenhouse gas emissions associated with agricultural production, using parameters such as water and energy consumption and waste production. This can also be applied to different modes of transport. In this case, we will use data such as the distances travelled, the amount of fuel

consumed and the number of passengers carried. The aim of mathematical models is to enable a more detailed analysis to be made based on global data. An analysis that can be passed on to an ecologist, for example, to find an optimal solution to a particular environmental aspect. In short, these are decision-making tools", he stresses.

But when we talk about ecological transition,

we are also invoking investment in the green economy. "The cost aspect of the transition is important. In this case, the maths can be used to define the optimum solution for green investment. In renewable energies, for example, mathematical models seek to combine maximum yield and minimum cost. These models also involve analysing the risks, particularly the financial risks, associated with these investments", he concludes. ■

A commitment to the environment

From the outset, UTC-Compiegne has distinguished itself by promoting curricula including the human and social sciences. Its aim is to train 'humanist engineers'.

A research project on the environmental commitment of engineers has been set up with the support of the UTC's research department and in partnership with Antoine Bouzin, a doctoral student registered at Bordeaux University. "It's a project that is as much about student participation in the GE90 research seminar as it is about the IS00 UV, which is at the cutting edge of teaching. These are relatively new issues and the body of knowledge is far from stabilised. Hence the very strong link between teaching and research, in contrast to subjects where teaching is based on stabilised knowledge", explains Hadrien Coutant, sociologist at the UTC-Costech Lab. The aim of the research project? "To try and understand the driving forces behind the ecological commitment of engineers. It's a project based on the following empirical observation: there are a

lot of engineers in the pro-ecology movements, even though, paradoxically, engineers are the least politicised profession among university graduates", he points out.

The Marie-Curie project

This doctoral network project falls into the "Science of Excellence" category of the EC Horizon Europe programme.

What is special about this project? "It aims to fund theses and doctoral training in order to create a community of researchers around an innovative subject," explains David Flacher, an economist at UTC-Costech and the is fully involved in this project. "We proposed working on economic policies for the ecological transition. The idea is that if we want to think about this bifurcation, we

not only need to break out of the disciplinary silos, but also out of the academic ghettos, by involving other players", explains David Flacher.

What are the main themes of this project? "We have defined three main themes. The first concerns the critical analysis of the socio-technical dimensions of the transition. The second concerns the choice of macroeconomic scenarios that take into account material flows, North-South relations and product life cycles, for example. Finally, there is a more socio-ecological section looking at the transformation of organisations, work, the role of democracy and so on," explains David Flacher. The project will involve 11 PhD students.

Functional economics

As a senior lecturer in economics, Frédéric Huet quickly became interested in the issue of sustainability. One of his areas of research? "If we think about sustainability, we have to ask ourselves what changes to the economic model this implies. So we need to think about issues such as the use values to be mobilised, the remuneration to be applied, and so on. I quickly became interested in the function-intensive economy. In this model, the aim is no longer to sell the goods themselves, but to sell the use of the goods. From an environmental point of view, this model presents a number of virtues. On the one hand, we can pool the resources needed to produce these services. For example, you don't necessarily have to own your own car to use an individual transport service. But the most interesting thing is to realise that from the moment we stop selling material goods and start selling their use, the producer remains the owner from the beginning to the end of the life cycle. Like Michelin, we could lease tyres to road hauliers and be paid on



STUDENTS AND STAFF IN CIS (SUSTAINABLE ENGINEERING) AND CLT (LOW-TECH) DURING THE FESTIVAL DEVOTED TO DESIRABLE ENGINEERING



a mileage basis. The advantage? The company, which retains ownership of the product, has every interest in ensuring that the tyres are as long-lasting as possible, since it is the company that bears the costs of the product throughout its life cycle, and this is excellent in terms of preserving the environment," explains Frédéric Huet.

Another axis, transverse between UTC-Costech and UTC-TIMR, is personified by Olivier Schoefs, Director of Process Engineering at Costech and TIMR, who is also working on bio-waste management. This project is designed to meet the requirements of the Climate and Resilience Law, which, from 2024, will require local authorities to deploy bio-waste recycling services. "In this particular case, we need to answer a number of questions: what services should be put in place, what economic model should be used for these methanisation or other systems, how should they be organised, how will users take ownership of these services, etc.? Especially as, in the case of bio-waste, unlike a traditional life cycle analysis, we are faced with its variability from one district to another, from one season to another, etc.," says Frédéric Huet.

Low-technicisation

For Hugues Choplin, a lecturer and researcher in philosophy and sociology, low-technicisation requires "high science", a high degree of interdisciplinarity and, above all, a different vision of innovation. Moreover, some manufacturers are starting to take this issue on board, leading to concrete technological research projects.

For example? A research project involving UTC-Costech and Magali Bosch from UTC-Roberval Labs, looking at the sustainability of the aeronautical industrial system in 2050. "With Airbus Atlantic, we're looking at the sustainability



PASCAL JOLLIVET

of the aeronautical industrial system in 2050. Some of the manufacturer's players want to go beyond the issue of reducing CO2 emissions through the use of hydrogen, for example, and are looking at the cost to the climate of aircraft manufacture itself. In this case, how can the production process itself be low-tech? In other words, move towards a form of 'permafacture', as they call it themselves", explains Hugues Choplin.

