





## Foreword

# Driving force for Luxembourg



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2016 was a year with many new initiatives some of which are outlined below.

Our mission is to provide first-rate research, teaching and learning and social outreach to Luxembourg and the world. We have a particular focus on digitalisation which we are driving forward as a tool both to keep our research in all areas including the humanities at the leading edge, and to develop new commodities for Luxembourg and beyond. This will have a positive impact on the country's and the people's future.

One of the defining elements of 2016 was the first external research evaluation since the inception of UL in 2003 – and we are proud to report that it showed that the majority of our research was internationally leading or competitive.

The evaluation also pointed out a number of challenges and provided a sound basis for addressing them and constructive suggestions for how to do so over the next few years.

Just read some of the fascinating stories that unfold in the present report.

In the field of education, for example, since 2016, UL's educational science unit offers the Master's in Secondary Education. This will have a lasting positive effect on the education landscape in the country. Our humanities departments enormously contribute to what is rapidly becoming a vibrant intellectual scene.

Many researchers and institutes of the University are collaborating intensively with industry. This is a decisive factor for the region, and the University will continue to strengthen this aspect in order to become an important driver for Luxembourg's economic future. It is continually entering new fields of collaboration between industry and science. Considering the important role that logistics plays in Luxembourg, for example, UL founded the Luxembourg Centre for Logistics and Supply Chain Management, LCL, last year in close cooperation with MIT in Boston, USA.

LCL is not the only institute that was established. The new Luxembourg Centre for Contemporary and Digital History, the C<sup>2</sup>DH, is also of great importance for the University's embedding in Luxembourgish society. It is dedicated to contemporary history with a particular focus on digital sources and digital methods. The centre thus has excellent chances of rapidly gaining international visibility.

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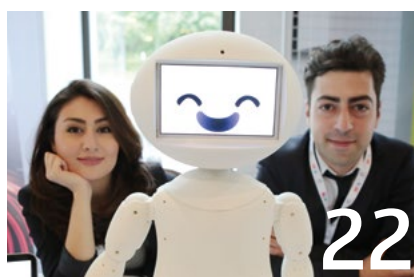
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## Joint doctoral education

# More supervisors for PhD projects

University of Luxembourg has signed an agreement with four Luxembourgish research institutions, namely the Luxembourg Institute of Health (LIH), the Luxembourg Institute of Socio-Economic Research (LISER), the Luxembourg Institute of Science and Technology (LIST), and the Max Planck Institute Luxembourg for International, European and Regulatory Procedural Law (MPI). On 26 October 2016 the institutions and the University stipulated at the Ministry of Higher Education and Research that they will cooperate in doctoral education.

Among the Luxembourgish research institutions, only the University has the right to award PhD degrees to students. In the new agreement, the contracting parties determine the way in which research projects for obtaining the doctor's degree

are carried out by the non-university institutions together with the University. Still being the sole degree-awarding institution, the University of Luxembourg remains responsible for the verification of academic standards of the doctoral training, but the supervisors for PhD projects within the framework of the cooperation can now also come from one of the other institutes.

The joint doctoral programmes will be set up in areas, where research interests of the other institutions overlap with those of the University. The partners defined 13 areas of cooperation including law, economics and finance, computer science, physics and material sciences, and biomedicine. For each joint doctoral programme, a separate agreement will specify the contributions of each partner.

## Research achievements in figures

- University of Luxembourg researchers published 1,139 refereed scientific publications (570 refereed articles and 569 refereed conference publications) in 2016
- Two University of Luxembourg researchers were awarded prestigious grants by the European Research Council (ERC) in 2016: the physicist Dr Massimiliano Esposito (Consolidator Grant) and the Vice Director of the Interdisciplinary Centre for Security, Reliability and Trust, Professor Lionel Briand (Advanced Grant).
- Total third party funding obtained by the University has increased from 41.4 Million euros in 2015 to 43 Million euros in 2016
- The University's total number of approved grants under Horizon 2020 – the biggest Research and Innovation programme of the European Union ever with nearly 80 billion euros of funding available over seven years – remains stable with 8 approved grants in 2016

## External evaluation

# The good assessment precedes the hard work

How is the University of Luxembourg faring in terms of achievement potential? The Times Higher Education ranking has provided initial indications: the UL is listed among the 200 best universities in the world. 'But we have to take a closer look at research than a comparable ranking would do, in order to obtain a realistic picture', says Professor Ludwig Neyses, Vice-president for research. For this reason the University had two evaluations carried out by expert appraisers in 2016: one evaluation for research and the other for process evaluation. 'The results are very good', says Neyses. 'We have also received indications of where more work is needed.'

“Many of our research units represent the best in the world.”

An evaluation of all departmental work and Inter-disciplinary Centres is a tremendous physical undertaking. 'Without the enormous commitment of all scientists as well as the entire administration and co-workers in the central Research Support Department, this would not have been possible at

all', says Neyses. In the summer 45 external expert appraisers came to Luxembourg to take a close look at the University on site. Their concluding assessments were submitted in the

winter. Says Neyses: 'A large majority of our research units represent the best in the world. The other units have also got researchers who play in the same league.' It is precisely these units that are to be intensively supported and specifically advanced, says the vice-president. 'It is a good thing that we now know how the external world sees us. We can use this information to further develop in a targeted fashion.'

The other field that was examined in a second evaluation involved the University's processes that take place outside its research arena. 'The expert appraisers particularly highlighted the University's contribution to the societal development of Luxembourg', says Neyses. 'Whether it involves collaboration with the market place, the University's significance for the educational situation in the country, its competitiveness in the fundraising of financial resources from the European Union or fundraising from private subsidies – the expert appraisers were of the opinion that such processes usually proceed more efficiently with us than at their own institutions. This is a remarkable result – and we shall work diligently to continue to improve.'



Heike Scheuerpflug, Head of the Research department, and Vice-president Ludwig Neyses

## THE Ranking

# A good starting position to gain new partners

178, 2, 14, 58. These four numbers represent the performance of the University of Luxembourg in 2016. They signify its positioning in four evaluation areas of the Times Higher Education Ranking (THE Ranking). They state: the university of the Grand Duchy holds 178th place among the world's 200 best universities; it has the second-highest degree of internationalisation after the University of Qatar; it comes in 14th place among the young universities that were founded less than 50 years ago; and it has made its way to 58th place in the research field of Computer Science, amidst renowned competitors such as King's College London (rank 52), the University of Stuttgart (rank 60) and the KTH Royal Institute of Technology in Sweden (rank 73).

"Participating in such ratings is a fundamental decision," says Professor Franck Leprévost, who is responsible for the topic of ranking at the University of Luxembourg. "A prerequisite for participation is for the university to have a good strategy. Only then can one properly interpret the results and work with them." Leprévost sees opportunities to which the THE-Ranking can open doors: "We can use it to approach cooperation partners who would otherwise not consider us." This applies not only to THE, but also the EU-sponsored U-Multirank, in which the university also participates.



Of key importance is the quality of the data the university submits for ranking. Collecting the data is a laborious task, as Leprévost can attest: "There are multiple levels of the university involved, which aggregate the data from different service areas, like student services or the personnel or finance department. Our data analyst Silvia Laracca aggregates these data. Then, we check once more through everything together before submitting the data."

What are the good THE assessments based on? The president of the University of Luxembourg, Professor Rainer

Klump, takes Computer Sciences as an example: "The Faculty of Science, Technology and Communication, and the Interdisciplinary Centre for Security, Reliability and Trust (SnT)

all paid attention from the outset to scientific excellence and outstanding education, or intensive communication with industry in their respective field. This is the basis for our excellent global competitive position in these and other research fields."

## UniGR

# Europe the way it was meant to be



Spend a seminar day in Luxembourg, then one in Saarbrücken, Germany, and the next in Metz, France. Tri-national seminars like "Multilingualism – dealing with knowledge in multilingual contexts" are made possible by the confederation University of the Greater Region – UniGR which started in 2008 as an EU-funded project and was turned into an association incorporated under Luxembourg Law in 2015. Since 2016, UniGR has had a branch office in Saarbrücken where Frédérique Seidel took over the management in September.



## New Vice-president

# Challenge and opportunity



Vice-president Tonie van Dam

*You were appointed Vice-president for Doctoral Education and Training, Gender, and International Relations in late 2016. What is it about the mandate as a vice-president that appeals to you?*

My interest has always been to improve the procedures of the University and to improve the quality of teaching and research at the University. But I never imagined that I would be asked

to be Vice-president. It was a difficult decision given how much I love my research. However, I was happy to accept a new challenge and an opportunity to contribute more effectively to improving the University.

*What are your objectives and priorities?*

I have a very broad mandate. My position will involve advancing doctoral education, gender, and international relations. With respect to the latter, the UL will look to capitalise on and consolidate its successes. This means developing a strategy that will make us even more attractive for international students and members of the UL community.

*Part of your mission will be doctoral education. How should doctoral education be organised and why?*

We need to ensure that our doctoral candidates are getting the best training, outside of their research, so that they will be employable after their time at the UL. We therefore have to establish a consistent governance across all the doctoral schools and programmes. And it is very important that our graduates have the opportunity to acquire leadership,

programme management, communication, and negotiation skills in addition to the skills they will automatically learn by doing their research and writing their theses. We will thoroughly evaluate the courses and provide even more skills training.

*Another part of your mission are gender related issues. What can you do to foster a more balanced gender ratio in research?*

The reason why there are fewer female than male professors is very complicated. First, the ratio varies depending on the faculty. It is also well known that researchers tend to pair up with other researchers. It is difficult to find jobs for both partners in the one location. Usually it is the woman researcher who gives up her career. And so we lose women who have the potential to become professors. To address this particular issue, we have written a whitepaper on dual career couples with the goal of raising the research community's awareness of the problem and suggesting that, in very special cases, a second position will be identified for the partner who would otherwise feel compelled to leave.

The 135,000 students of the six partners – University of Luxembourg, Saarland University, University of Liège, University of Lorraine, University of Kaiserslautern, and Trier University – can study, attend lectures and seminars, and even do their doctorates across borders.

