

EMERGENCE(S)

KEY EVENTS IN RESEARCH AT THE UPPA

(N° 6 - DECEMBER 2018)



THE ATTRACTIVENESS
OF E2S UPPA

THE POWER
OF PARTNERSHIPS

GOING
GLOBAL

PAGE 3

A WORD FROM THE PRESIDENT

PAGES 4/5/6/7

E2S UPPA

- The attractiveness of E2S UPPA
- Interview with Bucur Novac
- RESET: CSR takes on its responsibilities
- CAPEESH: different perspectives on the energy transition
- TEEN: a Chair for a smoother transition

PAGES 8/9

PARTNERSHIPS

- The virtues of partnership in all its forms
- MANTA: a naturally innovative Chair
- Renewal of the structural geology Chair

PAGES 10/11

UPPA-TECH

- A unique instrumental services center
- 15 platforms of excellence
- IE ECP: like fish in water
- IXIA: a comprehensive service offer

PAGES 12/13

INTERNATIONAL

- Going global!
- AQUASALT: indicators for improved management of wetlands
- Horizon 2020: Rémy Guyoneaud, National Coordinator for "Climate action"

PAGES 14/15

THE ENVIRONMENT

- Bacteria to fight hydrocarbons
- The legal dictionary of ecological transitions
- BIGCEES: Big data to rescue the environment
- The Lindley Award!

PAGES 16-17

HISTORY AND HERITAGE

- HCP: a history Chair to shed light on the present
- Joseph Peyré: writing the world, a world of writing
- Archeology enters the third dimension

PAGE 18

PUBLICATIONS

- The double meaning of sentences
- Going beyond GMOs
- The First World War from the civilians' perspective
- The Garaison camp from 1914 to 1918

PAGE 19

IT HAPPENED IN 2018

- The plastic packaging of the future
- The Iberian Peninsula and the Maghreb in the Middle Ages
- 450 connected IT engineers
- Concrete on the Basque Coast
- ALTER: a new research center

PAGE 20

INTERVIEW

- David Diop: "I try not to analyze my writing while I'm writing"

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EDITORIAL



Do you speak English?

“Just a year ago, in the last issue of *Emergence(s)*, I wrote that the kick-off of the I-Site ***Energy and Environment Solutions*** project (E2S UPPA) was not an end in itself but the beginning of a fantastic adventure. And everything we hoped for has been fulfilled: the project is gradually gaining momentum, sometimes faster than expected, confirming a little more, each day, that we have made the right strategic choices.

Opening of three high-level international Chairs, creation of five new partnership-based Chairs, emergence of a service dedicated to strategic cooperation with the best universities in the world, valorization of our laboratories' scientific power through the deployment of an exceptional instrumental service center, a twofold increase in the number of courses taught in English, and so on. For the researchers of the Université de Pau et des Pays de l'Adour, 2018 definitely marked the beginning of a new era.

Our small university is gradually gaining international visibility and its fields of excellence are becoming increasingly recognized. Our efforts and the invested resources are starting to bear fruit. More particularly, they have proved beneficial for all our research teams, whatever their discipline (sciences and technologies, social sciences and humanities or European and international studies). I firmly believe that the future will be both multi-disciplinary and multi-scale.

Despite our new international dimension, we must never lose sight of the fact that our university is unique, through its diversity, the quality of its research work and its capacity to meet major global challenges as well as those on a local and regional scale: on one hand, the energy transition, water conservation, and so on; on the other hand, the history of the small winegrowers of South-West France, the study of trans-Pyrenean literary heritage, etc. As many diverse and captivating research topics for you to read about in the latest issue of *EMERGENCE(S)*, available for the very first time in English.”

Mohamed Amara
*President of the Université de Pau
 et des Pays de l'Adour*



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The attractiveness of E2S UPPA



Kicked off in 2017, the E2S UPPA (Energy and Environment Solutions) project has considerably stepped up the international visibility of the UPPA. Gilles Pijaudier-Cabot, Executive Manager of E2S UPPA, gives us a very positive initial report.

How is the E2S UPPA project being implemented?

The project is gradually gaining momentum and the results are already visible. When the first call for applications was launched in late 2017 for an international Chair on the theme of energy and the environment, threefold more applications than expected were received. About a dozen highly competent foreign researchers applied. For this reason, we decided to open not just one but three international Chairs as from the first year: mathematics and statistics [Kerrie Mergensen, Queensland University, Australia], electrical engineering [Bucur Novac, Loughborough University, Great Britain] and chemistry [Shih-Yuan Liu, Boston College, USA]. Through the recruitment of these prestigious researchers, the UPPA has proved its attractiveness, the quality of its research work and its equipment, as well as the visibility of its laboratories.

How does an international Chair work?

First of all, the Chair holder is chosen by the external Scientific Council, i.e. an external and independent body composed of six world-renowned experts. The objective is to support, over five years, the implementation of a research project spearheaded by an expert hosted at the UPPA for two months each year, and given a status of "International adjunct professor". The Chair holders benefit from substantial resources including two PhD students and post-doctoral researchers on five-year contracts. International Chairs are a valuable asset for E2S UPPA and effective levers for consolidating our partnerships with the universities to which our guest researchers belong.

What about partnership-based Chairs?

Although some international Chairs can also be partnership-based (such as the one headed by Bucur Novac), partnership-based Chairs mainly contribute to developing the relationships we have with our industrial and institutional partners. In addition to the five Chairs that were already in place at the UPPA when the E2S UPPA project was validated, the latter also plans to create 16 partnership-based Chairs by 2021. Five were launched in 2018, including four senior ones. The UPPA has thus demonstrated its ability to recruit – sometimes worldwide – experienced researchers who are willing to work with us for five years, on a full time basis. As a sign of the times, almost 300 candidates – half of them international applicants – applied to obtain one of the eight PhD student positions opened as part of E2S UPPA. We are supporting this impetus upstream by teaching most of our training courses in English. 54% of the Master's courses under the scope of E2S UPPA are now taught in English (compared with just 18% last year).



Interview

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Professor of High Pulsed Power at Loughborough University (Great Britain), at the head of the Plasma and Pulsed Power Group (P3G), Bucur Novac is also the director of the international Chair in electrical engineering of the UPPA.

How did you find out about the UPPA?

The partnership between the P3G group of Loughborough University and the UPPA's research team on high pulsed powers at the IPRA-SIAME laboratory is a long-standing one and has been very fruitful in the past. We have published many co-authored articles in renowned international reviews and have often given joint presentations of our work at the best conferences in our field.

Tell us about your international Chair in electrical engineering...

The main objective is to help the active team of the UPPA to carry out research work in the two fields related to the possible applications of high pulsed power: first, the treatment of cancer using non-invasive pulsed electric field techniques, and second the electric fracturing of solid rocks in the areas of mining and geology. The team includes UPPA researchers, as well as three PhD students and five postdoctoral fellows I will be supervising. We have great ambitions. Our main goal is to make discoveries and extend knowledge well beyond the current state-of-the-art worldwide.