Tensions between developing renewable energies and maintaining biodiversity

Pascal Jollivet, a lecturer and research scientist in economics, was approached in response to a call for projects led by Price Waterhouse Cooper on "the tensions or conflicts between the development of renewable energies, on one hand and the maintenance of biodiversity on the other". "What was interesting about this project, which I began by developing, was that it was based on a mix of expertise and research", says Pascal Jollivet.



FRÉDÉRIC HUET

What was his precise role in the project? "I focused in particular on "controversy" in the sense of public controversy. What was the idea? The idea was to study the antagonism between the development of renewable energies and the preservation of biodiversity. Hence, I had to reconstruct the controversies linked to this debate by drawing on the social networks to find out what people were saying on the subject. I drew on two different sources. The first was what 'average' citizens were saying, and the second was what academics were saying, based on research articles. From there, I compared the way in which the controversy was expressed by research scientists and how it was expressed in civil society. And I realised that in each group, there was a sort of 'black hole', in other words a certain number of unanswered questions but, above all, that there were subjects that were addressed in one group and completely ignored in the other, such as the issue of collapse, absent from the scientific community, even though people made the link between maintaining biodiversity and the fear of collapse", explains Pascal Jollivet. ■

pedagogical innovations & sustainable development



Issues related to sustainable development were not absent from teaching at UTC. The 'SD Reset' minor was created in 2012. Since then, the need to go further has arisen with the creation, in 2022, of the compulsory CC for all first-year IS 00 students and the 'Ingénierie Soutenable' (Sustainable Engineering) label, which cuts across the 5 majors' branches of UTC.

Hugues Choplin, a lecturer-cum-research scientist, in the field in philosophy and sociology, is the coordinator of the 'Ingénierie Soutenable' label, co-piloted by 'referent' teacher-researchers in all the majors' branches of UTC and is currently followed by nearly 100 students from these five branches. A label set up following the founding, in 2020, of the Collectif d'Ingénierie Soutenable (CIS) and, at the end of 2022, of the Collectif LowTech (CLT).

What makes these groups special? "Firstly, they are groups that include students and lecturers, each playing an equally important role. Secondly, they are driven by 'radical' demands in the noble sense of the term. In other words, the idea is to look at the roots of the way we operate and see how we can change them, for example our means of mobility, in the direction of greater sobriety", explains Hugues Choplin.

How can we transition towards greater sobriety? This is the question posed by these groups, who believe that Low-Techisation could be one of the ways of achieving sobriety. What do we mean by Low-Techisation? "It's about transforming high-tech systems to meet three requirements: sustainability, sobriety and the individual or collective appropriation of technical systems. This "low-tech" transformation requires a priori interdisciplinary "High Science" and, above all, a different sense of innovation! Firstly, we need to think about and invent more sustainable devices, such as computer cards made from flax fibre. Secondly, we need to question our lifestyles and open up new possibilities ("utilities"). For example, a car could go from being an individual asset to become a shared asset. Finally, we need to innovate in new ways, by making systems that people can easily appropriate, repair if necessary and so on," he stresses.

Inter-semester seminar and IS 00

Developing sustainable engineering is at the heart of the thinking of a growing number of UTC lecturers and, increasingly, students. This approach requires pedagogical innovations in both training and research.

For example, since the start of the 2022 academic year, IS00, a compulsory CC has been introduced for all 1st year engineering students (TC01) in which various laboratories, including Costech, collaborate.

What is the aim of this course? "It's to ensure that all students share a common language on environmental issues, which cover both techno-scientific and socio-economic aspects," explains Hadrien Coutant, a sociologist at Costech.

In addition, the GE90 inter-semester seminar, which historically focused on issues related to international economics and management, has been completely overhauled. "Open to all students but also to colleagues from other disciplines, David Flacher and I have decided to refocus it on environmental issues. Each year, in January, we explore a given theme in an interdisciplinary way. This year, for example, we tackled the theme of 'living things'. At the end of the seminar, the students, in groups of three or four, supervised by David Flacher, Hugues Choplin and myself, write a dissertation on a subject of their choice but related to the theme we all chose to address," explains Hadrien Coutant, who co-leads the seminar with David Flacher.

Erasmus Mundus Masters

On the strength of his experience with the first Erasmus Mundus Master's degree that he set up at

the University of Paris XIII, David Flacher decided to repeat the exercise as soon as he was admitted to UTC in 2017.

What is so special about an Erasmus Mundus Masters course? "We offer Master's course leaders in different European countries the chance to work together to build an integrated course on a trans-European scale. If it is selected, this course will benefit from European funding, in particular grants, more than three quarters of which are reserved for students from outside Europe. In the EPOG+ master's programme, run by the UTC, students spend the first year of the master's programme with one or two European partners, and the second year in France. It's a showcase for European higher education on a global scale," explains David Flacher, Professor of Economics.

Alongside UTC, eight main partners award degrees and nearly forty associates contribute to training. As the lead partner for the master's programme, UTC's main partners include the Sorbonne Université cluster and Université Paris-cité in France, the Universities of Turin and Rome 3 in Italy, the Vienna University of Economics and Business in Austria and the Berlin School of Economics and Law in Germany.