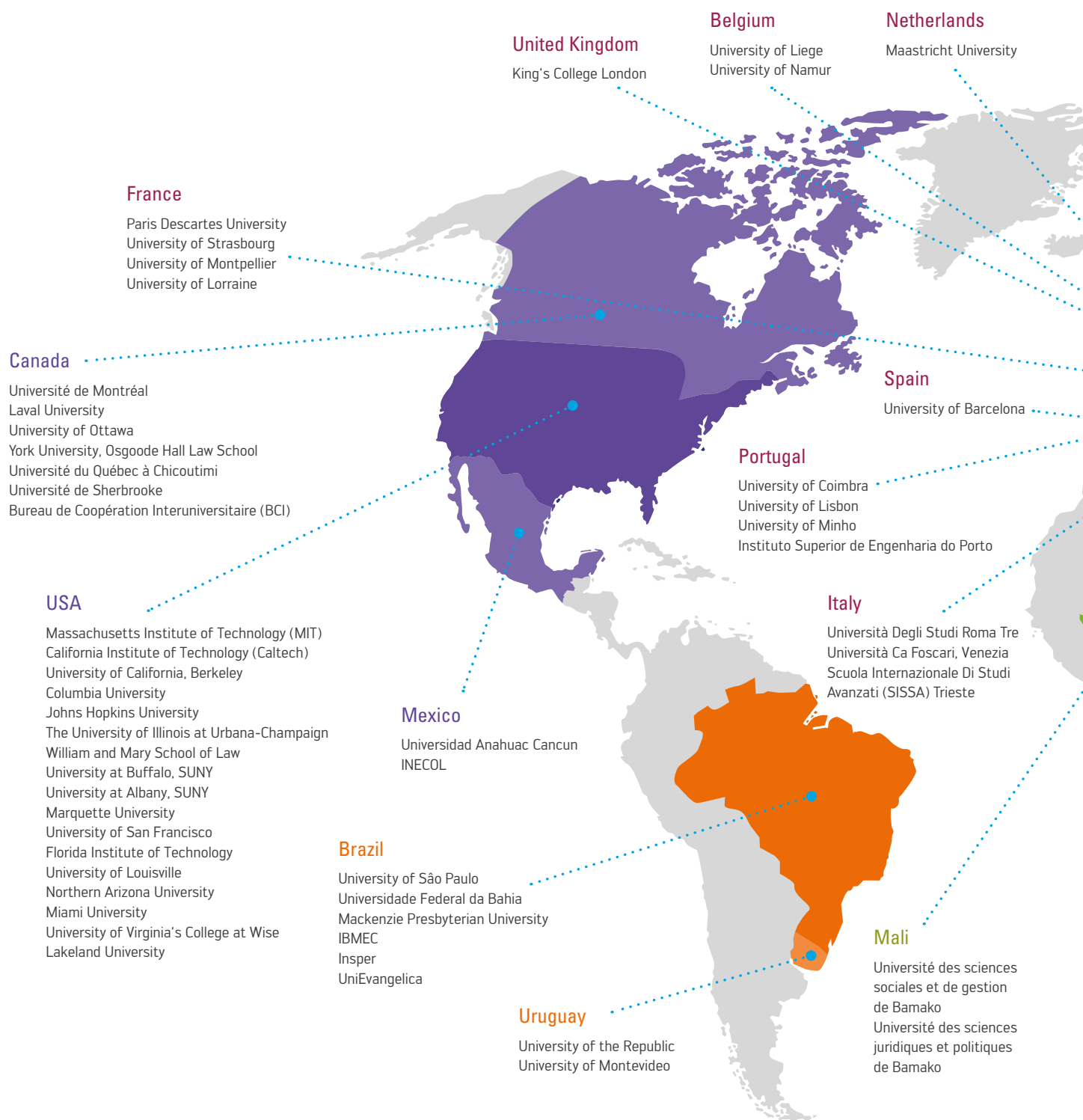
Luxembourgish researchers are active in key areas of UniGR: Border Studies, Biomedicine as well as in Material Science and Resource Efficiency. Moreover, the University has taken an active role in UniGR expert committees such as Language

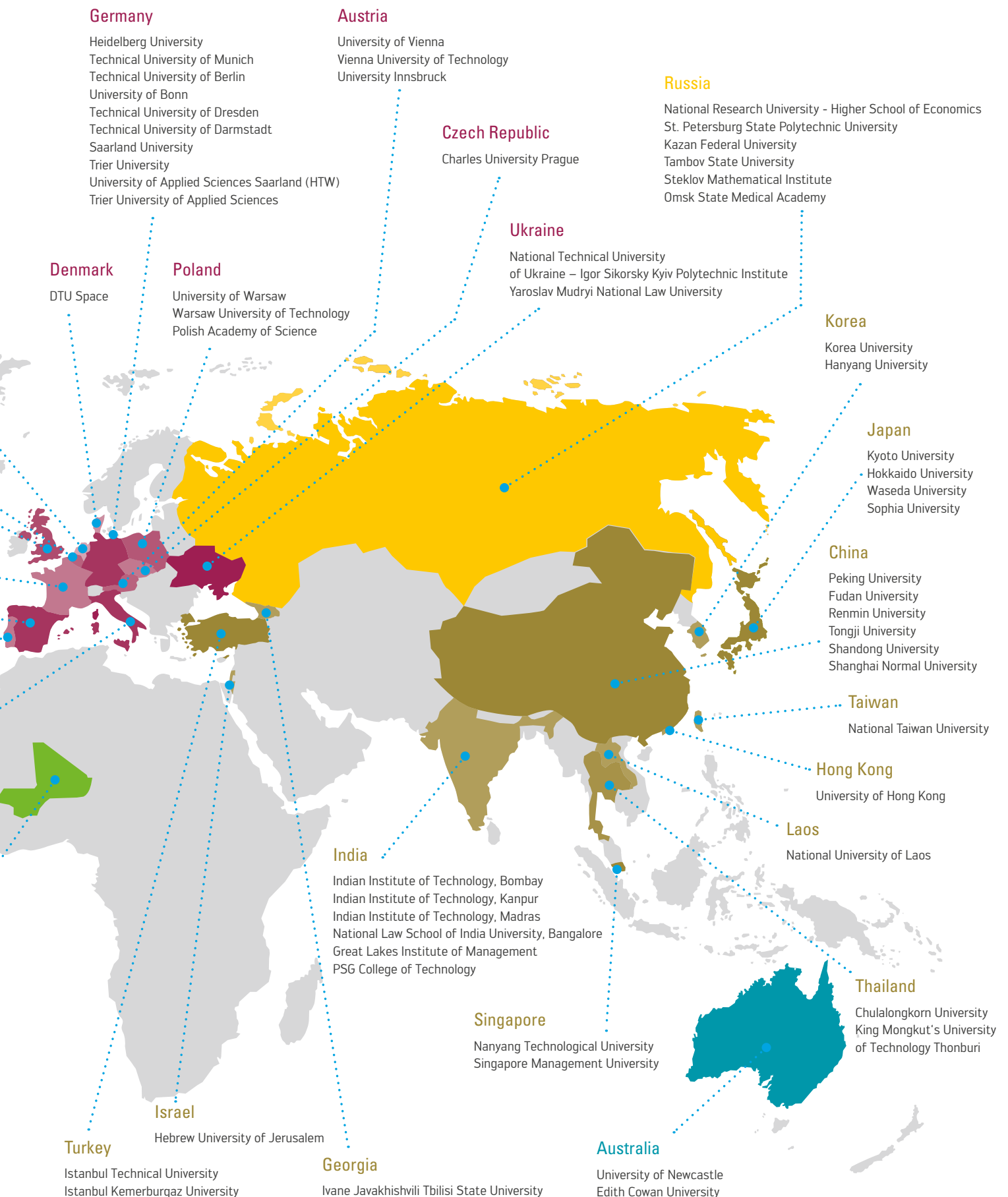
Centres and International Relations. "In October 2016, we organised the Europe Conference of the Association for Borderlands Studies in conjunction with the partners of the UniGR Center for Border Studies," reports Mareike Wagner, UniGR officer at the University of Luxembourg. Nearly 150 participants attended joint panel sessions and excursions, even digital teaching methods were employed: several lectures were broadcasted as a video link to all participants at the partner universities. No doubts – UniGR is a genuine benefit for Luxembourg.

# The University opens doors to the world

At the University of Luxembourg it is mandatory for students to spend one or more semesters at one of its many partner universities. "In 2016, the International Relations Office managed to sign a whole series of new cooperation agreements with prestigious universities", International relations specialist Stephanie Schott reports. Among other things, agreements were signed with the University of São Paulo in Brazil, Nanyang Technological University in Singapore, and Kyoto University in Japan. The University now counts 107

institutional partners from around the world. For the first time, the University also exchanged students and staff members in the framework of the new international dimension of the Erasmus+ programme, which allows for mobility from and to partners outside Europe. "We want to continue capitalising on and consolidating our successes in the area of international relations", emphasises Professor Tonie Van Dam, new Vice-president for Doctoral Education and Training, Gender, and International Relations.









## Learning Centre

From a library to a learning centre: the future heart of the University's digital strategy will open in late 2018

# Pioneer in learning in the digital age

Digital manuscripts, films and presentations – soon the time of lectures in auditoriums as the dominant form of teaching could already be a thing of the past. The University of Luxembourg is therefore adopting a new strategy for learning in the digital age. “Teaching and learning are currently undergoing a major upheaval,” says Romain Martin, Vice-president for Academic Affairs at the University of Luxembourg and professor of psychology and empirical

educational research. “The teacher’s task in future will no longer be to merely present content in lectures, but will also be to prepare and provide them in digital form and, subsequently, to discuss and develop them in personal communication with the student.”

This is easier said than done, especially if the students are not to be left to fend for themselves in preparing the course content. “We want to prepare this digital learning in our new Learning Centre and on the entire Belval campus collaboratively,” Romain Martin says. “We expect learning groups to form that will discuss and then prepare the content together. In doing so, different perspectives and depths of reception will meet and, ideally, all group members will benefit from it. In the following phase, the material is then deepened with and by the lecturers.”

To ensure concepts of this kind truly work, pilot projects with focus groups

are already underway. In these projects, scientists from various disciplines are exploring how the course content can be optimally prepared and presented. “Much of what sounds plausible in theory ultimately has to be done differently in practice,” Martin continues. “We are gathering this experience in pilot projects before we apply them to whole study programmes.”

The Learning Centre, which is currently being established in an old steel production hall and should commence operations in late 2018, offers the technical prerequisites for these concepts. It will take a powerful IT infrastructure and great flexibility of the premises. Romain Martin concludes: “The Learning Centre, as well as the Maison du Savoir and in the long term the whole campus, will make Belval a lively place of learning, where students and lecturers feel comfortable and where the research and public domains can meet to share ideas.”



Vice-president Romain Martin

## Erasmus<sup>+</sup>-Master's degree loans

# Study today, pay tomorrow

Young people should travel to become acquainted with other countries. This was the case 500 years ago for handi-craft journeymen, and it is still true today – especially for aspiring academics. The snag: living expenses are often higher abroad than at home, and university study is not free of charge everywhere. This is also the case for Luxembourg. How the University of Luxembourg can nevertheless be attractive for Master's degree students from other European countries is a question that Professor Eric Tschirhart had been thinking about. 'But I don't think much of it when students receive credit for their education that doesn't have to be implemented for a specific purpose. These loans create an unnecessary situation in which the young academics start their professional lives in debt', says the former vice-president for Academic Affairs and current designee for fundraising.

Tschirhart thought up a different concept and found a strong partner in the European Investment Fund (EIF) for implementation of a pilot project. In the context of the Erasmus Programme, EIF has made available a guarantee of five million euros to pre-finance earmarked tuition fees or rental costs. Tschirhart says: 'The University is a contractual partner for the students. It demands no securities from them, but offers them inexpensive payback conditions with long-term maturities of up to five years.'

Every year, approximately 300 Master's degree students from all 32 countries participating in the Erasmus Programme can benefit from the new Master's degree loan. 'We have placed the emphasis on study programmes here that

are particularly important for the business location Luxembourg', says Tschirhart. These include: 'logistics, economics and finance, wealth management and IT. The tuition fees can amount to several tens of thousands of euros per year, and are therefore a deterrent for foreign students.'

The programme developed by Tschirhart in 2016 and initiated in the autumn of 2017 is garnering interest already: 'This campaign is unique thus far in Europe. I have already received queries from several other universities that have recognised the potential in Master's degree loans.'



Representatives from the University of Luxembourg, the European Investment Fund and the European Commission signed the pilot scheme



### New study programmes and tracks launched in September 2016

In 2016, the University once again extended its range of programmes and courses, offering for the first time from autumn 2016

- a complete three-year specialisation in English literature and linguistics in the "Bachelor en Cultures Européennes".
- a "Master in Theaterwissenschaft und Interkulturalität" in cooperation with the University of Trier
- a vocational Master for prospective secondary school teachers ("Master en Enseignement Secondaire") in German, French and Mathematics

At the same time, the three successful master courses in European law have been restructured and expanded into six highly specialised "Master of Laws" (LL.M.) degrees. Aspiring lawyers now have a choice between "Droit et Contentieux de l'Union Européenne", "Droit Bancaire et Financier Européen", "European Economic and Financial Criminal Law", "European and International Tax Law", "European Private Law" and "Space, Communication and Media Law".