What are the benefits of the Chair with regard to your own research work?

My group, P3G, has long been in close contact with Laurent Pecastaing's team in Pau. In fact, this is the reason why both teams have been collaborating for several years to study non-invasive pulsed electric field methods applied to agriculture, food industry, and health. In my view, this Chair was created just at the right time. It will enable us to combine our efforts to take developments further and to better integrate the studies of our respective research groups. The PhD students of the UPPA will certainly have the opportunity to come and work at Loughborough University. Likewise, some of my students will also have the chance to come and work in Pau, and perhaps taste some of the incredible food and wine the region has to offer!

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RESET CSR takes on its responsibilities

The CATT and CRAJ laboratories study the corporate social and environmental responsibility of the businesses in the French region of Nouvelle-Aquitaine. An ambitious project at the crossroads between economic science and law.

Born in the 1950s in the United States, the concept of corporate social and environmental responsibility (CSER) has since taken hold worldwide. “CSER covers the best practices introduced by businesses in order to promote and integrate social, environmental, societal and economic issues through the prism of sustainable development,” explains Patrice Cassagnard, a researcher at the center for theoretical analysis and processing of economic data (CATT). Sometimes carried as a standard, CSER is most often materialized through a charter summing up the commitments of the company: responsible purchases, respect for the environment, exemplary work conditions, etc. On paper things look simple, but in practice it's a totally different ball game.

Arnaud Lecourt, researcher at the CRAJ (center for legal research and analyses) gives a more nuanced picture: first of all, the contours of CSER are not properly defined. There is still no firm boundary between soft law – i.e. what is done on a voluntary basis – and hard law – what is done out of obligation. Some principles promoted as values are the result of legal, prescriptive or regulatory obligations. Others, spun out in terms with no legal significance, are but good intentions. What's more, over 60.4% of French businesses with more than nine employees say they know nothing

about CSER. And the smaller the businesses, the less informed they are. “Consequently, most French businesses see CSER as a useless constraint without realizing the substantial economic and social advantages they could gain from it,” says the researcher regretfully. With his colleague Patrice Cassagnard, his resolute ambition is now to tackle CSER from a different angle, combining both legal and economic sciences.

The project called RESET (which in French stands for Corporate social and environmental responsibility in the region of Nouvelle-Aquitaine) was launched in late 2018 for a period of three years. Co-financed by the region of Nouvelle-Aquitaine and led jointly by the CRAJ and CATT laboratories, its initial aim is to assess how the land lies where soft law and hard law are concerned. For this purpose, a questionnaire will be sent to the hundred or so businesses in Nouvelle-Aquitaine with more than 10 employees. The data gathered will then be econometrically analyzed based on a mathematical model designed by the team. In addition, the two experts in Pau will strive to build a regional network of researchers, which will undoubtedly prove to be a valuable and lasting tool for both public authorities and businesses.

CAPEESH Different perspectives on the energy transition

Physicists and economists join forces to design a tool for optimizing the production and consumption of renewable energies

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The heat, energy and processes laboratory (IPRA-LaTEP) has been working on the energy transition issue for many years. "Modeling the energy requirements of a home, correlating the need for and the production of renewable energies, etc. are all things we know how to do," ensures Erwin Franquet, physicist. "On the other hand, anticipating market reactions in order to propose realistic solutions that meet both business' and consumers' needs, calls for specific competencies." To come up with a solution, the researcher – who belongs to the LaTEP – thought of turning to his colleagues at the CATT (the center for theoretical analysis and processing of economic data). This cross-disciplinary approach that involves combining notions of physics and economy, came into being in late

2018 with the launch of the CAPEESH project (Combined Analysis for Physical and Economical management of Energy Systems for Housings). Financed by the region of Nouvelle-Aquitaine, the research work carried jointly by the two laboratories for a three-year period aims to design a tool that will help to improve the management of electricity demand. As an active participant in the project alongside Erwin Franquet, Carole Haritchabalet – Co-Director of the CATT – is very pleased with this unprecedented partnership: "Our ambition is to build a new paradigm in the interests of electricity suppliers, households and the energy transition."

TEEN A Chair for a smoother transition

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Xavier Arnaud de Sartre is the holder of a new senior partnership-based Chair devoted to studying the impacts of the energy transition on the regions and local populations.

Research director at the CNRS and in the PASSAGES laboratory, Xavier Arnaud de Sartre was also appointed as the holder of a senior partnership-based Chair in September 2018, whose members include Total, the *Compagnie d'aménagement des coteaux de Gascogne* (company for the development of the Gascony hillsides), the pôle Avenia, the BRGM (French bureau of geological and mining research), and the Pau Béarn Pyrénées conurbation. Called TEEN (standing for "the regions in the energy and environmental transitions"), this E2S UPPA Chair is the result of his relentless work upstream. "The opposition to urbanization and industrial projects is what fueled our approach, and our aim is not only to explain this but also to find solutions," sums up Xavier Arnaud de Sartre. "The current energy transition is a source of many uncertainties: local authorities lack legitimacy, organizations are sometimes strongly opposed to the transition itself, technologies are not yet sufficiently mature so that they can be used without risk, and so on. All this makes the social tensions in the regions all the more visible." The disagreements concerning the nuclear waste burial site in Bure is just one example. To lift these restrictions, the researcher is inviting the Chair partners to examine the regional scope of their actions in order to help them better understand what is at stake. For this purpose, Xavier Arnaud de Sartre has the support of a strong team composed of a senior researcher responsible for projects involving local authorities, a junior researcher in charge of subsurface projects, two post-doctoral researchers and three PhD students.



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The virtues of partnership in all its forms

Vice-President of the University appointed to partnership-based research and transfer, Christophe Derail has long been convinced of the benefits of partnerships for academic research. At the head of the common laboratory LERAM (studying rheology and the adhesion of wound dressings), he has been working for several years with the researchers of the French company Urgo, renowned for its Band-Aids®. "Working as part of a common laboratory is hugely beneficial," he tells us. "The trust relationship established with the industrialist enables us to think things through to the long term, which is profitable for both the company and the university."

Director of the common research laboratory SAGE (sciences applied to electrical engineering), associated with the CEA (French atomic energy commission) and alternative energies, Laurent Pécastaing is just as enthusiastic: "The system is both a facilitator and an accelerator. As soon as we have an idea, it is formalized in a contract. With common labs, projects move ahead tremendously fast."