Associate partners include academic players from all over the world, as well as non-academic institutions such as the French Development Agency, the Intercontinental Network for the Social Solidarity Economy, CEPAL, one of the UN's five regional economic commissions, and UNESCO. "These are associate partners who can welcome students who wish to do so for their end-of-year Master's dissertation, depending on their project", he adds. The Erasmus Mundus Masters attracts more than 1 200 applicants of over 120 different nationalities each year, for a total of almost 50 places. What does the Erasmus Mundus Master's programme involve? "It is built around three major courses. One major is 'Innovation, knowledge and digital transition', the second is 'Socio-economic, macro-economic and financial transition' and the third is 'Sustainable development'. Students who choose a major become specialists in the field concerned. But our aim is above all for them to work together, whatever major they choose. For example, a student studying innovation issues should also be very familiar with ecological issues or the macro-economic problems that this could pose, so that his or her thinking on economic policies is relevant," concludes David Flacher.. ■



HADRIEN COUTANT



DAVID FLACHER



Natural alternatives to pesticides

Sonia Rippa, a research engineer at the GEC, is working in particular on rapeseed, with the aim of finding natural alternatives to pesticides.

Especially as the **Écophyto II+ plan sets a target of reducing the use of plant protection products by 50% by 2025**. This interest is reflected in the SHIELD project, funded by the ANR Ecophytomatisation research agency in partnership with Stepan Europe, a subsidiary of the Stepan Company (USA), and the RIBP laboratory (URCA, Reims). "I have been working for a number

of years on studying the effects and mechanism of action of rhamnolipids produced by bacteria, which also have properties that stimulate natural plant defence mechanisms. Together with my partners, I have demonstrated the benefits of these molecules for rapeseed.

Now, with SHIELD, the aim is to boost the effectiveness of these molecules against sclerotinia,

also known as white rot", explains Sonia Rippa.

What does this mean in practical terms? "We are studying different formulation strategies in order to offer a biocontrol solution based on natural substances. We're halfway through the three-year project, and we hope to find an alternative product by the end of SHIELD," she concludes. ■

Ecotrain, a futuristic shuttle

Walter Schön and Mohamed Sallak, respectively professor and lecturer at UTC, are both specialists in operating safety at UTC-Heudiasyc, a laboratory renowned for its high-level research. They have joined the ECOTRAIN project led by Philippe Bourguignon, a member of the ITM Albi-Carmaux Scientific Council until 2022.

The project is funded by the French Environment and Energy Management Agency (ADEME) and involves four industrial partners. Stratiforme Industries, Socofer, Clearsy and Syntony. The project will run from 2023 to 2027, with the first prototype due to be tested on a 10km stretch of track in Albi from 2025. What we have here is a project of immense environmental and social interest.

A number of railway lines of local interest have been withdrawn, leaving certain areas isolated, and for those areas where these lines remain, they represent not only a significant economic cost, but also an environmental one, since 42% of trains run on diesel.

What are some of the objectives of the ECOTRAIN project? "The aim is to introduce shuttle trains on lines averaging 50 km in length. Two types of rail shuttle, with a common technical base, are being developed. One for passengers (30 seats) and the other for micro-freight", explains Mohamed Sallak. What's special about these shuttles? "They will be 16 m long, autonomous (i.e., driverless), lightweight and battery-powered. The automated system will ensure a high frequency of service, timetables adapted to schoolchildren and workers, an on-off stop-on-request system, etc. In addition, the light material and the options envisaged in terms of rail design, in particular the use of new-generation rails, will ultimately make it possible to drastically reduce implementation and operating costs, and will also incorporate the issue of recycling," adds Mohamed Sallak. ■



WALTER SCHÖN



MOHAMED SALLAK





The activities of the TIMR, co-supervised by UTC and ESCOM, focus mainly on green chemistry and processes.

One of the objectives? "Khashayar Saleh, Professor at the UTC and Director of the TIMR, whose premises have recently been refurbished thanks to funding from the State, the Region and the ERDF, explains: "The aim is to reduce the impact on the environment as much as possible by using the most efficient and least polluting processes possible, but also to find solutions for recycling and recovering waste, for example.

What sorts of materials is UTC-TIMR working on? "We're working on champagne grapes, sugar beet and brewery spent grains. The aim is to extract the residual molecules of interest in the best possible way in order to reduce co-waste as much as possible. Take grape must, for example, which contains a wealth of polyphenols with recognised health benefits. Also in the area of health, we are working on the development of surfactants from silk waste using sustainable chemistry. Finally, another area of research concerns the recovery of shellfish (prawns and crustaceans) in order to extract compounds of interest that can be used to produce biodegradable packaging", explains Khashayar Saleh. The project is being carried out in collaboration with Sultan Ageng Tirtayasa University in Indonesia.

Mocopée 3, "the InnEAUvation Project"

Launched in 2014, Mocopée, a programme involving more than twenty research teams and industrial partners, has thus far passed two phases. The third phase, running from 2023 to 2027, which is part of the InnEAUvation¹ project, has just begun.



ANDRÉ PAUSS

The Mocopée programme, which stands for "Modelling, Control and Optimisation of Water Purification Processes", was created in 2014 as a result of the joint efforts of Siaap, UTC and Irstea. What is the Programme's aim? To create a permanent space for work and exchange between scientists - more than twenty teams are involved (university scientific bodies, national

research centres) - operational players in the water sector and industrial partners involved in urban water treatment.