## Catapulted through the interdisciplinary engineering course: the Trebuchet Competition

The short arm of the trebuchet drops down and the long throwing arm flings forward, but the projectile just misses its target. In December 2016, seven model trebuchets were set up in the sports hall and tested for functionality and design. The 'Trebuchet Competition' is an example of the continuing professional development programme of the **Faculty of Science, Technology and Communication**, aimed at promoting innovative and practical teaching formats.

The Trebuchet Competition is part of a project-based learning scheme that

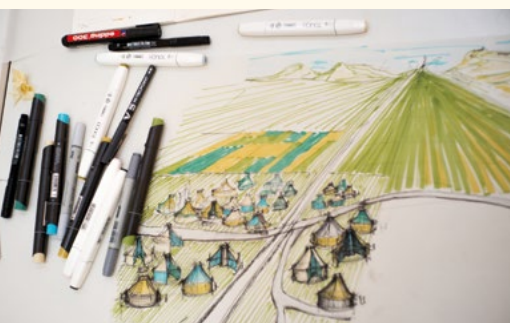
was developed by senior lecturer Claude Wolf. He received a teaching and learning innovation grant for the realisation of his innovative teaching concept. "Project based learning is a very good exercise for future engineers, it gives them the opportunity to conduct a real project from the idea to the realisation," says Claude Wolf.

Claude Wolf's area of expertise is mechanical engineering and computer aided design. Instead of concentrating solely on theory, the participants in the Trebuchet Competition learned in the Fab@uni lab how to work with 3D printers and laser cutter technologies.



Since 2013, innovative teaching projects can be presented to interested professors and students in an FSTC Forum. The Trebuchet Competition was presented, too – as an example of an especially successful learning event.

## Master in Architecture, European urbanisation, and globalisation



A bright yellow container stands in the middle of the city. In it, little concerts, handicraft workshops and cooking courses are put on with the involvement of refugees. This hypothetical scenario was devised by the participants of a 10-day summer school titled 'Architecture

and Migration'. The summer school was held in early September 2016 in advance of the English-language Master in Architecture, starting with the first cohort in 2017 at the **Faculty of Language and Literature, Humanities, Arts and Education**.

The course director, Professor Florian Hertweck, designed the new programme to be interdisciplinary. Students attend courses not only in theory of architecture but also on urban economy, energy efficiency and sustainable transport systems. "Contemporary society needs architectural and urbanistic answers to the urgent questions that are arising from issues such as globalisation, climate change and migration,"

Hertweck says. He wants to move away from the segregated formation of socially homogeneous islands towards a diverse city, in which the ground is – again – considered as a common good. "The idea is for the budding architects to internalise a transdisciplinary culture and understand how society is changing demographically, culturally and socially."

At the end of the master programme, the students will also have developed the architectural part of their urban design – the first cohort will deal with the relationship between architecture and economy." Our plan is to become an active part of the regional planning debate," Florian Hertweck explains.



## Luxembourg School of Finance students go global

Students at the Luxembourg School of Finance at the **Faculty of Law, Economics and Finance** in September 2016 embarked on one-week trips to New York and Singapore to pursue a programme of dedicated seminars as part of their Master's degrees.

The Master of Science in Banking and Finance cohort visited the New York University Stern School of Business, attending classes taught by renowned NYU professors. During their stay, students were able to gain an insight into the world of global finance at a leading international business school.

Tudor Fedeles at the end of the week commented that taking part in intense and high-quality seminars allowed him to gain "valuable insights into different disciplines of finance, which I will be able to take back to Luxembourg and use as I start my professional career."

Students from the Master in Wealth Management visited Singapore Management University (SMU), where they were able to deepen their understanding of a variety of wealth management topics and the specifics of the Asian markets. Marko Klacar commented that learning about "the differences between Asia and Europe when it comes to the services clients require" was one of the highlights of the programme.

Like the Stern School of Business, SMU is a world-class business school, which pioneered wealth management education at Master's level with a dedicated programme. In addition to seminars, students were able to visit financial institutions in Singapore and network with bankers and professionals from the field as well as students and alumni of SMU.





Dossier:

# The University's role for Luxembourg

The University of Luxembourg is the hub and the engine of the national system of research and innovation. Some of its activities in this sector are well established and well known – for example the Partnership Program of the Interdisciplinary Centre for Security, Reliability and Trust (SnT). But what about the latest developments – often initiated by young researchers or associated with recently founded institutes? Our Dossier offers fresh insights.



University meets industry

# One brick in the wall



Innovative materials developed by students for local companies: PhD student Patrick Pereira Dias, Associate Professor Danièle Waldmann, Carlo Spina from Chaux de Contern and PhD student Gelen Gael Chew Ngapeya (from left).

Lego bricks are a timeless toy. The simple principle behind these interlocking pieces provides a promising avenue of research into mortar-free masonry. PhD student Gelen Gael Chew Ngapeya is investigating the load-bearing behaviour of walls built with an interlocking system that keeps the bricks together without the extra layer between them. The engineer is currently doing his PhD in the Solid Structures group, led by Professor Danièle Waldmann-Diederich at the Faculty of Science, Technology and Communication.

The advantages of mortar-free systems include not only faster construction, but also clean handling and, above all, easy disassembly. Of course, mortar plays an important role in conventional masonry: it distributes the load evenly across the bricks. Without it, even minor irregularities could weaken the structure.

In an earlier study, Shahriar Agaajani from Waldmann-Diederich's team developed an analytical algorithm for simulating the load distribution in walls, which earned him an award from the International Masonry Society in 2015.

“Cooperation with the university allows us to develop new, innovative construction materials and components.”

The research group is now investigating how the load is distributed if mortar is eliminated from the joints. This is one of two doctoral theses being written in the team and receiving funding from the Luxembourg construction materials manufacturer Chaux de Contern. The second thesis delves into the load-bearing capacity of modular mortar units produced

from sustainable raw materials, where the aggregate is being developed from Giant Chinese Silver Grass.

Such investigations are of enormous interest to compa-

nies like Chaux de Contern. “Cooperation with the university allows us to develop new, innovative construction materials and components,” says Carlo Spina of Chaux de Contern. The researchers and the company are working closely together on both projects. Danièle Waldmann-Diederich sees the cooperation as a win-win situation for science and industry: “It creates opportunities for research that can pay off in original product ideas. In this kind of research collaboration, for example, we are combining fundamental research with new product development.”



University meets education

# LUCET – for a future-proof education system



Dr Sonja Ugen and Dr Antoine Fischbach

The education system in Luxembourg is in a state of transition. How can we increase equality of opportunity? Is multilingual education always an advantage? How can we improve the quality of education? These and other issues have occupied the minds of social and political stakeholders since the first PISA studies.

“Empirical education research helps us find answers by delivering data as the basis for constructive debates about the strengths and weaknesses of our education system, and for systematic quality assurance,” emphasises Dr Antoine Fischbach, Acting Director of the Luxembourg Centre for Educational Testing (LUCET) of the University of Luxembourg. The university has been responsible for national education monitoring since 2007,

LUCET took over this task in 2014, with a focus on the Épreuves Standardisées (ÉpStan).

These tests objectively assess the competencies that all students have attained at specific levels of their compulsory education. Additionally, the students' motivation to learn, socioeconomic family background, language(s) spoken at home, and migration background are surveyed. “The data are a solid basis for evaluating the effectiveness and equality of opportunities in the Luxembourg schooling system, and also for verifying whether the set educational goals are being achieved, and whether reform efforts are taking hold. Furthermore, they reveal concrete starting points for making improvements, with the results communicated in tailored reports to students, teachers and school administrations,” summarises Dr Sonja Ugen, Executive Manager of LUCET. The annual census also allows the creation of a unique longitudinal database. This database can then be used to correlate the results obtained over many years thus providing unique insights into the functioning of national education. This could provide a basis for making evidence-based educational policies, for increasing quality of education, or for preparing scientific projects and papers.

Aside from ÉpStan, the 30 or so employees of LUCET have further responsibilities. These include analysis and reporting of the national PISA studies and university-internal assessment tasks. However, to remain state-of-the-art, LUCET is also a research centre with a strong commitment to digitalisation. One focus of research is the development and application of pedagogical measurement and evaluation instruments, in particular for heterogeneous and multilingual target groups. Fischbach concludes: “These primarily technology-rich instruments should help in future to make advancements in national education monitoring and to increase the meaningfulness of ÉpStan.”

## University meets economy

# Logistics – Innovation, impact and inspiration

After its successful foundation in 2015, the Luxembourg Centre for Logistics and Supply Chain Management (LCL) at the Faculty of Law, Economics and Finance took big strides in 2016 towards the creation of its dedicated Master programme and clearly setting out its mission as a partner for Luxembourg's government and industry.

The LCL was established in cooperation with the Massachusetts Institute of Technology (MIT) in Boston, USA, and the Luxembourg government in December 2015. With logistics identified as a priority sector by the Luxembourg Ministry of the Economy, the LCL's mission is to train supply chain experts, to conduct leading-edge research in the field and to be a valuable partner for the business community.

Professor Benny Martin joined the LCL in September 2016 to help the centre

fulfil this mission. "The LCL aims to strengthen the international competitiveness of the industrial and service companies in this European heartland, which relies heavily on international exchanges."

The international character of the LCL is further emphasised by its membership in the MIT's Global Supply Chain and Logistics Excellence (SCALE) Network, a group currently consisting of centres carrying out teaching and research in logistics and supply chain management.

Associate Professor Steffen Klosterhalfen also joined the team in 2016, moving forward the development of the University's new Master in Logistics and Supply Chain Management. During the 10-month programme, which will start with the 2017-2018 academic year, students will benefit from close industry interaction with a focus on analytical problem solving as well as



the opportunity to spend three weeks at MIT together with students from across the SCALE Network. Executive and doctoral education is under development, with further academic staff joining the centre over the course of 2017, which has already seen the official launch of the LCL's activities with the first annual eXplore Conference.

The conference, hosted on 1 March 2017, provided a platform of exchange for practitioners, researchers and policy makers to discuss the future of the logistics and supply chain industry, highlighting the role the LCL will play in the growth of this sector through research, innovation and the facilitation of knowledge transfer.

## University meets society

# C<sup>2</sup>DH – New insights into Luxembourg's history

The research profile of the Luxembourg Centre for Contemporary and Digital History (C<sup>2</sup>DH), founded in 2016 as the University's third Interdisciplinary Centre, see also page 38) reflects the mission entrusted to the University of Luxembourg to produce new knowledge about the contemporary history of Luxembourg by studying phenomena and processes that have profoundly affected the country and whose comparative value goes beyond the national perspective. The centre investigates the political, economic, cultural and

social history of Luxembourg in the 20th and 21st centuries, including the world wars, the transition from an economy based on the steel industry to a mixed manufacturing and services economy with a strong financial and audiovisual sector, the emergence of a migratory area with societal and political implications and responses, and the development of Luxembourg as a nation state, welfare state and democracy within the framework of Europeanisation and globalisation. The scientific, independent and comparative nature of the centre's research will provide both the academic community and society as a whole with new insights.