The UPPA relies on the common laboratories and partnership-based Chairs to further enhance its fields of excellence and establish long-term partnerships with businesses

In addition to the LERAM and SAGE, the UPPA has three other common laboratories that attest to the ties gradually established with private research. The LFCR (laboratory of complex fluids and their reservoirs), founded in 2003 as a mixed research unit with Total and the CNRS, blazed the trail. Its teams and the quality of its research are now recognized worldwide. The C2MC (common laboratory for molecular mapping of complex matrices), which includes the CNRS, Total, the INSA and the University of Rouen, focuses on the analysis of physico-chemical processes in fossil and plant raw materials. Lastly, the common laboratory created in 2017 with Nobatek/INEF4 on the topic of architectural and urban physics, and headed by the researcher Benoît Beckers, is on the verge of becoming a reference in Europe.

The UPPA's ambition to step up its partnerships with businesses is also highlighted by the increasing number of partnership-based Chairs. In addition to the five already in place (X-ray imaging, structural geology, Optima, sustainable construction and history, cultures and heritage), the University has opened five more as part of the E2S UPPA project, one junior with Hugo Santos Silva (Estimator/molecular modeling) and four senior: Fabrizio Croccolo (CO2ES/energy storage); Volker Roeber (HPC-Wave/wave modeling); Xavier Arnaud de Sartre (TEEN) and Susana de Matos Fernandes (MANTA/biomimetics). "Beyond the project itself and the added visibility given to our work with regard to the general public thanks to possible applications, a partnership-based Chair is also a unique chance for researchers to develop specific competencies and conduct some great research!" underlines Christophe Derail."

The liaison bureau

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The UPPA is setting up a liaison bureau (as part of E2S UPPA) designed to simplify and rationalize the relationships between the competencies offered by the university and the socio-economic partners. It is both a single point of contact and a tool accessible to all personnel in the UPPA. It serves to inform partners, analyze their requests, identify their needs, collect information, and pass on and process their demands. For this purpose, the bureau will be equipped with client relationship management (CRM) tools and will organize collective actions (thematic days, etc.) and foster partnerships.

MANTA A naturally innovative Chair

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Susana de Matos Fernandes was recruited by the UPPA at the end of 2018 to head a new partnership-based Chair focused on biomimetics.



Biomimetics? Laurent Billon prefers the term bioinspiration. As a researcher at the IPREM, he has been developing materials inspired by nature for several years. “We have a lot to learn by observing the animal and plant world, in terms of functionality, structure, and architecture. For example, I’m thinking of the structural colors of butterfly wings, of the architecture of leaves conducive to photosynthesis, of the mechanical properties of shellfish, and so on.”

The UPPA started taking interest in the topic around a decade ago, led by the IPREM and the LFCR. A decisive step has now been taken with the creation of a partnership-based Chair headed by Susana de Matos Fernandes as part of the E2S UPPA project. Susana is recognized as an authority in her field and has a résumé as long as the tentacles of a giant squid so to speak! Specialized in the study of natural polymers, she has put her talents to good use at the University of Aveiro (Portugal), the University of the Basque Country (Spain), the Royal Institute of Technology (Sweden), the University of Uppsala (Sweden again) and the UPPA that she joined in 2017 following the call for projects Tremplin-ERC (aimed at promoting French researchers at European level).

Naturally inquisitive, Susana de Matos Fernandes chooses her research topics based on the observation of her surroundings. It’s by looking at two transparent fish in an aquarium one day that she ended up coming across strange bioactive molecules with surprising properties. “I realized that these molecules had, in fact, nothing to do with transparency; that they were soluble in water, present in fish skin and eyes, and capable of absorbing UV radiation.” Without a second thought, the researcher took the bull by the horns and set out to discover the origin of these molecules synthesized by algae that fish feed on. She immediately imagined tangible applications such as natural materials for solar protection.

Algae are precisely at the heart of her new Chair called Manta (Marine Materials) which has enlisted the Laboratories of Biarritz specialized in bio-innovative solar protection. Assisted by four PhD students and post-doc researchers on a two-year contract, Susana de Matos Fernandes now has five years to design revolutionary biomaterials with zero impact for both populations and the marine ecosystem. A project that will keep them as busy as bees!

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Renewal of the structural geology Chair



The structural geology Chair attributed to Jean-Paul Callot in 2011 helped formalize the strong cooperation between university research at the LFCR and Total’s research groups in the field of geosciences. After five years of success during which 11 theses, 13 post-doctoral projects and about 20 one-off specialist actions were achieved, the Chair has just been renewed until 2023. “The experiment proved that a strong bond between a dynamic research team and an industrial partner intent on promoting scientific exchanges is an ideal framework for research; this model should continue to grow, in particular as part of the E2S UPPA project,” says Jean-Paul Callot.



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UPPA-TECH

A unique instrumental service center

Open to the laboratories and partners, the instrumental service center comprises all the technical platforms of the university since January 1, 2018.

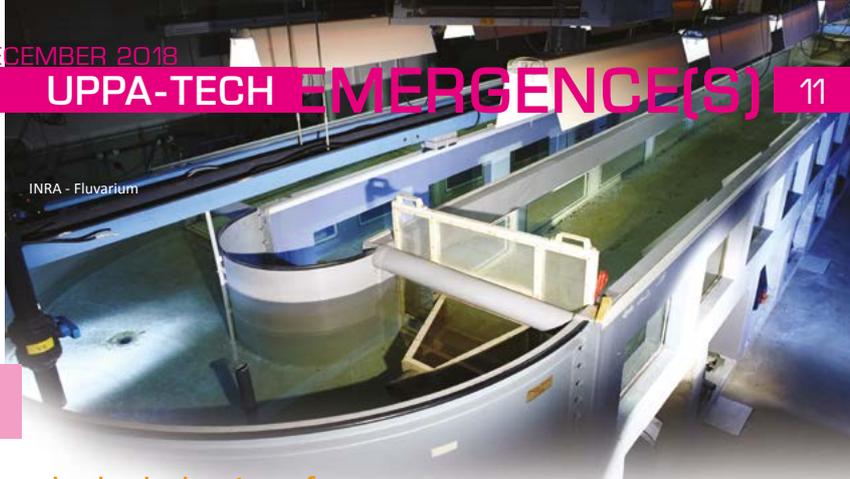
In her role as advisor for the implementation of the instrumental service center (UPPA Tech), Isabelle Le Hécho loves reeling off the long list of equipment that makes up this powerful and one-of-a-kind platform. Spread over several sites in the departments of the Pyrénées-Atlantiques and the Landes, the 15 technical and thematic platforms that form the instrumental service center are valuable tools for innovation and territorial development intended for researchers and businesses alike. "We provide our partners with installations manned by highly competent personnel," explains Isabelle Le Hécho. "For example, we have a mass spectrometry center equipped with exceptional experimental tools, a latest-generation imaging center with two X-ray tomographs, a technology center for food-processing, an experimental river that is unique in Europe, etc."