What has changed since phase one was launched? "The number of players has increased, the budget has increased - around two million euros a year in consolidated budget - and today we have around 80 researchers," explains André Pauss. This makes it the largest public water treatment programme in Europe.

What's special about Mocopée 3? "This phase is undergoing a significant change, as Mocopée 3 is part of a wider programme known as "InnEAUvation". Whereas Mocopée 1 and 2 were essentially research and development programmes, InnEAUvation is based, in addition to Mocopée 3, on other pre-existing programmes and is intended to be more operational. It is a global approach, with the aim of moving towards industrial deployment. The results of some of the research carried out at the UTC are beginning to be tested on the Siaap water treatment site at Achères," he explains.

Today, Siaap is clearly positioning itself in favour of resource recovery. "As a water treatment operator, Siaap has changed its paradigm. We're no longer just in the business of purifying water. Questions are emerging: what do we do with the water as a by-product of the plant? Should it be discharged into the river, used for irrigation, re-injected into the network or into the water table? How do we recover the nutrients - nitrogen, phosphorus and potassium - contained in the water discharged from the cleansing plants? In short, water is a collection of by-products that need to be recycled. Wastewater treatment plants also produce energy, in particular biogas. The Achères plant is one of the biggest biogas producers in France. We're moving away from the logic of treating water to complying with standards to the implementation of policies that, while respecting this objective, go further in the recovery of by-products", he stresses. ■

<https://inneauvation.fr>

Methanisation, accelerating the development of renewable bio-gases

It was with UniLaSalle that research into methanisation was relaunched within UTC-TIMR in 2008. The research focuses on biogas production through the methanisation of organic waste, as well as the gasification of dry biomass.

This collaboration led to the creation of Soliméthas, a scientific interest grouping (GIS) between UTC and University LaSalle, with the aim of federating research and training activities in the field of methanisation of agricultural waste and by-products. After five years of activity, the GIS has been renewed for a further five years and is overseeing a number of research projects. These projects are carried out in a partnership with the Region, but also increasingly with industry, since they have led to three Cifre theses, which have resulted in five patents, one of which is UTC property.

These projects have earned the UTC and UniLaSalle both academic and industrial recognition.

The proof? The Cométhas² project. "In this project, two players in water and waste treatment in the Paris region, Siaap and Sycotom, launched a call for innovation partnerships for the co-digestion of solid and liquid waste. The aim is to co-treat sludge from wastewater treatment plants and household waste. Six consortia made up of industrialists and academics were evaluated, including ours with Sources and John Cockerill. They selected four of them, including ours, for a two-year phase, essentially based on R&D. Then, at the end of these two years, they selected only two for a pilot demonstration. We are one of them, UTC-Compiègne and UniLaSalle being the only French academic partners selected for this project", explains André Paus.



The project is progressing well, with a methanisation pilot plant now being set up at the Valenton site in the Val de Marne. The project could potentially move into a third phase with the development of an industrial reactor. ■

UTC is now 50 years of age !

Created in 1972 as an 'experimental' university of technology, UTC, a public establishment of a scientific, cultural and professional nature, welcomed its first class of students in 1973. I propose we explore these fifty years of history in the company of the person who carefully preserves the school's archives. Claire Etienne, in charge of the archives at UTC (University of Technology, Compiègne) whose responsibility it is to ensure that these collections are well preserved in her secure, temperature- and humidity-controlled storage.

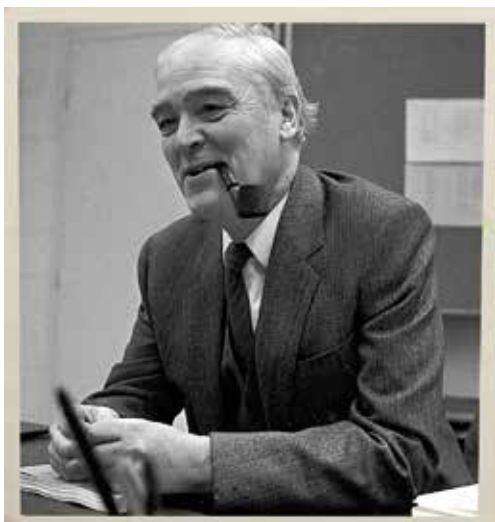
Welcome to this journey through the history of UTC !

I've selected a few highlight moments for you. It's impossible to be exhaustive, given there are so many. But first, let me introduce you to the UTC's archive centre. This building, entirely dedicated to the collection and preservation of the UTC's archives, was opened in 2009. Financed by the Picardy Region and the Compiègne agglomeration, it has made it possible to collect more than 2 linear kilometres of documents from all the UTC's entities: management, administrative and teaching services, departments, laboratories, lecturer-cum-

research scientists and student associations. Their retention period depends on their legal, practical, educational or scientific interest. After sorting, those that are of historical or heritage interest will be kept indefinitely, for the purpose of constituting the sources that make it possible to retrace the history of the UTC and preserve its memory.