## Student representation

# We can make a difference



More than 6,000 students are receiving their academic education at the University of Luxembourg, a university that is developing dynamically, filling its new Belval campus in Esch-sur-Alzette with life, and which will assume a pioneering role for new digital learning and teaching formats. "The students must have the opportunity to participate in its definition, so that these changes don't all deviate from their actual needs," says Professor Romain Martin, Vice-president for Academic Affairs. Therefore, in 2016, student representatives were elected for the first time in all of the University's study programmes. 90 delegates will help to define the alignment of the University as well as the specific working and living conditions at their alma mater.

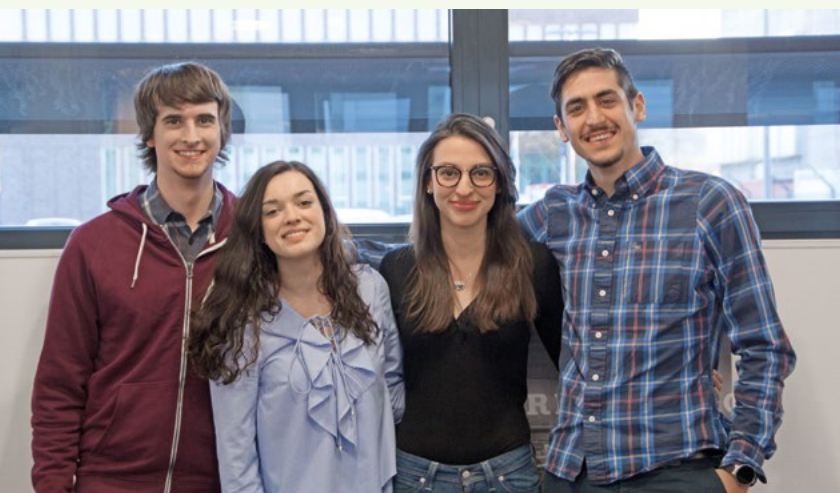
Stefanie Knill is the Advisor of the Vice-president for Academic Affairs. She helps the students to organise themselves and to design their working environment. "Last year, we organised two workshops in order to get to know the students' needs in more detail," she says. "The students showed great commitment, eagerness to be part of the process, and willingness to compromise."

In the beginning, says psychology student Christopher Weyer, the role of the student representative was still largely unclear. "While we are working together on solving specific problems, we only gradually figure out what influence we can have on the University's alignment." Romain Martin stresses that this influence must be done ample justice: "It is of great importance for the proper development of the University that the students be obligatorily included in the decision-making processes. Next year, accordingly, a revision of the University laws will be brought underway in the official channels to define their right of say in more detail."

Student representative and history student Marco dias da Costa draws a first positive conclusion: "Thanks to the student representation, we can articulate our positions and needs much better than we could before. We can therefore make a real difference."

## Office of Student Life

# Counsel, suggestion box, event manager



The "Welcome Days" in September were a success. As in previous years, many new students used the occasion to acquaint themselves with the university. Co-organiser of the event was the Office of Student Life (OSL) at the University's student department (SEVE), a team of four dedicated students. Their aim is to promote communication on campus – and to ensure the needs of students are taken seriously. "We want to create transparency, especially concerning daily student life," says Maria Rodriguez. The law student has been with the OSL for two years, during which time she and her colleagues have initiated many projects.



## Housing facilities

# Student accommodation offer “unbeatably good”

With the opening of the Résidence UNI-VAL II in 2016, 204 additional studio-apartments became available for rent for students enrolled at the University of Luxembourg. Thus, the number of student accommodation units in Luxembourg – ranging from single rooms to small apartments – has risen to 1009. “We are doing pretty well at the moment,” says Marc Rousseau, coordinator for student housing within the student department SEVE. “Now we have to see that we progressively align the amount of available accommodation to the growth of the number of enrolled students, meaning: lease more apartments.”

Finding an affordable room or apartment is one of the biggest challenges students face when beginning their studies, just as much in Luxembourg

as in any other university city. Creating affordable student accommodation has therefore been a primary concern ever since the University was founded. The student dormitories are either owned by public authorities or private promoters and are leased by the University.

Most student housing units are located on the Belval campus (442), some in Luxembourg City (266), in Esch-sur-Alzette (214) and in numerous surrounding townships (87). By the end of 2017, there will be another 150 units. The new apartments, especially, are built to very high standards in terms of facilities, furnishing and low energy consumption, says Marc Rousseau.

Compared to the private housing market, the monthly rent for the furnished lodgings is “unbeatable”. A room of about 15 square metres in a shared flat, for example, costs about 360 euros



per month, all charges included. Rooms with private bathroom are somewhat larger, for which students pay on average 440 euros, all charges included. A studio with a floor space of 22 square metres is offered for 650 euros, all charges included.

For example the “Guidance Program”, run by the OSL and the rectorate. “With this, we help fellow students to overcome obstacles to their studies,” Rodriguez says. At round table meetings, students with responsibilities will be able to speak about problems such as housing, mobility and courses. “We are also creating a website where all student life related information will be found,” Rodriguez continues. The OSL looks for sponsors, is involved in the Esch Carnival, and participates in a student radio programme. On the new Belval campus, it organised the “Student Container”: a temporary lounge where students gather to

study, talk, or have a good time, until the future House of Arts and Students is finished at the end of 2017.

The team is in constant contact with Administration and student associations which collaborate for all events and manage the Student Container. Another recipe for success: “Every student can come to us at any time for any concerns,” Maria Rodriguez stresses. This is a very popular offer, as attested by the number of emails – with questions about everything from course contents to tips for going out.

# Our student housing facilities

35 student housing facilities,  
1,009 rooms and studios

Average monthly rent\* for furnished single rooms:

- 15 m<sup>2</sup>, common kitchen and bathroom 360 €
- 19 m<sup>2</sup>, common kitchen and private bathroom 440 €
- 22 m<sup>2</sup>, studio apartment 595 €

\*Included: charges for water, gas, electricity, heating, internet



Résidence UNI-VAL II, Esch-sur-Alzette



Maison Prince Henri, Oberkorn



Résidence UNI VAL I, Belvaux

Esch-sur-Alzette

Belgium

Oberkorn

Belvaux

Luxembourg

## Room equipment

Each room is in principle **equipped** with:

- a bed (90 x 200);
- a mattress;
- a desk;
- a desk chair;
- a wardrobe;
- a set of shelves.

Furthermore, the rental of a room entitles students to the **following services**:

- common or private bathrooms and kitchen facilities;
- conference or recreation rooms;
- utilities (water, gas and electricity, heating)
- internet connection (WiFi or with Ethernet cable);
- cleaning services for the common areas;
- vacuum cleaner;
- telephone.
- The voltage in the room is 230 V.

Germany

Luxembourg City



Maison Claire-Chêne, Esch-sur-Alzette

Mondercange



Maison Bicheler, Mondercange

Noertzange



Maison de la Gare, Noertzange

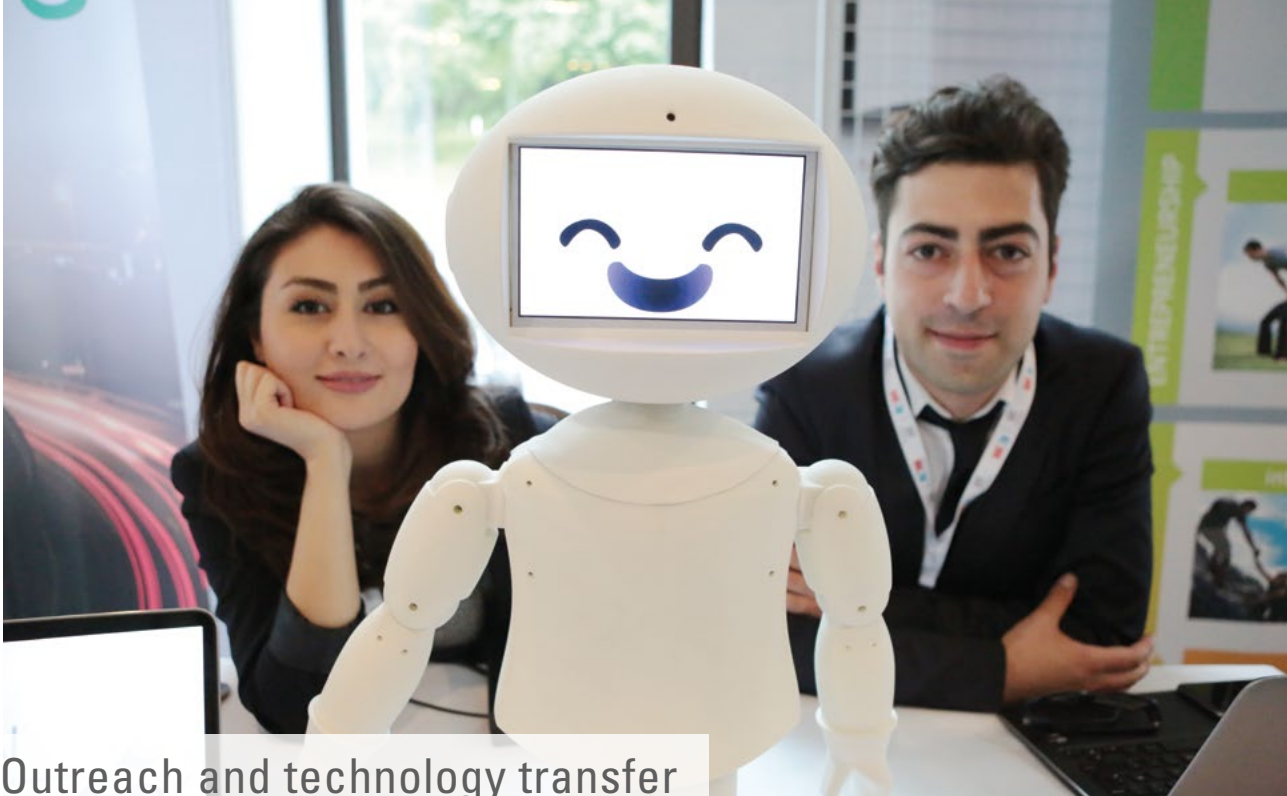
Dudelange



Maison Kazerech, Mondercange

France





Outreach and technology transfer

# LuxAI Social Robots – programmable by everyone

At the heart of every robot is its programming – the software that enables it to interact with the world and help others. Improving robot design is part of the mission of innovative start-up LuxAI, who specialise in robotic solutions for various industries. Created after the success of a research project at the University's Interdisciplinary Centre for Security, Reliability and Trust (SnT) funded by the Luxembourg National Research Fund (FNR), LuxAI uses the latest advances in artificial intelligence and robotics to build social robots for assisting people, enabling teachers, therapists and caregivers.

Such robots can be used in health care, where they would support trainers and therapists in their work. They can be programmed to practice vocabulary

with children or run through rehabilitation exercises with stroke patients. To date, robots have proven to be an effective tool in rehabilitation efforts, but LuxAI seeks to address a key drawback to the traditional design of robots – namely, that robot programming requires extensive IT knowledge.

"Practitioners who want to teach a robot on how to rehabilitate stroke patients, for example, can't learn their way into programming – it's too complicated," says Dr Pouyan Ziafati, CEO of LuxAI. "They need an interface by which they can program the robot intuitively and naturally."

In cooperation with the Autonomous Robot Lab of the University's Computer Science and Communications Research Unit (CSC), LuxAI has developed an interface based on the mobile Android

platform, and can make social robots suitable for the mass market. After conducting tests with non-IT experts, LuxAI staff found that the test participants were able to program the robots (for their purposes) within 20 minutes.