Above all, everything is done to make them easy to use. In every laboratory, each platform is managed by a person in charge of evaluating needs and the feasibility of the service or research partnership. "Insofar as possible, we want to make this equipment available to as many businesses as possible, from local SMEs to multinationals," she continues. "It is equally intended for historical partners such as SAFRAN or TOTAL and small businesses – like SYCLOPE in Sauvagnon that develops and manufacture sensors; or the start-up NOOSTRIM (based in Pau), which is specialized in plastic food packaging." Company visits are regularly organized for this purpose, either on request or via the Pyrénées-Adour business cluster (CEPyA). "This set-up of E2S UPPA is an asset for galvanizing the region, and also for developing new research projects and enhancing the visibility of our laboratories."

15 platforms of excellence

- **POLYCaTS:** analysis and characterization of polymer materials (IPREM)
- **EcoMeS:** emerging contaminants, speciation, omics (IPREM)
- **I³:** inorganic, isotopics, imaging (IPREM)
- **Characterization of surfaces and interfaces** (IPREM)
- **Microbiological characterization** (IPREM)
- **IE ECP:** experimental installation studying the behavioral ecology of fish (INRA - ECOBIOP)
- **G2MP-GC:** geomechanics, porous media and civil engineering (IPRA-LFCR)
- **MAVERIC:** template for the experimental validation of cooling by controlled injection (IPRA-LMAP)
- **CFC:** complex fluid characterization (IPRA-LFCR)
- **The energy transition and non-fossil energies** (IPRA-LaTEP)
- **PHT:** high-voltage processes (IPRA-SIAME)
- **DMEX:** development of experimental methods
- **CRG:** geological reservoir characterization (IPRA-LFCR)
- **Technology center for food-processing**
- **Scientific computing**

IE ECP: Like fish in water



INRA - Fluvarium

The experimental installation ECP is used to study the behavior of migratory fish in controlled or semi-natural environments

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The experimental installation, “Behavioral ecology of fish” (IE ECP), is one of the 15 thematic platforms of the UPPA’s instrumental service center. It is backed by the ECOBIOP laboratory, whose main aim is to gain knowledge on the effect of environmental stress on fish populations. The equipment is essentially spread over two sites in the Pyrénées-Atlantiques department: the experimental technical platform on the Aquapôle site in Saint-Pée-sur-Nivelle, and the experimental site of Lapitxuri in Ainhoa. The set-up is completed by an “in nature” instrumented observatory site located on the Nivelle, a small coastal river belonging to the

international network of “Index Rivers”.

The platform in Saint-Pée is specifically designed for experiments in a controlled environment. Alongside an energy workshop with respirometry equipment and an outside platform with experimental basins, it includes a 10-m long circular fluvarium with an inside current and two chronotrons simulating the tides. Light, water quality and temperature are just some of the parameters that can be adjusted to conduct research on wild fish populations (eels, salmonids, Allis shads, etc.).

Upstream of the Nivelle basin, the Lapitxuri site also boasts original equipment, unique in Europe, including an experimental channel of 130 m, with an adjustable inflow rate, for studying fish – day and night – growth, dispersion, reproduction, thanks to underwater observation stations and video equipment. “Because our installations are so diverse and complementary, we can conduct research work at different scales, from individual fish to the entire population, and thus adapt to specific needs,” rounds off Jean-Christophe Aymes, Co-Director of the IE ECP.

> www6.bordeaux-aquitaine.inra.fr/ie-ecp-ecobiop

IXIA

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A comprehensive service offer

The Nouvelle-Aquitaine region and the UPPA are investing to create the IXIA platform (X-ray tomography, ionic sensors and laser ablation).

The study of matter to understand its properties requires the development of new analysis strategies based on multi-scale and multidisciplinary approaches. In this respect, the aim of IXIA is to federate high-level experimental competencies in association with three existing platforms: the I³ platform - particularly its centers of expertise on the analysis of trace metals by laser ablation (PAMAL) and NanoSIMS imaging in cooperation with the MARSS team - the “Characterization of surfaces and interfaces” platform and the DMEX platform. “The equipment and the fact that it is located on just one site - the Pau campus of the UPPA -



DMEX - Tomographeur - Peter Moonen

makes our offer unique, not only in France but in Europe too,” says Peter Moonen, Manager of DMEX, enthusiastically.

By coupling multi-scale imaging with the quantitative analysis of organic and inorganic products, IXIA strives to meet the needs of researchers and private partners in terms of imaging, dating and traceability. The platform will be of interest to a wide variety of sectors including energy, the environment, archeology, oil & gas exploration, petrochemicals, anti-counterfeiting, biology and biomedicine, surface treatment and food processing.



Going global

The International Project Unit is a new support service designed to strengthen strategic partnerships with target universities and to promote the UPPA abroad. It is a complement to the Europe cell and the International Welcome Desk backed by E2S UPPA.

Hired in 2018 as part of the E2S UPPA project, Sabine Balas is in charge of international partnerships. The young woman previously worked in the field of international cooperation, and her current mission is to give substance to the International Project Unit, in particular by focusing on a list of target universities. "Many partnerships already exist, in Europe of course, but also with a large number of establishments worldwide," she says. "The idea is to develop and step up partnerships on energy and environmental topics with the most prestigious universities." Twenty or so establishments in Europe, America and Asia have already been pinpointed: Chalmers University of Technology in Sweden, the MIT and Stanford in the United States, the UNAM in Mexico, China University of Petroleum in Beijing, among others. Drawing on existing partnerships, the International Project Unit explores opportunities, puts the UPPA's researchers in contact with their counterparts and follows-up relationships over the long-term. To this end, the university is striving to implement a specific CRM (Customer Relationship Management) tool designed to centralize – in a database able to produce reliable indicators – research contracts, the projects in progress and all sorts of useful information.

In her position as Manager of the Europe unit, in charge of supporting European project leaders, Mélodie Falcon holds a key role.

To gain greater visibility, the UPPA is now taking part in international exhibitions (such as the EAIE in Geneva) and regularly organizes visits of foreign delegations to the Pau campus. For example, 30 or so participants from 25 different universities were in Pau last October to take part in the "International week".

"The UPPA can definitely count on its fields of excellence, its exceptional instrumental power, the quality of its laboratories, its high-quality training courses and its privileged setting to arouse the interest of the best research teams worldwide," says Sabine Balas.

An additional strength is the gradual internationalization of our Master's degrees, an important lever for attracting the most talented foreign students.

The creation of an International Welcome Desk in 2018 was another sign of the international opening of the UPPA; its aim is to welcome foreign students, researchers and lecturers and answer any questions they might have about preparing their stay or settling in. Claire Harai and Caroline Hanin are in charge of the offices, respectively in Pau and Anglet. Let's rock!

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AQUASALT Indicators for improved management of wetlands

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Financed by ERANET MED and coordinated by the UPPA, the AQUASALT project studies the impact of human and agricultural activities in arid and semi-arid environments.