Among the documents conserved are the archives of the UTC's founding president, Guy Daniélou, whose files retrace the birth of UTC, the archives of the first Head of the President's Privy Cabinet, the files of meetings of the Board of Directors, the Executive Committee and the Scientific Council, plus a collection of silver-salt and digital photographs

taken by Jean-Pierre Gilson since 1973, a collection of video cassettes of courses filmed for the Continuing Education Department in the 1980s, a collection of course handouts from 1976 onwards, student guides, collections of posters, student reports, models from the Industrial Design programme and archives donated by research professors as and when they reached their retirement... So, if you agree, follow me!



Let's start this beautiful story beginning in the 1970s

October 2, 1972

UTC was created by Government decree. Guy Daniélou, a naval officer and research engineer at the Commissariat à l'énergie atomique (CEA), had been working on the idea since the early 60s. Approached by Olivier Guichard, then Minister of Education, he left his post as head of the neutron reactor department at the CEA in 1972 to move to Compiègne, where he served as president of UTC from 1974 to 1986.

1973

In the absence of any new buildings, the newly founded university had no choice but to spread out over the town. It therefore multiplied its addresses while waiting for the construction of the Avicenne building, known as "Le Château", in October 1973, followed by the gradual opening of the Benjamin-Franklin Centre (1975-1976) and the Royallieu Research Centre (1977-1978).

September 1977

The first 41 students graduated from UTC, 27 majoring in Mechanical engineering, 10 in Biological engineering and 4 in Chemical engineering.



November 1978

Four personalities from the Chinese Embassy in Paris visit UTC to negotiate the enrolment of Chinese students. This visit was reported in the UTC's house magazine, informations.UTC n° 201 covering the week November 2 to 8, 1978, a real "Intranet" at the time! It already read: "These contacts follow on from the negotiations between the Chinese authorities and the French Ministries of Foreign Affairs and Universities to welcome Chinese students and research staff to France. The recent visit by the Deputy Prime Minister of Beijing comes to mind. A delegation from Compiègne could be sent to China to establish closer relations with a Chinese university.

It was against this backdrop that UTC's first "little sister", was initiated by Jean-Pierre Chevènement. In May 1985, negotiations were held between the Besançon School of Micromechanics, UTC-Compiègne and Franche-Comté's major industrial partners, Alstom, Bull and Peugeot. This branch, the future UTBM (University of Technology – Belfort – Montbéliard), dedicated to surface treatment and the design of industrial products, was initially planned to be located in the château in the town of Sévenans, near Belfort. The first matriculation of students took place on October 15, 1985.

1986

The Department of Technology and Human Sciences (TSH) was created, as a successor to a former division of "General Personality Development".



31st March 1987

President François Mitterrand came to lay the foundation stone of what would later become UTBM, the Belfort-Montbéliard University of Technology.

Moving on to the 1980s

In the spring of 1980

Spring-time 1980 saw the opening of the new Industrial Design course, created in 1979 within UTC's Department of Mechanical Engineering.

February 1985

The UTC model had proved its worth. The then President of the French Republic, François Mitterrand, and Jean-Pierre Chevènement, the French Minister for Education and Higher Education, visited UTC and announced their support in terms of human and material resources.



So, let us now pursue the journey celebrating the 50 years of the UTC with the years 1990s

1991

The first graduation ceremony took place at the Cultural Centre (Espace Jean Legendre), coupled with the award of Honorary Doctorates to three presidents of partner universities.



1994

Creation of the University of Technology, Troyes (UTT).

1996

Inauguration of the Pierre Guillaumat building

(PG). It bears the name of one of the founders of UTC, also 4th President of the University's Academic Council.

Now we have reached the year 2000

2000

The first academic year begins for students enrolling in the brand new Urban System Engineering (GSU) branch.

2004

Opening of the Science and Technology Master's degree following the Licence, Master, Doctorat (so-called L.M.D.) reform.

As we pause for a moment in this journey through time, I'd like to share this quote with you, dear readers:

"We even saw the creation of the first university of technology (Compiègne), like a planet among the stars - in short, competition between the grandes écoles and the universities, the 18th century in reverse [...]"

Source: Bertrand Lechevalier. L'université et les savoirs professionnels: les avatars d'un modèle médiéval? SPIRALE n°13, 1994 (Persée)

2005

Creation of the Shanghai Sino-European University of Technology (UTSEUS), founded on a pioneering and unique partnership in the fields of education and research between UTT, the two other French universities of technology, UTBM (Belfort-Montbéliard) and UTC (Compiègne), and Shanghai University.

August 17, 2008

Julien Bahain, who was to graduate in 2011 in Mechanical systems engineering after his admission to the "elite sports" programme proposed from the UTC, won the bronze medal in the Men's Four rowing final with his three team-mates, behind Poland and Italy, at the Beijing Olympics. He will be the God-Father of the 40th class of UTC graduates, on the occasion of the UTC's 40th anniversary.



September 6, 2012

The first stone of the UTC Innovation Centre is laid in the presence of Bernard Cazeneuve, Minister Delegate to the Minister of Foreign Affairs, responsible for European Affairs. Supporting the local UTC innovation ecosystem, the innovation centre will be similar to a research, training, development, industrial and technology transfer platform, integrating and supporting the innovation process in the conduct of collaborative projects.