Ziafati sees many possible applications for these robots, such as support for autistic children, the entertainment industry or in elderly care. LuxAI continues to work with Fondation Autisme Luxembourg and three departments at the University of Luxembourg to develop applications for autism therapy, post-stroke rehabilitation and elderly cognitive rehabilitation.

"Social robots can't ever replace qualified personnel – but they can provide support, since they have unlimited time and can take over routine tasks," says Ziafati.

## Outreach and society

# Scienteens Lab sparks interest in research

The Scienteens Lab – De Labo fir Jonker – aims to bridge the gap between school and university and it successfully excites high school students about science and research done at the University of Luxembourg. Over the years the programme has grown immensely, with more than 1,900 students attending more than 115 workshops between 2012 and 2016. Now the Scienteens Lab has expanded again: in November 2016 Her Royal Highness the Hereditary Grand Duchess of Luxembourg, patroness of the Scienteens Lab, and Marc Hansen, Minister Delegate for Higher Education and Research, not only inaugurated the first biology laboratory, but also gave the start signal for the new scientific disciplines mathematics and physics.

In the mathematical workshop, students can now compare, for example, early encryption techniques to today's complex methods. Meanwhile, in the physical workshop students look at the physical properties of mayonnaise, and how chemical bonds affect viscosity. In the new biological workshop experiments with *Escherichia coli* bacteria are performed to



study how sunscreen protects against gene mutations caused by ultra-violet rays.

While designing and planning the workshops, the team of the Scienteens Lab cooperates closely with teachers from Luxembourgish schools to ensure the courses tie in well with the school curriculum. They also make sure that the content relates to current research and our daily lives, so that students are quickly engaged in the topic. "Practical experimentation is a good way to boost interest in science and to give the students some idea whether a career in science is something they want to pursue," explains the coordinator of the Scienteens Lab, Dr Elisabeth John.

## Fundraising

# Doing good and setting trends

The tradition that has been mainstreamed in British and American universities is now also being implemented in Luxembourg: A professional fundraising programme is supposed to contribute to adequate university financing. The former Vice-president for Academic Affairs, Professor Eric Tschirhart, is responsible for the design and development of the fundraising initiatives: "Private donations are

increasing in significance for the university because we are growing out of the foundation phase. Of course, we are also counting on future generous financing from the Grand Duchy. But with financial resources from the fundraising initiatives, we can become even more flexible and set trends that are not possible with state funds."

Tschirhart envisions three areas in which he wants to become active. Since rental costs in Luxembourg are quite high, he wants to continue to improve the living situation for students with the aid of fundraising – with new buildings, for which donations will be invited, or with transference of houses that can be transformed into residence halls.

A further field is engagement of enterprises: companies support selected students, so-called Company Fellows – from the beginning of the study programme until the completion thereof. Or they commit themselves in the context of projects. "Here we have a broad spectrum, from purely financial support to project-based cooperation, in which research and business can collaborate", says Tschirhart.

Money donations not intended for a special purpose are also important, the science manager continues: "But many people aren't even aware yet that they are able to apply for university donations. I am working on changing this."

## Portrait

# Music transcends boundaries



Dr Jasmin Sinha

"Music is a universal language."

Dr Jasmin Sinha is convinced of this.

She is also convinced that music transcends boundaries – "be it nationality, religion, age, profession or hierarchy – everything becomes trivial when people find their way to each other through music." She knows what she's talking about. Having long played acoustic and electric guitar, Jasmin recently picked up electric and upright bass. For a long time she sang in an a cappella group in Heidelberg and since 2012 Jasmin, who holds a Ph.D. in linguistics, can be regularly found playing at concerts in Luxembourg, to which she usually brings her own instruments.

One such gig is the uniJAM after-work sessions in the Mix 'N Kava – MK Bar on Campus Belval. Since April 2016 employees and students of the University of Luxembourg have regularly gathered here to jam together. The

sessions are open to a public audience, although most guests are associated in some way with the University.

Jasmin Sinha introduced these sessions in the first place to enrich the cultural life on campus. "The idea came after the annual LCSB work outing in autumn 2015," she recounts. Under the motto "Talent Day", the participants were invited to show their talents outside professional life, Jasmin Sinha offered a music workshop. "On that day, a strong team spirit was born which we wanted to keep," she recalls.

There was no way they were going to leave it as a one-off event. It took a lot of organisational talent to get a successful series of shows off the ground, but the certified project manager Sinha has acquired exactly that skill in her professional life. As Grants Officer at the LCSB, she assists the researchers with acquiring funding. She knows the most suitable funding programmes



and the arguments which will convince the potential funders, and she supports the scientists during the entire application process, from preparation of project proposals to administration of approved grants, all the way to the project end.

She organises the uniJAM sessions in her free time. Musicians of at least ten nations and all kinds of professions meet once a week during lunch break to practice. It doesn't matter if someone can't make it every week, or if it doesn't go perfectly. "We are very flexible, and we are not aiming for perfection. Above all else, the sessions are meant to make the musicians and the audience happy," Sinha says. Their great popularity proves they succeed at that.



U-Join

# What belongs together has come together

The Grand Duchy of Luxembourg is structuring its research landscape more clearly in the field of the humanities, following the government's decision in the summer of 2015. So far, this has involved integrating four non-university institutes into the university: the Centre Virtuel de la Connaissance sur l'Europe (CVCE), the Centre d'Etudes et de Recherches Européennes Robert Schuman and the documentation departments of the Centre de documentation et de recherche sur la Résistance and of the Centre de documentation et de recherche sur l'enrôlement forcé. With about 40 employees, the CVCE was the largest organisational unit to make the transition on 1 July 2016.

To make the transition as smooth as possible, workgroups were created at the operative level in which the respective experts from both sides worked directly together: personnel with personnel, IT with IT. "This way, many problems of a technical nature were solved quickly and uncomplicatedly," Funk says.

The researchers, too, had to be won over to the CVCE's integration into the University. Most of them have joined the Luxembourg Centre for Contemporary and Digital History (C<sup>2</sup>DH). As Isabelle Voegeli, Head of Communications at the former CVCE, explains: "The integration has given the researchers broader research opportunities, especially in the areas of digital history and the contemporary history of Luxembourg. The focus of their research has also been expanded by the centre's emphasis on public history and outreach."

Several months before the integration, a steering committee was called into being with Administrative Director of the University Alfred Funk as chairman and Vice-president for Academic Affairs Professor Romain Martin as scientific and content director/manager. "The success of the entire project depended on mutual trust," says Funk. "From the very beginning, we therefore made sure there were many university employees present at the CVCE, so that questions could be clarified directly and without circuitous routes through the hierarchy."

Professor Romain Martin sees the digital expertise the CVCE scientists have brought with them as another gain: "To a university that adopts a digital strategy, nothing better could happen than integrating and developing this know-how which the CVCE has amassed over 25 years."



Welcome on board: Arrival of CVCE staff at the "Maison des Sciences humaines" in July 2016

## Infrastructure

# Arriving and settling in



New environment: FDEF's Bachelor programme administrators in their brand new premises

Slowly but surely the Belval campus is filling with life. Since the move of Central Administration and the Faculty of Humanities in 2015, the students, professors and administrative staff have had a year to settle into their new environment. Half of the 6,000 Luxembourg students have moved to Belval so far and now, one step at a time, they are taking over the campus for themselves.

This has been made easier after negotiations with the Fonds Belval, with the University being promised sole responsibility for the four storeys in the Barre d'Enseignement in the Maison du Savoir. "The students and directorship needed more autonomy in the design and use of their premises," explains Thomas Barra, head of the Service de Développement des Sites (SDS). "It is a great success that this has become possible."

**“The students and directorship needed more autonomy in the design and use of their premises.”**

Henceforth, the University can independently maintain these storeys and design the public spaces how it pleases. Of course, this comes with responsibility for routine maintenance. "We have put together a team of four people for logistical management and one person for organising the room reservations," says Pierre Fagot, head of the Service des Infrastructures et de la Logistique (SIL).

Last year a team of 40 arrived in Belval from the Centre Virtuel de la Connaissance sur l'Europe (CVCE). The CVCE was integrated into the research structures of the University with creation of the Luxembourg Centre for Contemporary and Digital History (C<sup>2</sup>DH). The Faculty of Law, Economics and Finance (FDEF) has held its bachelor's courses in Belval since the winter semester of 2016. Other newcomers are the Mathematics, Computer Sciences and Theoretical Engineering research units of the Faculty of Science, Technology and Communication (FSTC).

Until all university sections intended for relocation to Belval have moved, commuting will be the norm for many students

and professors. But, thanks to the shuttle service and a car sharing system, it is at least still easy to get to the various locations. Thomas Barra has more confidence in the Belval campus than ever: "Many who are here now quickly lost their original scepticism. Some might have to make do with less space than before. But they are modern buildings here, built specifically for the university's use; this is perceived very positively overall."





## Transport

# The University provides mobility

Since 2015, the University has gradually been moving to Belval Campus, located near Esch-sur-Alzette. However, “many units are still in the City of Luxembourg and some will remain there,” says Katja Kümpel, Transport Officer of the University. Lecturers and students are therefore often forced to commute frequently between the two locations, which are about 20 kilometres away from each other.

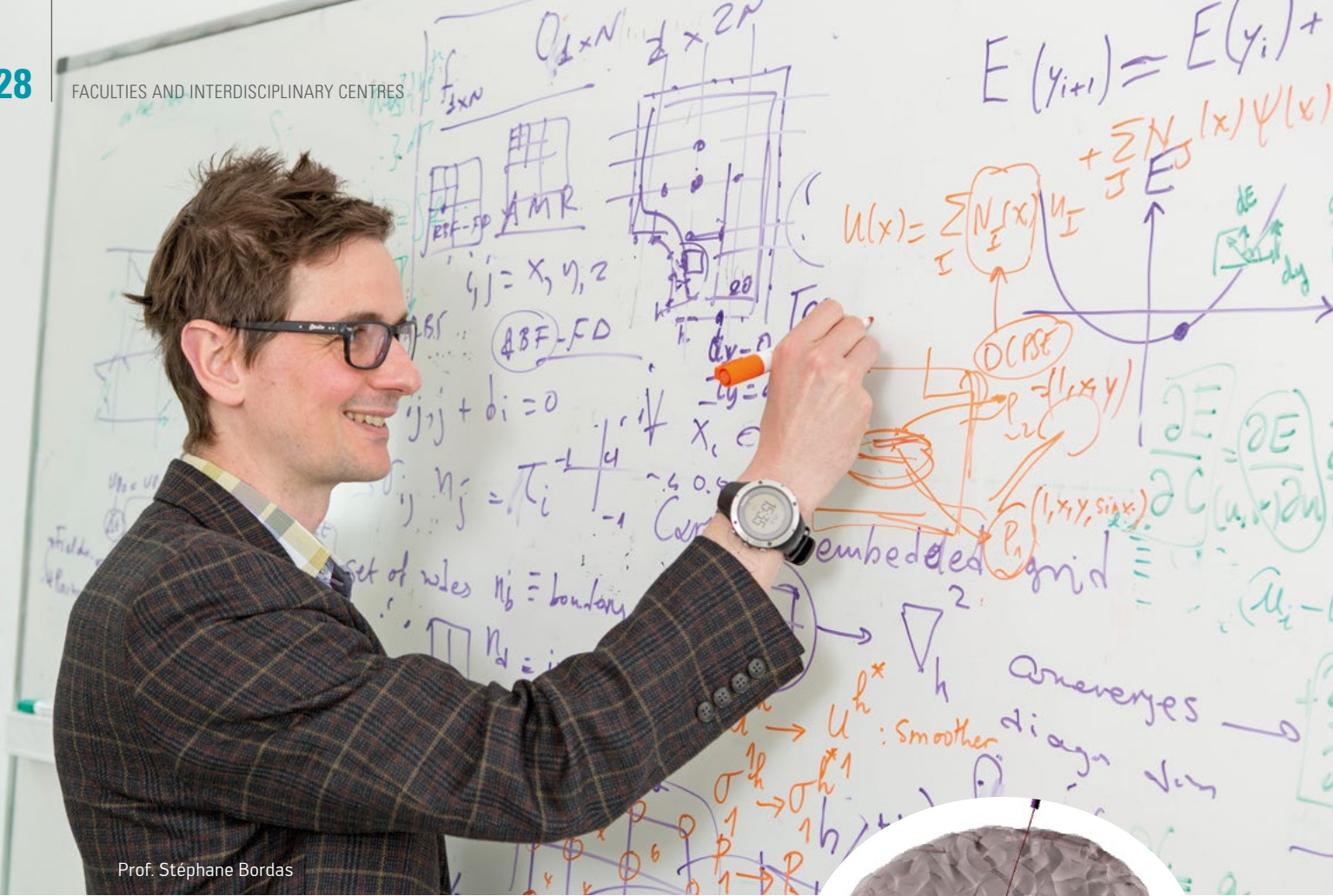
The University has therefore introduced an Inter-Campus Shuttle service. “Two mini-buses travel between Belval and the other locations within Luxembourg city throughout the day,” Kümpel says. “Riding on these buses, which are barrier-free and equipped with Wi-Fi, is free.”