Water resources are becoming a major global concern, particularly in arid and semi-arid zones subject to intense agricultural stress. One specific example is the Mediterranean region where water resources are scarce and hard to come by. “We are aware that human and farming activities have an effect on the water resources and ecosystems of these very particular environments, but we currently lack reliable indicators for measuring exactly what their impact is,” observes Robert Duran, microbiology professor at the IPREM (Institute for analytical sciences and physical-chemistry for the environment and materials). He fully intends to fill the void through the AQUASALT project, kicked off last September, with the support of the European program ERANET MED.

The resources mobilized are commensurate with the stakes involved, as the project is carried by a large research team composed of European (France,

Spain), North African (Tunisia, Morocco, Algeria) and American (USA) scientists. The activities of the AQUASALT project will be conducted in two areas protected by the Ramsar Convention – pertaining to the preservation and sustainable use of wetlands. First, the central valley of the Ebro (Gallocanta and Monegros, Aragon, Spain). Second, the hydrological complex of Ichkeul Lake / Bizerte Lagoon (Tunisia). The IPREM will be performing microbiological analyses of molecular diversity.

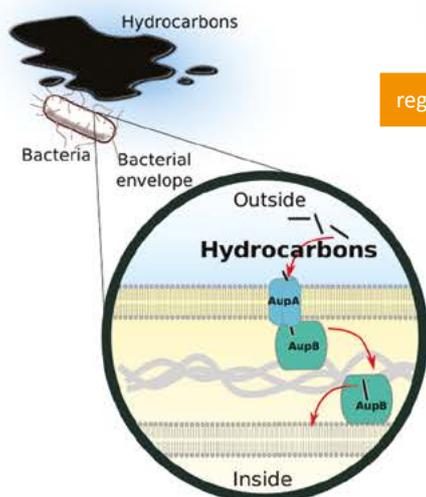
“The main objective is to characterize the impact of farming activities on microbial communities in order to determine relevant microbial indicators. These bio-indicators, adapted to the appearance of salt, should provide essential information for evaluating environmental health and helping to improve how these wetlands, so specific in nature, are managed.”

HORIZON 2020 Rémy Guyoneaud National Coordinator for “Climate action”

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He doesn't yet make the sun shine or the rain fall, but he's not far from it. The French Ministry of higher education, research and innovation appointed Rémy Guyoneaud, microbiologist at the IPREM, as Coordinator of the national contact points (NCP) network for the Horizon 2020 program in charge of the challenge “Climate action, environment, resource efficiency and raw materials”. He is now head of a network of scientists from many different backgrounds – the ADEME, IRD, CEA, IRSTREA, Universities, CNRS, ministries and competency hubs – responsible for informing and raising awareness among the French research and innovation community with regard to opportunities for European funding as part of Horizon 2020. The missions of the NCP also include helping, advising and providing training on how the program works. In this case, the team spearheaded by Rémy Guyoneaud focuses on environmental subjects: circular economy, waste, water resources, biodiversity and ecosystems, raw materials and climate change.



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Bacteria to fight hydrocarbons

Researchers at the IPREM shed new light on the molecular mechanism involved in hydrocarbon degradation.

The *Erika* and *Prestige* shipwrecks, in 1999 and 2002 respectively, marked the collective memory. Ever since these fateful events, Régis Grimaud, microbiology professor and specialist at the IPREM, tasked with developing biofilms at the interfaces between water and hydrophobic organic compounds, has relentlessly studied the bacteria that contribute to the biodegradation of hydrocarbons in seawater. Many stems have been isolated and the corresponding metabolic pathways elucidated. However, little is still known about the molecular mechanisms that these bacteria use to access hydrocarbons (insoluble in water), capture them and absorb them. The work initiated by Julie Mounier in her thesis – that she defended at the UPPA in 2013 under the direction of Régis Grimaud and Pierre Sivadon – opened up prospects by taking a closer

look at the bacteria *Marinobacter hydrocarbonoclasticus*. “We discovered two new protein-coding genes, *aupA* and *aupB*, that allow the hydrocarbons to enter the cell where they are then broken down into lipids. The function and distribution of these genes give the bacteria a selective advantage that enables them to proliferate in the contaminated seawater and thereby contribute to eliminating the hydrocarbons,” explains Régis Grimaud, who, alongside Julie Mounier, Florence Hakil, Priscilla Branchu, Muriel Naïtali, Philippe Goulas and Pierre Sivadon, signed an article published on June 5, 2018 in the scientific review *mBio**. Beyond the benefits for the environment, this discovery also opens up the possibility of transforming hydrocarbons into lipids to make cosmetics or lubricants for example.

* <https://mbio.asm.org/content/9/3/e00520-18>

The legal dictionary of ecological transitions

An ambitious book aimed at anyone, whether legal experts or not, who might be confronted with legal issues on the path to ecological transition.



Deputy Director of the CDRE (Documentation and European research center) in Bayonne, Fabrice Riem also represents the Lascaux Center on Transitions at the Michel Serres Foundation. In this respect, he took part in writing the *Dictionnaire juridique des transitions écologiques* (Legal dictionary of ecological transitions) that examines a number of concepts pertaining to the law, such as exact, social or human sciences. Investigation of these concepts showed

that it will be impossible to take concrete actions for ecological transition if nothing is done to include them in legal texts. The well-established scientific committee, to which Fabrice Riem and his UPPA colleague Alain Bernard belong, mobilized a network of over 120 French and foreign researchers. This book follows on from the project “Ecological transitions and integrated agri-food systems” (ETIAS) pertaining to the evolution of agri-food systems at regional scale.

> *Dictionnaire juridique des transitions écologiques*, under the scientific direction of François Collart Dutilleul, Valérie Pironon and Agathe Van Lang. University Institute of Varenne. 2018.

BIGCEES

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**Big data
to rescue the environment**

Researchers at the IPRA-LMAP (Laboratory for mathematics and its applications) in Pau are steering a multidisciplinary project combining data analysis and statistics at the service of ecology.

On one hand is the Earth, undergoing unpredictable climate changes, and on the other hand is an unprecedented and under-exploited data deluge on coastal erosion, pluviometry, marine pollution, etc. In the middle, two statisticians of the IPRA-LMAP (Laboratory for mathematics and its applications) in Pau (Benoît Liquet and Noëlle Bru), an oceanographer (Damien Sous, from the University of Toulon) and a project: BIGCEES, standing for “big model and big data in computational ecology and environmental sciences”. A member of the MIRA federation (aquatic environments and resources) associating researchers of the UPPA, the CNRS, the Ifremer and the INRA, Benoît Liquet had the idea of forming a multidisciplinary team to

process and cross-reference existing data in order to model the impact of climate change on the environment and natural resources. A bold objective, as the ambition of this tool – yet to be created – is to predict coastal risks due to extreme events. For this purpose, the group is composed of mathematicians (IPRA-LMAP), experts in coastal engineering (IPRA-SIAME), hydrologists (the Irstea) and halieutic specialists (the Ifremer).