"Technology is the word we ascribe to science when it deals with the products and processes of human industry" - Guy Deniélou

2012

The UTC became a founding member of the cluster Sorbonne Universités Community of Universities and Establishments (COMUE) (which became Sorbonne Université in 2018) along with six other French higher education establishments: Paris-Sorbonne University (Paris IV), Pierre and Marie-Curie University (UPMC), the European Institute of Business Administration (INSEAD), the Muséum national d'histoire naturelle (MNHN), the Pôle supérieur d'enseignement artistique Paris Boulogne-Billancourt (PSPBB), and the Centre international d'études pédagogiques (CIEP).

Would you like another quote?
I really like this one by the philosopher Michel Serres

"To create, to build, to manage, you need to have a memory, of trades and techniques, of people and places, of organisations and methods, and, at the same time, while you are creating, building and managing, you are making History".



An SD&RS (Sustainable development/Social Responsibility) project manager was recruited in July 2022 to help implement the selected actions.

The "introduction to environmental issues for engineers" foundation course will open at the start of the 2022-2023 academic year. It concerns all new UTC students, i.e., 483. Its objective is not only to provide an understanding of global changes (climate, resources, biodiversity, pollution, etc.) and their systemic dimension, but also of their implications for Society, particularly those that directly concern the engineering profession.

A new course, the cross-disciplinary Sustainable Engineering label, is also offered. It offers students a choice of credits in all the specialisations. These cover three dimensions of sustainable engineering: the systems approach and modelling, the low-technology approach, and critical reflection on our own cultures.

In addition, training courses have helped to raise awareness of climate issues among 20% of staff, and various initiatives are aimed at reducing the institution's carbon footprint.

Finally, to mark this strong commitment, in March 2023 the UTC will sign the 'Grenoble Accord', committing itself to 134 of the 180 measures in the accord.

And all this is just the beginning: a new department, "Ecological Transition and Societal Commitment", will be launched in June 2023, with the transverse mission of rolling out the approach to all the institution's activities, in order to create the conditions that will enable it to apply for the SD&RS label in 2025. ■ KD

Illustrations by Claire Etienne and Jimmy Achkar

Remember, the documents and data we produce today are the sources of tomorrow's history!

December 5, 2012

Claudie Haigneré, France's first female astronaut and Minister for Research and New Technologies in Jean-Pierre Raffarin's Government, was welcomed to UTC-Compiegne by Prof. Alain Storck, President & Vice-Chancellor of UTC, to attend the presentation of the CSTI (Scientific, Technical and Industrial Culture) network in Picardy. She had already visited UTC on several occasions, notably on October 17, 2003 for the Fête de la Science, when she decorated Francis Goubel, then Director of the doctoral school, who had been her physiology professor.

August 2016

Marie Gayot, a student engineer at the UTC, took part in the 4 x 400 metres relay at the Olympic Games in Rio, thanks to her runner-up finish in the European Championships for French women in the 4 x 400 metres.

And what happens in the "world after"?

Ecological transition and social commitment are becoming two of the institution's strategic priorities.

From January to July 2022, a major consultation of all UTC stakeholders will take place. It covers the UTC's 6 main areas of activity: research and innovation, student and staff training, communication, inter-campus transfers, real estate assets and administrative management. A total of 1 447 responses were received, including 927 from students and 441 from staff. Five priority actions were identified, including a core training programme for students, thermal renovation of buildings and solutions for soft mobility.



January 12, 2015

The Daniel Thomas Innovation Centre is inaugurated in the presence of Ms Fioraso, Secretary of State for Higher Education and Research to the Minister for National Education, Higher Education and Research.

Directors of University of Technology of Compiègne since 1972

1972	1987	1995	2005	2010	2011	2017	2021	2022
Guy Deniélou	Michel Lavalou	François Peccoud	Ronan Stephan	Pierre Charreyron	Alain Storck	Philippe Courtier	Christophe Guy	Claire Rossi

UTC, a local ecosystem that benefits the town of Compiègne

Combining the assets of a university with those of an engineering school, UTC-Compiègne represents a local innovation ecosystem where students are encouraged to take the initiative and become involved in the life of the city. The school is located on several sites, all within the city of Compiègne. As a result, the entire urban area benefits from a dynamic that is more than promising. Interview with Philippe Marini, Mayor of Compiègne, Chairman of the Compiègne Region Urban Area and Honorary Senator for Oise.

What is your view of the history of the UTC, as it celebrates its 50th anniversary?

Jean Legendre * set up UTC at a time when many people were opposed to it after the events of May 68. Elected members of the town council and local residents were opposed to the idea of setting up a university in the heart of the town. Pierre Guillaumat, a former minister under General de Gaulle and Jean Legendre were able to impose their vision for Compiègne. At the time, UTC proved itself highly innovative in making this establishment a university and a grande école of technology, even though these subjects were "despised" by a whole section of the intelligentsia. Today, UTC is an educational institution benefitting from a worldwide reputation, with partnerships in China and Brazil, for example. It is one of the best engineering schools in France. What's more, it has become a major asset for the city and a magnet for brains and businesses. Thanks to the presence of UTC, a favourable ecosystem for the development of companies with jobs that cannot be relocated has been established in the area. Compiègne would not be Compiègne without UTC!

What links does the university have with the town of Compiègne?