Since the beginning of 2016, University employees have also had the option of using a car from the University’s car sharing fleet. The fleet consists of nine compact cars, which are kept available at the various locations. This service is also free and currently places no limits on usage. The cars are available for all work-related journeys – even across borders.

The car fleet is operated and funded by both Administration and the MobiLab Transport Research Group of the University. Professor Francesco Viti, a scientist at the Research Unit in Engineering Sciences (RUES), uses the statistics of the car sharing service for a number of research projects. “The data is very useful to understand how these non-conventional transport alternatives help in improving the multimodal mobility of our staff members,” he reports. Currently, around 260 users are registered.

Still, the Belval campus continues to grow. Following Administration and the Faculty of Language and Literature, Humanities, Arts and Education, more research groups are moving to the new location. Until now the new campus has been hard to reach by public transport; a tram line is planned to come into service in the autumn of 2018 in Luxembourg city and the general public transport situation in the south of Luxembourg is going to be revised. Until then, many employees will continue to depend on a car. In order to limit the traffic load the University has also set up a carpooling service on the Karzoo platform. “Employees and students can use this to organise pooled rides,” says Katja Kümpel. “This service is very positively received.”





Prof. Stéphane BORDAS

FSTC

# It's not exactly brain surgery

Professor Stéphane BORDAS from the Institute for Computational Engineering was selected as a Highly Cited Researcher in 2015 and 2016 by Thomson Reuters – an award given to researchers who are among the top 1% of cited scientists in their field. BORDAS leads the Legato team which develops quality-controlled computational engineering solutions for biomechanics and materials science.

Legato produces open-source numerical methods which will allow brain surgeons to better plan their operations, for instance when having to place the tip of a needle into a specific region of the brain. "The target region moves in the brain during the operation

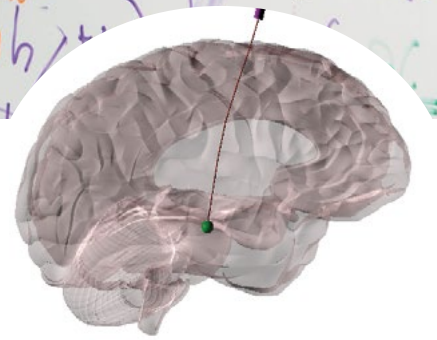
because of brain shift, so that as soon as the cranium is opened, any pre-operative imaging information becomes meaningless," explains BORDAS. Using a three-dimensional deformable model of the brain, the Legato team predicts these deformations and thus provides the surgeon, in real time, with the current position of the target.

BORDAS goes on to explain: "the properties and geometries of organs are highly variable from one patient to the next, and it is impossible to measure these properties directly on the patient. These uncertainties make deterministic predictions impossible."

In 2016 Legato developed an algorithm that enables the user to quantify the effect of uncertainties on the motion of the target. For the first time in this field, an algorithm can provide the surgeon with a confidence interval

about the position of the target. "The results obtained in 2016 are critical stepping stones leading up to predictive personalised medicine, but much work remains to be done to make computational medicine truly 'smart'," says BORDAS. The team is now investigating machine learning algorithms which will allow real-time information to be merged with information from databases and atlases, thus providing patient specificity at an affordable cost.

As Chargé de Mission for Data Modelling and Simulation, BORDAS is creating a core cell of top-level academics in Luxembourg around the theme Data-driven Modelling and Simulation, with applications ranging from social inequalities to tumour growth, asteroid mining and the financial market. He is also devising a new framework for introducing algorithmic thinking early on in Luxembourgish classrooms.



## FSTC in brief

### Profile

#### The Faculty of Science, Technology and Communication (FSTC)

contributes multidisciplinary expertise in the fields of Mathematics, Physics, Engineering, Computer Science and Life Sciences. Through its dual mission of teaching and research, the FSTC seeks to generate and disseminate knowledge and train new generations of responsible citizens and leaders in order to better understand, explain and advance the society and the environment we live in.

The FSTC offers a total of 14 research-oriented ("académique") and applied ("professionnel") bachelor and master degrees across all of the Faculty's key disciplines, including: 2 research-oriented Bachelor programmes; 2 applied Bachelor programmes; 6 research-oriented Masters programmes; and 4 applied Masters programmes. In addition there are 4 lifelong learning/ vocational certificate programmes.

Number of students

1,512

External funding in 2016

8.5 million euros

Number of publications

612

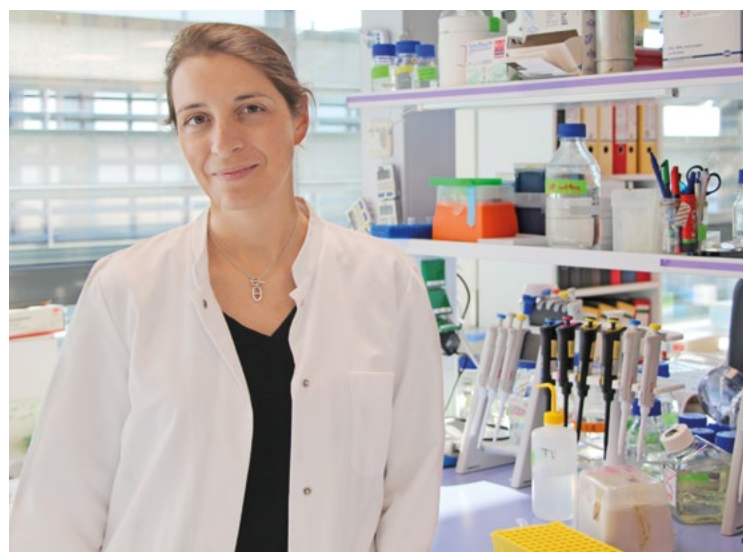
## Studying the molecular mechanism involved in cancer

*Dr Letellier, you are a post-doctoral researcher and principal investigator at the Life Sciences Research Unit (LSRU); what is your research about?*

My main research interests lie in the study of the molecular mechanisms involved in the development and progression of cancer. Ultimately, we aim to identify new biomarkers for early detection of colorectal cancer as well as to elucidate potential new therapeutic strategies.

*Why is your research relevant for Luxembourg?*

If diagnosed early, colorectal cancer can be cured in 9 cases out of 10. Patient survival is therefore largely dependent on early diagnosis and intervention. Over the past years, I have contributed to the identification of novel powerful diagnostic parameters that could ultimately allow colorectal cancer incidence to be reduced. Importantly, these biomarkers may also help clinicians to choose the best treatment option for a given patient. Furthermore, more than 90 per cent of cancer-related deaths can be attributed to metastases and not to the primary tumors from which these malignant lesions arise. We aim at understanding how tumor cells can disseminate and form clinically relevant macrometastases in a secondary organ in order to develop new therapeutic strategies. These research purposes are highly relevant for Luxembourg as colorectal cancer is the second leading cause of cancer-related deaths in Luxembourg.



Dr Elisabeth Letellier

*What do you value most about your faculty?*

The Life Sciences Research Unit is a small unit that belongs to the Faculty of Science, Technology and Communication. I like the spirit of the LSRU, which puts a lot of effort into high quality cancer research and educational training of young scientists. We mostly focus on cancer research and are particularly interested in the translation of our research findings into the clinical setting for the needs of cancer patients.



Prof. Dirk Zetzsche



Prof. Mark Cole

FDEF

# Helping Luxembourg lead the FinTech revolution

As the digital revolution changes the face of finance, a group of eight professors and additional research staff at the FDEF's Research Unit in Law (RUL) is helping tackle the challenges FinTech poses for Luxembourg's financial centre.

Analysing to what extent digitalisation and internet-based technologies impact on the existing rules, regulations and institutions in Luxembourg, Europe and beyond, they cover areas as varied as regulatory leniency for innovation, shadow banking, data and consumer protection, blockchain and virtual currencies, clearing and settlement, automatised compliance, risk management, anti-money-laundering checks and cybercrime law enforcement, among others.

The arrival of Professor Dirk Zetzsche in March 2016 as the ADA Chair in Financial Law (Inclusive Finance), added another dimension to the group's research. Luxembourg is an important supporter of microfinance solutions in developing countries, where financial technologies can play a crucial role. According to Professor Zetzsche "technology may drive down transaction costs and enable custom-tailored suitability and risk assessments: both could lead to greater financial inclusion. In order to ensure that the people in less privileged countries benefit, legal institutions must grow hand-in-hand with tech opportunities."

As part of the FinTech and Digitalisation research group, Professor Mark Cole believes that the topic is a natural fit: "Research into banking and IT law has

had a home at RUL from the very beginning and a dedicated Master of Laws (LL.M.) relating to tech issues is on offer. Tackling the FinTech challenge is a must and an opportunity. We contribute not only from a research perspective but also by taking on an active role in knowledge transfer, offering the sector as well as politics a forum for discussion."

Efforts to bridge the research-practice divide in 2016 included a conference organised with the Massachusetts Institute of Technology (MIT) as well as the 3x3 FinTech Lecture Series, hosted throughout the 2016-2017 academic year with the Luxembourg House of Financial Technology (LHoFT). With FinTech firmly established as a priority of the University, research at RUL will continue to help Luxembourg stay abreast of global FinTech trends.



## FDEF in brief

### Profile

The **Faculty of Law, Economics and Finance (FDEF)** is divided into three research units corresponding to these disciplines, also including the Luxembourg Centre for Logistics and Supply Chain Management (LCL) and the Robert Schuman Institute of European Affairs, the latter organised in cooperation with the Faculty of Language and Literature, Humanities, Arts and Education (FLSHASE).

Over a dozen research areas have been identified within the FDEF's research units, a number that keeps developing as the faculty continues to grow and evolve. A key theme to all of the FDEF's activities is a European and international outlook that is rooted in the Luxembourg context.