The first task is to evaluate the impact of climate change on the marine species of the Bay of Biscay. The MCI (the mesocenter of Aquitaine for high performance computing) will be in charge of processing the data in order to build operational tools in real time.

The researchers will also tackle coastal risks (submersion, pollution, erosion, etc.), the difficulty being to compile reliable data on extreme events. Lastly, BIGCEES will focus on developing hydrology models capable of evaluating flow-rates in the event of heavy rainfall or floods. “Our project will rely on innovative methods to develop tools that will enable big data to be applied in environmental sciences,” concludes Benoît Liquet, who is convinced that the huge dataflow is likely to reveal some of Mother nature’s secrets too. Artificial intelligence will play a part, particularly Bayesian networks and deep learning methods (neural networks). All we have to do now is make the figures speak...

> Winning project of the E2S UPPA scientific challenge

The Lindley Award

Dennis Lindley was a scientist renowned for his work on Bayesian statistics, a method that factors in the uncertainties of a model by integrating prior knowledge about the event. In his honor, the International Society For Bayesian Analysis (ISBA) created the prestigious Lindley Award that gives prominence to innovative research in this field.

On the occasion of the ISBA International Congress held in Edinburgh in June 2018, four researchers were rewarded: Benoît Liquet (IPRA-LMAP/UPPA), Kerrie Mengersen (International Chair E2S UPPA/Queensland University of Technology), Anthony Pettitt (QUT) and Matthew Sutton (QUT). The Award was presented to them for their article “Bayesian variable selection regression of multivariate responses for group data” published in the Bayesian Analysis review.

> <https://projecteuclid.org/euclid.ba/1508983455>

HCP

A history Chair to shed light on the present

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Signing of the partnership with the Crédit Agricole Pyrénées-Gascogne. Mr. Laurent Jalabert, Director of the "History, culture and heritage" Chair, Mr. Jean-Paul Mazoyer, General Manager of the Crédit Agricole Pyrénées Gascogne and Mr. Mohamed Amara, President of the UPPA.

Three questions to Laurent Jalabert, holder of the HCP Chair (history, culture and heritage), attached to the ITEM (identities, territories, expressions and mobility) laboratory.

Could you tell us a bit more about the partnership with the *Cave de Buzet*?

The program was kicked off in 2014 and was organized around four different aspects: an inventory of the private funds available and classification of the winery's archives; recording the memories of the winegrowers; an appraisal of the winegrowing heritage of Buzet; and a historical record of the cooperative winery. To understand the present, our partners need to dive into the past of their company, its governance, its identity, its relationship with the region... and this is what we offer them. In return, they help us develop our research on small vineyards across the world and communicate our findings (symposiums, books, scientific articles etc.). This should keep us busy until 2024.

How did the idea of this Chair blossom?

We wanted to build a structure that would allow the ITEM lab to work with partners in the private sector, regional authorities and players of the associative world. This Chair is the ideal tool for that. It gives us the chance to carry out ambitious projects centered on issues related to research on heritage and how to valorize it, while streamlining the relationships between fundamental research and teaching. In this way, the Chair backs the training of our PhD and Master's students. It is also important to point out that we received valuable support from the French heritage foundation right from the start.

Can you give us some examples of research projects?

We conduct theme-based research or asset appraisals depending on the needs of our partners, communes, businesses or associations. Our most recent partner is the Crédit Agricole Pyrénées-Gascogne for which we are drawing up an exhaustive historical record from its creation to today. Our most solid project involves research on "The history of small winegrowers" supported by the winegrowers of Buzet, the House of Armagnac Dartigalongue, and the Nouvelle-Aquitaine region. We try and concentrate on specific fields.

www.vignerons-buzet.fr

Verbatim

Pierre Philippe, General Manager of the Buzet winegrowers' cooperative in the department of Lot-et-Garonne.

"The history of our company founded in 1953 was gradually fading and was in danger of becoming distorted. We needed solid bases. It's not just crucial for communication, it also concerns our values, our identity as well as our respect for and loyalty to the region we belong to. Our winegrowers are part of the region's heritage, and wine and history have always been intrinsically related. I needed an academic point of view and I called on Laurent Jalabert, who on top of being a talented researcher is also a winegrower's grandson! Conducted with the help of a Master's 2 student, the project has helped to unveil our true history and that of its players. This work now fuels the company's project. I know where we come from, and as for knowing where we're going, that's another story that remains to be written!"

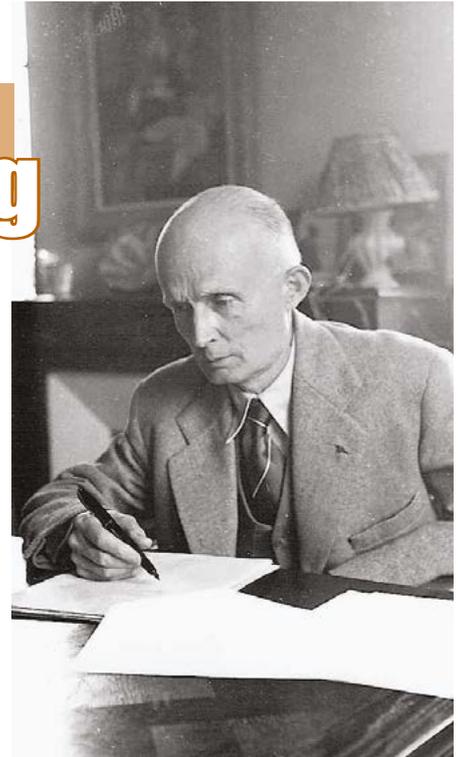
Joseph Peyré

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Writing the world, a world of writing

The ITEM laboratory is conducting research on Joseph Peyré, a journalist and writer native of the Basses Pyrénées. It oversaw the national commemorations for the 50th anniversary of his death.

Joseph Peyré was born in 1892 in the small Bearnese village of Aydie. He went to high school (Barthou) in Pau, and followed up with a literature preparatory class at the Henri IV high school in Paris. He then moved to Bordeaux where he graduated with a BA in philosophy and a PhD in law. He rapidly turned to journalism to fulfill his ambition to write about the world, particularly Spain that he was very familiar with. "A world shaken by many conflicts that led him to react," underlines Lola Thion, who is taking part in the project "*Patrimoine d'encre transpyrénéen*" (literary heritage across the Pyrenees), coordinated by the ITEM (identities, territories, expressions and mobility) laboratory and carried by an international network of 28 researchers. "He could not accept that the values of the world he was living in were dying, and committed himself body and soul to saving them", she continues."