The town and its conurbation have benefited enormously from the presence of the university. First of all, it's located in the town centre, so it brings in young people, which makes our town centre more dynamic. Shops and services, such as sports clubs and cultural life, all benefit from the presence of these young people. UTC's community life is also part of the city's liveliness. The Imaginarium Festival is a popular event for young people. Festupic livens up the streets and parks in June. Of course, I cannot list all 155 UTC associations, but they are all useful. As for Tous Unis pour la Cité, this operation, which is now 10 years old, has made it possible to normalise relations between young students and local residents by integrating them into their adopted city from September onwards. Every year, the new undergraduate intake gets involved in improving the town by helping the municipal services, repainting a door, repairing a gate or planting bulbs for spring. It's a smart way of contributing to the day-to-day life of the people of Compiègne and getting adopted. It's also a way for young people to experience the reality of life in Compiègne's neighbourhoods. The UTC is also an architectural link that structures the South of the town. The main entrance to the town is via the main road that passes in front of the Pierre Guillaumat Centre, then in front of the Innovation



Thanks to the presence of UTC, a favourable ecosystem for the development of companies with jobs that cannot be relocated has been established in the area. Compiègne would not be Compiègne without UTC!

Centre, and in fact unites the town and its university. Compiègne's modern urban development over the last 50 years has been partly shaped by the development of the university.

Tell us about the projects and work being carried out by research scientists and students that are having an impact on the city, particularly in terms of a sustainable city.

On the community side, we have two areas of work with the UTC. Firstly, I'd like to emphasise the excellent relationship we have with the world of research. Lecturers and students regularly help us to move forward with our projects. For example, the station eco-neighbourhood project relies heavily on the work of students and their academics, both in terms of consultation with the station's residents and users, which is essential for us, and in terms of finding solutions adapted to the site's environmental constraints. We have been awarded the Eco-quartier label. This is a process that phases each stage of the project with stringent ecological requirements. The impact must be carbon-neutral, and we expect UTC to support us in each of these areas: the reorganisation of traffic flows, the place given to soft traffic, parking arrangements, resilient construction, green spaces, appropriate public lighting.... Here, UTC has a unique place to put the knowledge it has acquired into practice and to produce in situ the fruit of interdisciplinary research. It is the very foundation of the university to produce intelligence for the benefit of society. We also work with UTC via our business incubator. Many start-ups from the UTC develop their industrial projects in our incubator in the Rives de l'Oise Technology Park, which has

around twenty companies that are generally the result of private initiatives in conjunction with young research scientists and engineers. This link ensures that fundamental research and applied research are not pitted against each other, but rather that all the right conditions are created for the emergence of innovation to benefit both people and the economy.

What are your expectations for the future with the UTC?

Prof. Claire Rossi, the new President&Vice-Chancellor, Director of UTC, is a local figure! You can feel this in our discussions. She knows and loves Compiègne and wants to strengthen the links between the town and the university. On this basis, we are going to consolidate UTC's local development plan. We will support her in further developing the university, which needs land to expand and increase its student intake capacity. She and I share this builder's spirit, and her strategy for UTC can only be a good omen for the town. As another area for developing our relations, I have high hopes for UTC's skills in the very promising field of ecology, as we have initiated with the Eco-quartier station. We all need to be involved in this area, and I know that I can count on committed and efficient people. Finally, during our initial discussions, Prof. Rossi affirmed her desire to consolidate the university's relations with the local economic fabric, and in particular with SMEs. This is an area in which we can be very proactive, given our very good knowledge of this sector, which is very present in our intercommunal area. ■ KD

*Jean Legendre preceded Philippe Marini as Mayor of Compiègne

An immersive box that creates links

Thanks to the nomadic and immersive exhibition project supported by UTC's Communications Department, a new collaboration with the Lycée des Métiers d'Arts in Saint-Quentin has come into being. The idea is to create an immersive wooden space to broadcast podcasts created to mark the school's 50th anniversary.



students are always more committed. This was the case for Melissa Renard from the acoustics and vibration engineering course," points out Thomas Boutin, who was immediately attracted by the communications team's proposal. From an educational point of view, it's very interesting to be able to combine the skills and knowledge of the high school pupils and our students on such concrete projects," he continues. They can be proud of themselves. ■ KD

Another fruitful collaboration between the Lycée des Métiers d'Arts in Saint-Quentin and the UTC's industrial design engineering programme has led to the creation of the 50th Anniversary Box. Measuring 4 m² and 2.40 m high, the hexagonal-shaped box with a flat roof, made entirely of wooden panels was delivered at the beginning of June. "The specifications were very precise, but left plenty of scope for creativity. In particular, the box had to be able to be dismantled and reassembled on UTC's different sites, in an environmentally-friendly way. It is mainly made up of panels, assembled using wooden keys. It also has to have good acoustic properties so that you can experience a real immersion experience full of surprises," says Thomas Boutin, head of the IDI prototyping workshop. With a background in cabinetmaking that began at the Lycée des Métiers d'Arts in Saint-Quentin, he immediately thought of connecting the two establishments on this project when the UTC's Communications Department approached him. Not to mention embodying a sustainable development approach. In fact, both inside and outside the box, cardboard furniture specially created from recycled cardboard tubes will also provide a comfortable welcome so that you can fully enjoy the "Box des 50 ans" experience.