By offering three Bachelor programmes, 12 Master's degrees as well as five life-long learning/vocational training certificates, the faculty aims to educate critical thinkers who will be able to help provide solutions to the challenges of today and tomorrow, both within Luxembourg and Europe and abroad.

Number of students

2,562

External funding in 2016

8.3 million euros

Number of publications

298



Dr Christina Constantinidis

## Relevant research for Luxembourg entrepreneurship

*Dr Constantinidis, you are a post-doctoral researcher at the FDEF – what is your research about?*

I investigate issues of gender diversity and entrepreneurship. At the moment, I specifically work on a project on women's collaborative entrepreneurship. Another project examines succession in family businesses and the ways in which sons and daughters take leadership roles.

*Why is this research relevant for Luxembourg?*

With family businesses, for example, we see that owners are growing older but have not planned the succession. Research shows that daughters are often not identified as potential successors. How can we counteract this trend? I also work on diversity management in SMEs, which is important for Luxembourg as it has a very diverse workforce. There is a growing interest in entrepreneurship in Luxembourg, but female entrepreneurship is a potential that is untapped. I investigate reasons and recommendations. One of the advantages in Luxembourg is that as researchers we are close to policy makers and have the chance to make a real difference.

*What do you value most about your faculty?*

I value the fact that we have time for research. As post-docs we work with the community, we teach – which I enjoy – but this is not at the expense of research. The international environment is inspiring and I value being able to speak English and French every day. And also the interdisciplinarity, carrying out research at the intersection between economics, management and entrepreneurship. You can learn a lot across disciplines.

FLSHASE

## Psychophysiology: Interoception as a key to understanding physical symptoms

Disturbed perception of one's own physical functions can lead to mental disorders in the long term. Conversely, chronic stress often invokes physical symptoms that cannot be attributed to any organic dysfunction. A treating physician cannot always clearly discern whether the symptoms a patient experiences can be categorised as neutral or disease-associated. Dr André Schulz and Professor Claus Vögele of the Integrative Research Unit for Social and Individual Development (INSIDE) at the University of Luxembourg are, therefore, investigating suitable methods with

which patients' experience of their own physical symptoms (so-called interoception) can be better reconciled with the actual physical symptoms. "How people experience and interpret the signals coming from their body is of crucial importance to their health, or indeed to the onset of disease," says Claus Vögele.

In order to better examine the correspondence between actual body signals and a person's perception thereof, Claus Vögele and co-worker André Schulz have developed a method to assess phases of inhalation and exhalation in relation to startle eye blinks. When hearing a startling noise, there is an involuntary blink reflex that differs between inhalation and exhalation. The researchers have analysed this blink reflex and compared it with individuals' perception of breathing.

This new assessment technique allows for the exact assessment of the correlation between a physical symptom (for example breathing) and its perception.

"We want to understand the mechanisms that are responsible, if the communication between brain and body is permanently dysregulated," says Schulz. "If it turns out for a given disease that the communication of signals between brain and body is disrupted at a certain level, then interventions, such as bio-feedback treatment, for example, could be developed that are based on these results."



Dr André Schulz



Prof. Claus Vögele

## FLSHASE in brief

### Profile

The **Faculty of Language and Literature, Humanities, Arts and Education (FLSHASE)** covers a wide range of areas in the fields of humanities, linguistics, cognitive sciences and social and educational sciences. Research and teaching at the Faculty creates new knowledge about society's social, economic, cultural, political and educational aspects.

Our ambitious, interdisciplinary research addresses key issues such as education in multilingual and multicultural environments, interactions between health and behaviour, migration and identity, social inequalities, and sustainable development. Our four Bachelor's and 18 Master's degree programmes and our doctoral school provide innovative and attractive perspectives for the next generation of academics and professionals.

### Number of students

**2,080**

### External funding in 2016

**8.9 million euros**

### Number of publications

**561**

## Understanding mathematical thinking

*Dr Guillaume, you are a senior researcher at the Education, Culture, Cognition & Society Research Unit at the FLSHASE, what does your research focus on?*

My main scientific interest focusses on the study of cognitive mechanisms for processing numbers and processes for solving calculations. Currently I am leading two research projects based on this interest. With one project, I am helping to devise a method to assess non-verbal numerical skills such as, for example, our ability to estimate and compare amounts by measuring brain activity using electroencephalography. With the other project, I am analysing logical, mathematical reasoning in adults when they have to deal with a set of arguments and counter arguments.

*Why is this research relevant for Luxembourg?*

This research into number processing is very relevant to the situation in Luxembourg because in the schools here children often have difficulty learning mathematics. Being able to assess children's numerical and arithmetic skills, independently of their mother tongue, is actually becoming crucial for practitioners; for certain pupils language is an additional challenge which they have to overcome. Finally, having a greater understanding of the mechanisms involved in mathematical thinking will provide an invaluable tool for teaching this subject.



Dr Mathieu Guillaume

*What do you value most about your faculty?*

We benefit from having optimum conditions to carry out leading edge research thanks to the wealth of resources made available to researchers, including the new suite of experimental rooms, and thanks to all the many contacts the Faculty has with the official education system.



SnT

# Meeting the world's digital demands

In 2005, the internet saw its first billion users come online; five years later, another billion. Today, 3.6 billion people consume data over the web every day, and although the growth rate of new users has slackened, the demand for data continues to grow.

"In just five years, nearly 75% of the data consumed over the web will be video," says Dr Symeon Chatzinotas, deputy head of the SIGCOM group at the University of Luxembourg's Interdisciplinary Centre for Security, Reliability and Trust (SnT).

"Without new innovations to deliver the data, the current 4G network could eventually become overwhelmed." Not only will the future bring new users and greater demands, but as the Internet of Things continues to expand, with millions of new devices connecting and receiving data, it too will be a force to deal with.

Enter the 5G era. The next iteration of data delivery systems must improve speeds and bandwidth capabilities of the network.

To do so, Chatzinotas is leading a project called the Satellite Precoding Hardware Demonstrator, referred to as SERENADE. Working closely with external partners like SES, the group aims to improve satellite transmission by improving the current infrastructures already in place.

One method looks at the basic principle of sharing. Given the limited frequencies available for wireless transmissions, some satellites, for example, have exclusive spectra but do not continuously transmit data. Chatzinotas sees this as an opportunity. Through a technique called "precoding" the team is able to create a multi-beam system that can improve transmission rates. When successfully implemented, performance gains can be significant, with nearly four times the throughput, improved flexibility and energy efficiency.

While new infrastructure, such as cellular towers, will have to be built to accommodate the coming demands, Chatzinotas sees room for much improvement through the many avenues already in place. Many of these, to date, have been capable of delivering an immense amount of data to the world's robust number of online users.

By working with industry, SnT, in collaboration with its partners in industry, will help ensure a future of reliable data access for people around the world.



## SnT in brief

### Profile

The **Interdisciplinary Centre for Security, Reliability and Trust (SnT)** conducts internationally competitive research in information and communication technology (ICT) with high relevance creating socio-economic impact. In addition to long-term, high-risk research, SnT engages in demand-driven collaborative projects with industry and the public sector. Through its Partnership Program, currently boasting 32 members, SnT develops strategic areas addressing the key challenges confronting industry and the public sector in ICT. The resulting concepts present a genuine, long-lasting competitive advantage for companies in Luxembourg and beyond.

SnT has undergone a rapid development since its launch in 2009, recruiting top scientists, launching over 50 EU and ESA projects, founding a technology transfer office (TTO), protecting and licensing IP, launching four spin-offs, and creating a dynamic interdisciplinary research environment.

External funding in 2016

**10.53 million euros**

Number of publications

**251**

## Our students will be the basis of the future brain-economy

*Dr State, you are head of the SEDAN research group at SnT; what is your research about?*

My research is related to making better and more secure systems, capable of dealing with the large volumes of data encountered in the modern IT driven society. We are interested in different viewpoints ranging from systems, network and application layer processing to streaming and static data.

*Why is your research relevant for Luxembourg?*

My research is relevant for Luxembourg since we work in strong collaboration with industry. Both SMEs (Idetect, Ola Mobile, Choice) and large companies (BCEE, POST, Telindus) can benefit from the highly qualified research personnel and its qualifications for getting alternative approaches and long term strategic solutions for their business and technology needs. Moreover, we train PhD students, who will be able, after graduation, to form the basis of the future "brain-economy", which has been shown to be one possible way towards long term and sustainable economic growth.



Dr Radu State

*What do you value most about SnT?*

SnT is an extraordinary place to be. PhD students and research associates have excellent work conditions and an outstanding research environment. Moreover, the lean management and extraordinary autonomy that principal investigators have, coupled with an impact- and project-driven approach to research, is challenging and motivating. There is a lot of interesting work, there are many opportunities offered in terms of research and practical outcomes, and most of all, the work that we do is always capable of exciting us and leading us to learn something new, experiment with new technologies, and create new scientific outcomes.

LCSB

# HuMiX works like the human intestine

One of the most complex human organs is our digestive tract. Here, the body comes into contact with all manner of diet-derived compounds and with countless bacteria. For a better understanding of this tight interaction, Associate Professor Paul Wilmes, head of the LCSB Ecosystems Biology Group, and his team have developed HuMiX: the Human Microbial Cross-talk model. In HuMiX, human intestinal cells and bacteria can be cultivated together in a very small space under representative conditions. In 2016, together with colleagues at the Luxembourg

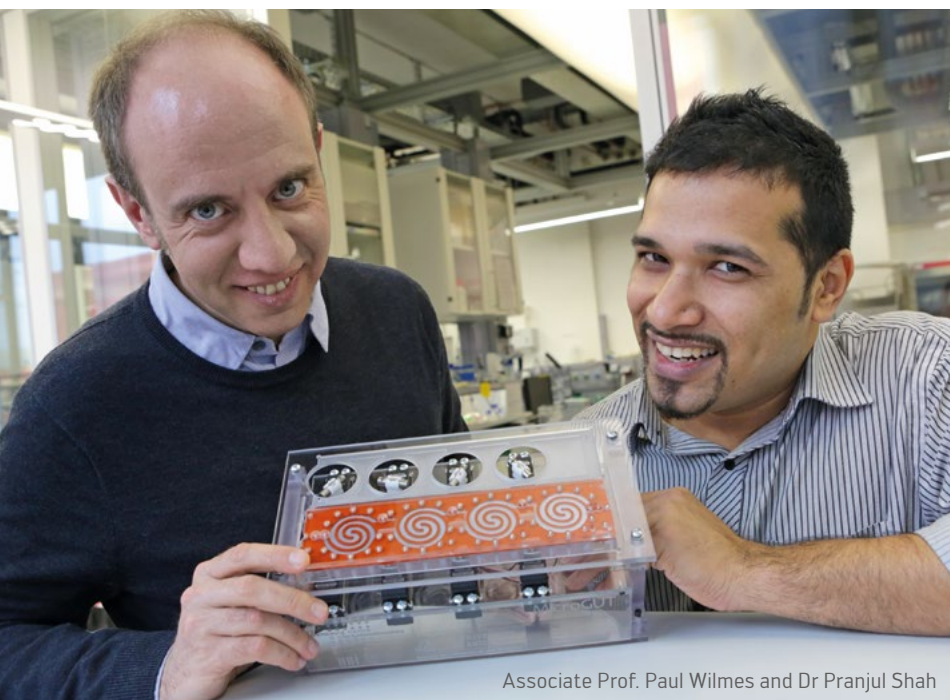
Institute of Health and the University of Arizona in the United States, the researchers proved that their model of the human gut is representative of the actual conditions and processes that occur within our intestines.