Joseph Peyré published his first book in 1922. His literary career spanned 40 years, during which he wrote 44 books, and his book *Sang et Lumières* received the ultimate reward of the *Prix Goncourt* in 1935. But exactly how many readers today are aware of the extent and humanistic dimension of his work? This is the whole challenge of the mission the ITEM has set itself, which is to preserve and study manuscripts that have fallen into oblivion, and to valorize trans-Pyrenean culture. In 2018, two round tables and three symposiums dedicated to Joseph Peyré were organized in Pau, Bordeaux, Paris and Madrid. A fitting tribute for the French writer, Spanish at heart.

Archeology enters the third dimension

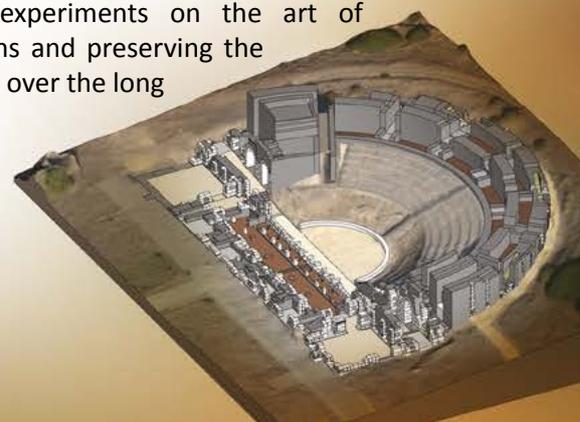
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The Pau office of the IRAA (institute for research on antique architecture) is working on new 3D imaging technologies for archeological purposes.

"Archeology relies on images designed to record, study or communicate on vestiges. The emergence of 3D imaging is casting a new light on this scientific exercise, just as photography did at the beginning of the 19th century." Véronique Picard and Jean-François Bernard, researchers at the IRAA of Pau, are convinced they are living a revolution. The development and use of new technologies is one of their research focuses. "As things stand today," they observe, "representation is no longer manual or mechanical, it is digital. Precise, easy to share and in three dimensions, these new images can be used to produce facsimiles of existing vestiges and model hypothetical reproductions." They are currently taking part in two international projects. The first, launched in early 2017, consists in performing photogrammetry of the ancient Roman city, Baelo Claudia in Andalucía, that would serve as a basis for the digital

reconstruction of the lost remains. The second, an ANR project called ArchXant, aims to virtually reconstruct the Nereid Monument of Xanthos in Turkey. However, they warn against the frenetic development of algorithms "conducive to technological prowess, at the risk of losing sight of the historical perspective of five centuries of reflection and experiments on the art of representing ruins and preserving the memory of them over the long term."

An issue they fully intend to find answers to.



The double meaning of sentences

A student has read each book... There are two possible meanings to this sentence: either one student has read all the books, or each book has been read by a different student. This is known as a quantified expression. The subject caught the attention of many linguists in the 1980s and 90s. Urtzi Etxeberria and Aritz Irurtzun, of the IKER research center in Bayonne, published a special volume in the international review *Glossa, a journal of general linguistics* compiling current works on the significance of quantifiers in different languages in terms of syntax, semantics and acquisition.

> **Special Issue on Quantifier Scope: Syntactic, Semantic, and Experimental Approaches.**
Urtzi Etxeberria and Aritz Irurtzun. *Glossa*. 2018.



Going beyond GMOs

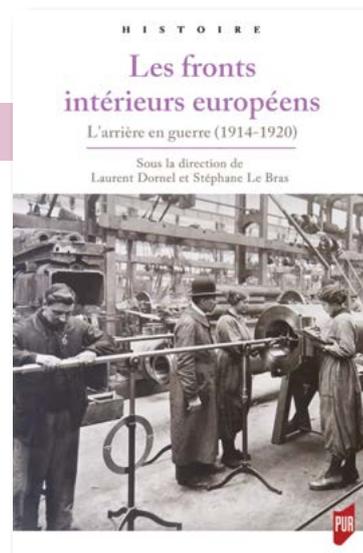
Member of the French academy for agriculture and professor emeritus at the UPPA, Catherine Regnault-Roger co-directed collective work on agricultural genetically modified organisms (GMOs). The work addresses the future of biotechnologies through new gene-editing techniques that create genetically-edited organisms (GEOs), the most symbolic being CRISPR-Cas9. Ten authors of different backgrounds, spanning philosophy, sociology, biology and political science, express their multidisciplinary views on this topic, and go on to discuss the importance given to science today in society and in public debates.

> **Au-delà des OGM : Science-Innovation-Société.** (Going beyond GMOs: Science-Innovation-Society). Under the direction of Catherine Regnault-Roger, Louis-Marie Houdebine and Agnès Ricroch. Presses des Mines. 2018.

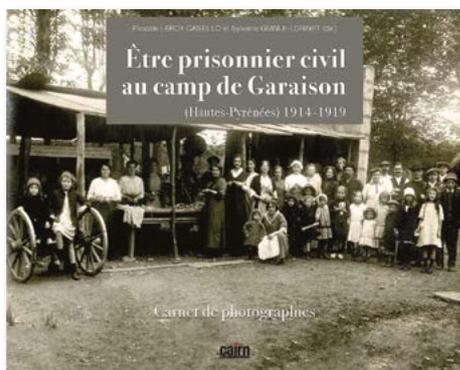
The First World War from the civilians' perspective

Members of the ITEM laboratory, Laurent Dornel and Stéphane Le Bras have directed a book devoted to life behind the lines in the First World War. Where military mobilizations have been studied extensively, those of civil society represent a vast field of research that has yet to be properly explored. How did populations manage to adapt their daily routines to the turmoil of war? What was the form and extent of their mobilization or resistance? This book intends to provide answers by looking at the subject at national, regional, departmental and village levels.

> **Les fronts intérieurs européens. L'arrière en guerre (1914-1920).** (The home lines in Europe. The war behind the lines (1914-1920)). Under the direction of Laurent Dornel and Stéphane Le Bras. Presses Universitaires de Rennes. 2018.



The Garaison camp from 1914 to 1918



In the First World War, the German, Austro-Hungarian, Ottoman and Bulgarian civilians present on French soil were placed in camps such as Garaison in the Hautes-Pyrénées. Exceptional and little known photos give us a glimpse of the daily living conditions there. Archivists and historians give their respective points of view on this prison camp, and try to determine how photography contributes to its understanding. The team was coordinated by Pascale Leroy-Castillo (archives of the diocese of Tarbes and Lourdes) and Sylvaine Guinle-Lorinet (UPPA).

> **Être prisonnier civil au camp de Garaison (Hautes-Pyrénées) 1914-1919. Carnet de photographies.** (Being a civilian prisoner at the Garaison camp (Hautes-Pyrénées) 1914-1919. A photo album). Under the direction of Sylvaine Guinle-Lorinet and Pascale Leroy-Castillo. Cairn. 2018.

ALTER: a new research center



On January 1, 2018, the three laboratories of the Arts, Literature and Languages sector of the UPPA merged to form a research center called ALTER.