for five years, with our students in the first year of their cabinetmaking national diploma. Fifteen of them from all backgrounds are taking part in this project. They are extremely motivated by the project. They presented UTC with three lines of work to validate, in particular, the aesthetics of the box. After the creation and design phase, it was time for the complete manufacturing process. The students divided up the work: cutting the panels, making the keys, assembly, various machining operations," explains Nicolas Grenaut, 40, who teaches contemporary cabinetmaking to students on the Diplôme National des Métiers d'Art et du Design, cabinetmaking, heritage, digital and materials at the Lycée des Métiers d'Arts in Saint-Quentin. "Working with our students on a real project is always a great opportunity. The

TOUR OF THE IMMERSIVE EXHIBITION :

June 20: Opening at the UTC's Pierre Guillaumat 2 Centre until July 8

From July 10 to September 15: Compiègne Town Hall

From September 17 to 30 October 20: UTC's Library at the Benjamin Franklin Building

From November 2 to December 31 : at the UTC Daniel Thomas Innovation Centre

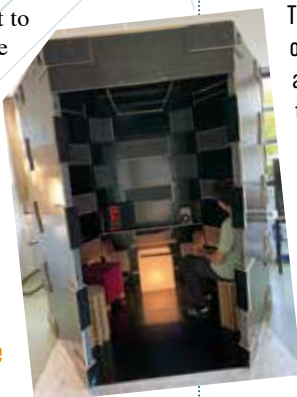
>> Information and opening times at www.utc.fr



Scan the QR code to see the video of the design of the "box" and the making of the podcast or go to www.utc.fr/50-ans/#box

The genesis of the "Nomadic and immersive exhibition" project

The nomadic and immersive exhibition was conceived with the aim of telling the story of UTC in an original way, other than in the form of a book that had already been produced for UTC's 40th anniversary. "Anne-Fleur Andrieu, a UTC graduate and producer of podcasts, suggested as an alternative a series of podcasts, in tune with the times and more "alive". We had to come up with a way of 'offering' these episodes, and the idea of a sort of 'cocoon' in which we could settle down and take the time to listen to the story came up," explains Dorothee Prot-Tombini, a graphic designer in the UTC communications team who has been working for over a year on the UTC's 50th anniversary and the concept of an immersive box. "We also wanted an exhibition that would reach out to people and be easily accessible. As there are several UTC buildings scattered around the city, the idea of a nomadic exhibition seemed relevant to us. That's how we came up with the idea of a 'box' that could be easily assembled, dismantled and transported by our logistics team, who provide invaluable assistance. We then designed the scenography of this exhibition around the box, which would include key dates in the history of UTC-Compiègne, photos and anecdotes in the form of multi-sized totems made of recycled cardboard".



Collaborative work between the two schools

"We've been in contact with UTC

LISTEN...

50 years of UTC history ... in podcasts

Anne-Fleur Andrie is the creator and author of several podcasts of personal accounts and audio documentaries. She has been living in the United States since 2011 and has been producing podcasts for various media and institutions since January 2021. With over 500 episodes of podcasts to her name, this former UTC student naturally came up with the idea of a podcast for the UTC's 50th anniversary.

Anne-Fleur Andrie is a graduate of UTC, 2012 with a degree majoring in Biological Engineering, Biomechanics and Biomaterials, is now a podcast producer after retraining in 2019, following a podcast project carried out with her employer at the time, MIT, Boston. Depuis, elle réalise de nombreux podcasts pour différentes institutions, comme le gouvernement français ou le CNRS.

Since then, she has produced numerous podcasts for various institutions, including the French government and the CNRS.

"When I heard about UTC's 50th anniversary, I got in touch with UTC's Communications Department to suggest the idea of a podcast. We worked together on this project for almost a year. It was a real collaborative effort to tell the story of UTC's 50 years through the testimonies of current and former students, professors, researchers, administrative staff and other agents, in five episodes that tell what UTC is, without trying to be exhaustive," explains the producer and director. The result is a total of five twenty-minute podcasts on the school's values, its commitment to the future of the planet, its

behind-the-scenes work, its local and international roots, as well as the UTC's uniqueness, its DNA, its educational innovations and its research.

Keeping in touch with the UTC

I discovered the world of sound in 2008 during my studies at UTC during a course on democracy. I got in touch with the local radio station Graf'hit, which is based on UTC campus, where I was able to do a column on Jean-Noël Moreau's programme. That was my debut in audio. It was a real revelation for me," confides Anne-Fleur, who more than loved this highly formative experience, which she was able to continue throughout her studies at UTC. She even chaired the radio station's board of directors during her final year. "For me, a podcast is an intimate medium where you only talk to the listener. The listener is in their own bubble, in a special relationship over a long period of time. Yes, you have the time to tell a real story with the power of your voice. I hope that these podcasts will also enable students to keep in touch and remain attached to the UTC in this way too. I'm extremely proud to have been able to be part of this project and I can't wait for everyone to be able to discover



these podcasts, which are available on all the dedicated platforms and at the exhibition organised by the Communications Department," concludes Anne-Fleur, for whom this is a fine way of bringing her UTC career full circle, having learned so much more than just how to be an engineer on a day-to-day basis. ■ **KD**

50 YEARS' HISTORY AT UTC

A series of Podcast Episodes

Scan the QR code or listen to the Episodes (in French) directly on one of UTC's social media sites.



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