ALTER, for Arts/Languages: Transitions & Relations. This is the name of the new research center created from the merger of three host teams of the Literature, Languages and Arts sector of the UPPA: the CICADA (the intercultural center for arts and artistic discourse), the CRPHLL (center for research in poetics, literary history and linguistics) and the LLCAA (the center for languages, literature and civilizations of the Atlantic Arc). ALTER is composed of about fifty lecturers-researchers and thirty PhD students, divided into three teams. The first, *Formes en mouvement* (Shapes in movement), favors an esthetic approach to artistic objects and puts specific emphasis on contemporary poetry and the questions of intermediality

and intergenerativity. The second, *Arts et savoirs* (Arts and knowledge), is interested in the connection between artistic and scientific discourses, and develops innovative concepts such as geopoetics and ecopoetics. The third, *Sujets, représentations, sociétés* (Subjects, representations, societies), examines the notions of alterity, power and marginality looking at their social, societal, ideological and geopolitical resonances. For example, ALTER organized a seminar, an exhibition and an international symposium dedicated to the plastic artist and poet Gérard Titus-Carmel.

> <https://alter.univ-pau.fr>



Plastic packaging of the future

On June 7 and 8, 2018, on the initiative of the IPREM, the Pau campus held workshops on the manufacturing, sorting, reuse and recycling of plastic packaging. This event, aimed at the general public, was organized as part of the Foodyplast project, which is going to develop healthy and environmentally-friendly plastic food packaging. > www.foodyplast.eu

450 connected IT engineers

The 33rd edition of the SAC (Symposium on Applied Computing) was held in Pau from April 9 to 13, 2018. It was organized by the SPIDER group of the LIUPPA, together with the ACM SIGAPP.

The event was attended by 450 experts from across the world who focused their attention on connected objects, smart cities, cybersecurity, mobile technologies, big data and privacy protection.

> <https://www.sigapp.org/sac/sac2018/>

The Iberian Peninsula and the Maghreb in the Middle Ages

From October 2 to 5, 2018 in Bielle, Véronique Lamazou-Duplan (the ITEM) coordinated the second session of an international advanced training seminar on political cultures in the Iberian Peninsula and the Maghreb from the 8th to the 15th century, in partnership with the universities of Bordeaux, Toulouse and the Casa de Velázquez. In opposition to the approaches based on the myth of two united yet conflictual blocks, this multidisciplinary seminar on the "Writings of power" studied political culture and experience through the prism of writing on either side of the Islamo-Christian border.

Concrete on the Basque Coast

On July 12 and 13, 2018, the "Geomaterials and structures" and "Wave-structure interaction" teams of the IPRA-SIAME laboratory in Anglet organized the 19th edition of the (RF)²B days, a French speaking group for research and training on concrete. In addition to the scientific discussions, a technical visit of the works conducted in Bayonne harbor served as an illustration of the symposium on the theme of "Sustainable construction and urbanization in extreme conditions".

> www.rf2b.org

David DIOP

“I try to not analyze my writing while I’m writing”

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A university lecturer and researcher in 19th century literature at the UPPA, author of the remarkable novel *Frère d’âme*, published by the *Editions du Seuil* and finalist of the *Goncourt*, *Médicis*, *Renaudot* and *Femina* awards, David Diop tells us about the gateways between research and literature.

Is writing a novel the inevitable fate of all lecturers-researchers in literature?

I imagine there are as many points of view on writing poetry or novels as there are lecturers-researchers in literature. There is no need to be a writer to teach literature, just as there is no need to have invented a theorem to teach math. Literati or mathematicians – or vice versa as there’s nothing to stop a mathematician from being a poet – can write a poem or a theorem without necessarily publishing it. But due to their academic background, researchers-lecturers are expected to have a theoretical relationship with literary texts, and this can be somewhat inhibiting when they are considering writing and publishing a work of fiction. As far as I’m concerned, I try not to analyze my writing while I’m writing, but to let it flow freely without thinking about what I should be doing.

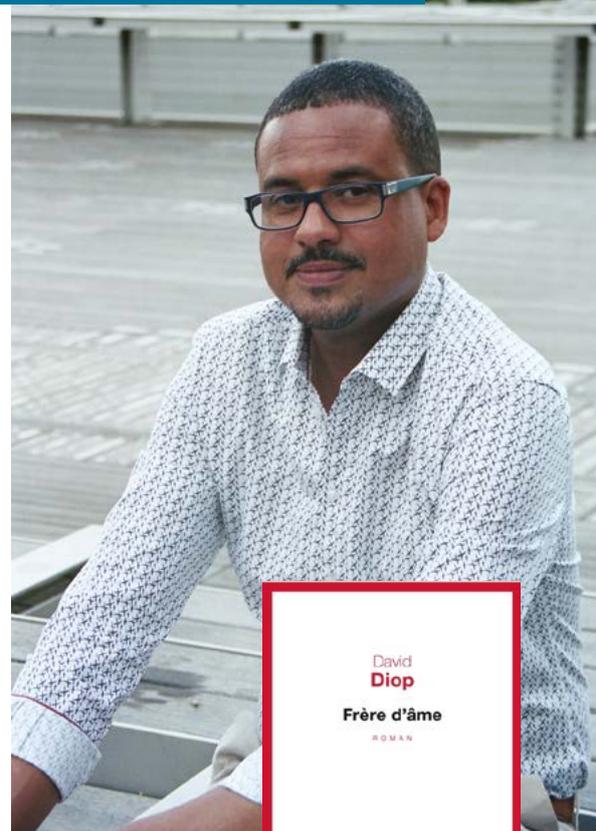
What are the gateways between teaching and writing?

I’m thinking in particular of the *Heptaméron de la Nouvelle* award that you created...

In 2011, several colleagues and I created the *Heptaméron de la Nouvelle* award to awaken the interest of future high school graduates to our department of classic and modern literature at the UPPA. For young minds, the activity of writing fiction, out of enjoyment, can be a point of entry into literary studies. The analysis of great literary texts feels less abstract when you’ve tried putting together a fictional text yourself. For a few years now, our department has been proposing writing workshops that help our first-year students hone their skills in writing essays, a key exercise in literary studies. The notion of quality of style – somewhat vague it has to be granted – is omnipresent in the appraisal of all university work, right up to PhD level. In literature as in other humanities, the art of saying things well makes arguments all the stronger.

How does your research work in literature help fuel your writing?

I’m currently studying the European representations of Africa and Africans in the 17th and 18th centuries; I’m particularly sensitive to how the Europeans, through their travel narratives – halfway between scientific writing and fiction – built images of Africa and its inhabitants. While doing research on the Senegalese skirmishers of WW1, I realized that these images had been “exploited” both by French and German propaganda. In *Frère d’âme*, I wanted to refute this propaganda on West-African soldiers that portrayed them either as bloodthirsty savages or as grown-up children that needed to be civilized.



> *Frère d’âme*:
Goncourt des lycéens
award 2018.