"With HuMiX, we can observe interaction of bacteria in realtime as they communicate with human intestinal cells," says Paul Wilmes, who invented HuMiX. For their tests confirming the validity of HuMiX experiments, the researchers compared their data with results from other research groups who obtained theirs from humans or animals. "The data sets showed

strong agreement," says Wilmes: "That means HuMiX delivers a very accurate portrayal of the cellular and molecular processes taking place in the human gut."

Dr Pranjul Shah, co-inventor of the HuMiX device, names one example of a metabolic process the LCSB researchers discovered with HuMiX: "In a co-culture of intestinal cells and a certain strain of the bacterial species *Lactobacillus rhamnosus*, we determined that production of a messenger of the nervous system is stimulated in intestinal cells, indicating a mechanism by which the intestine may be communicating with the brain. The ability of HuMiX to provide such responses can be attributed to the unique capability of the HuMiX model to allow cultivation of anaerobic bacteria along with human intestinal cells." In 2016 the results were recognised with a Lush Young Researcher's Prize.

"We can now study these and similar effects at an unprecedented level of precision thanks to HuMiX," Paul Wilmes continues. He sees a benefit not only for basic research, but also for clinical application: "With HuMiX, we can now also analyse how probiotics, dietary compounds or drugs affect human physiology. We aim to better understand how these therapeutics need to be refined in order to work better in the future."



Associate Prof. Paul Wilmes and Dr Pranjul Shah



## LCSB in brief

The **Luxembourg Centre for Systems Biomedicine (LCSB)** is an interdisciplinary research centre at the University of Luxembourg. It is accelerating biomedical research by closing the link between systems biology and medical research. Collaboration between biologists, medical and computer scientists, physicists, engineers and mathematicians is offering new insights into complex systems like cells, organs and organisms. These findings are essential for understanding principal mechanisms of disease pathogenesis and for developing new tools in diagnostics and therapy.

Neurodegenerative diseases like Parkinson's disease and description of diseases as networks are at the focus of the LCSB's research. The Centre has established strategic partnerships with leading biomedical laboratories worldwide and with all major biological and medical research units in Luxembourg. The LCSB fosters collaboration with industrial partners and accelerates the translation of fundamental research results into (clinical) applications.

External funding in 2016

**8.81 million euros**

Number of publications

**122**

## Computational modelling to accelerate microbiome research

*Professor Thiele, you are Principal Investigator in the Molecular Systems Physiology group at LCSB, what is your research about?*

We develop cutting edge computational models of human and gut microbial metabolism to investigate how diet and the human gut microbiota can modulate human health. Therefore we integrate metabolomics and metagenomics data from healthy individuals and patients to identify potential disease biomarkers, obtain novel insight about disease mechanisms, and generate hypotheses for diet-based therapeutic approaches. We are particularly interested in applying our models and tools to Parkinson's disease. We are working closely with experimentalists and clinicians to validate our key hypotheses.

*Why is your research relevant for Luxembourg?*

Biomedicine and big data analysis is one of the main focus areas of Luxembourg's research efforts. With our computational modeling approach, we provide a powerful mean to analyse big data arising from modern biomedical experiments and facilitate the interpretation of complex biomedical data. With our approach, we will be able to bring research results to the general public faster than would be possible through drug development.



Associate Prof. Ines Thiele

*What do you value most about your centre?*

The Luxembourg Centre for Systems Biomedicine provides a very motivating environment with a can-do attitude for new ideas and approaches, which, I believe, is crucial for advancing our understanding of the multitude of factors influencing the development and progression of several diseases.



Prof. Andreas Fickers

C<sup>2</sup>DH

# The challenge of going digital

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The University of Luxembourg has set up a new interdisciplinary research centre, the Luxembourg Centre for Contemporary and Digital History or C<sup>2</sup>DH. The C<sup>2</sup>DH was launched in autumn 2016; its founding director is Belgian historian Professor Andreas Fickers. The origins

of the centre go back to the change of Luxembourg Government in 2013: during the negotiations for the formation of a coalition, plans emerged to establish an academic institute to carry out research into the contemporary history of Luxembourg. "Reconstructing the history of Luxembourg at the time of the German occupation has so far proved to be a minefield, often marred by a lack of objectivity and sometimes overshadowed by personal animosities," says Andreas Fickers. "At the C<sup>2</sup>DH, we want to look at this period of Luxembourg history from a scientific perspective." As a university institute, Fickers argues, the C<sup>2</sup>DH will enjoy the necessary independence to carry out this delicate task.

Fickers' vision, however, extends far beyond the World War II era: "We are naturally also interested in Luxembourg's development during the post-war decades, which in some ways was highly atypical compared to its

neighbouring countries. And we want to examine in detail the country's role in the process of European unification."

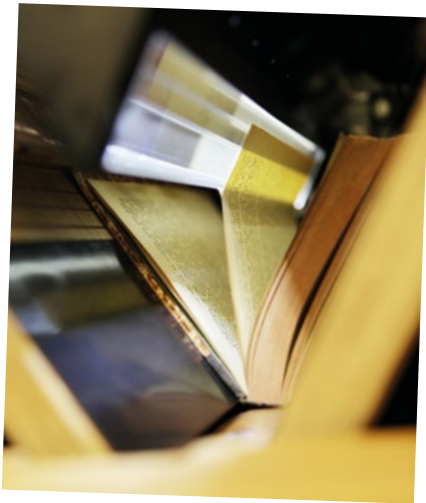
Fickers, whose PhD in History investigated the failed attempts to standardise colour television in Europe, has carried out extensive research into the history of communication technologies and the media. He has an ambition for the new centre: "We want to gain international recognition by addressing the urgent question of how digitisation and big data affect the practice of doing history today and in the near future."

This applies not only to scientists' work but also to the publication of their results: "Historians must make a concerted effort to align their methods with the critical use and interpretation of digital sources," says Fickers. "We should make effective use of new digital media to present our research findings in innovative ways and formats."

# The C<sup>2</sup>DH in brief

## Profile

The **Luxembourg Centre for Contemporary and Digital History (C<sup>2</sup>DH)** was officially set up on 1 October 2016 and is directed by Professor Andreas Fickers. The centre's key focus is the contemporary history of Luxembourg and the history of Europe in the 20th and 21st centuries. A third research area looks at digital history, analysing the impact of the digital turn on the practice of historical research, conceptualising the use of digital methods and tools and serving as a catalyst for innovative and creative scholarship and new forms of public dissemination. Public history, outreach and societal engagement with history in Luxembourg are a core aim of the centre's approach. A new series of events, Forum Z (Z for *Zeitgeschichte*, contemporary history), offers a platform for a critical and open discussion of current issues in contemporary Luxembourgish and European history.



## History sells!

*Professor Fickers, the C<sup>2</sup>DH wants to use scholarly methods to address contemporary topics while also investigating the importance of digitisation in the historical sciences. Do you feel this will help you reach out to the general public?*

The general public plays an important role in our work. At the C<sup>2</sup>DH, we will not be sitting in an ivory tower; we will be working with and for people who may not be historians but who do take an interest in history. I am convinced that this approach will work. Take a look at the media market: history sells! There is a great interest in history.

*And how will it work?*

We will get people involved in our research and we will present our research findings to people in a new and unconventional way. With our new Forum Z series the C<sup>2</sup>DH wants to discuss controversial issues in contemporary history and society in a more democratic and engaging way. We have a strong "public history" mission and we want to use our approach to digitisation to present history in a creative way – not merely in writing but also in video, pictures, audio



and other formats. Every format offers a chance to perceive history differently. Exploring the possibilities of transmedia storytelling will be a fascinating experience.



# Milestones in 2016

## A year between Belval and Berkeley

2016



### JANUARY

The University announces the nomination of Professor Romain Martin and Professor Tonie van Dam as vice-presidents. As of March 2016, Romain Martin will focus on academic affairs and in particular on the Learning Centre project - the new central library on Belval Campus. As of 2017, Tonie van Dam will be primarily concerned with further expanding the doctoral schools as well as with international relations and gender issues.



### JANUARY

In a kick-off meeting with representatives from Swiss-based Interface Politikstudien Forschung Beratung GmbH and the Ministry for Higher Education and Research, the University's third external evaluation is launched.



### JANUARY

Five master programmes at the Faculty of Law, Economics and Finance are accredited by the Foundation for International Business Administration Accreditation (FIBAA), an international agency for quality assurance and development in higher education and research. The FIBAA accreditation is the first study programme certification at the University of Luxembourg and represents an important step in receiving international recognition for its study programmes.



### JANUARY

The University signs a partnership agreement with Kyoto University in Japan and strengthens the already existing research cooperation between the two institutions.



## FEBRUARY

Dr Massimiliano Esposito, a physicist at the University of Luxembourg, is awarded a prestigious Consolidator Grant by the European Research Council (ERC). Esposito, a Luxembourgish expert in nanosystems thermodynamics, receives altogether 1.7 million euros funding over five years for his project entitled Energy Conversion and Information Processing at Small Scales.



## FEBRUARY

The Minister of Education Claude Meisch presents the national youth report on the situation of youth and young adults in Luxembourg in 2015 to the public. The report was prepared by scientists of the University's research unit INSIDE and deals with the transition from youth into adulthood.

## MARCH

Professor Lionel Briand, FNR PEARL Chair and Vice Director of the University's Interdisciplinary Centre for Security, Reliability and Trust (SnT), is awarded an Advanced Grant by the European Research Council (ERC) for his research in the field of software reliability and security. He is the first Luxembourg-based researcher to receive an Advanced Grant, the most prestigious of the European Commission grants.



## APRIL

On Limpertsberg Campus, the University inaugurates the Robert Schuman Institute of European Affairs, after securing funding from the European Commission for the institute as a Jean Monnet Centre of Excellence. The institute will focus on interdisciplinary research on European affairs and the European Union.



## APRIL

The Luxembourg School of Finance (LSF) at the Faculty of Law, Economics and Finance elects professor Jang Schiltz as its new head. Under a new strategy, further emphasis will be placed on research activities in the areas of digital finance, alternative investments and risk management.

## MAY

The University law clinic presents its service to the public: law students offer free assistance to citizens on consumer rights disputes as part of their master studies. Citizens can submit their case online thanks to a new platform now available.

## MAY

During a visit of Professor Tomáš Zima, Rector of Charles University in Prague, to the University of Luxembourg on 31st May, both institutions reaffirm their willingness to cooperate by signing a new agreement on scientific and educational cooperation. Charles University and the University of Luxembourg have been partner universities since 2013. Historical ties between Charles University and Luxembourg, however, are much older, as Charles University was founded in 1348 by Charles IV, of the House of Luxembourg.



## JUNE

At the invitation of His Royal Highness The Grand Duke, the President of Romania, Klaus Iohannis, and his spouse, Carmen Iohannis, visit the University and Belval Campus, accompanied by state secretary for European Affairs, Cristian Badescu.

## JUNE

Professor Rudi Balling, Director of the Luxembourg Centre for Systems Biomedicine (LCSB), is bestowed with the Ordre de Mérite by Grand Duke Henri for his contribution and commitment to research. The scientist receives the distinction during the official celebration of Luxembourg's National Day on 23 June 2016 at the Philharmonie Luxembourg concert hall.



## JULY

After more than ten years of fruitful cooperation between the two institutions, the "Centre Virtuel de la Connaissance sur l'Europe" (CVCE) joins the University of Luxembourg on 1 July 2016. Three weeks later, the 40 CVCE staff members arrive for their first working day in their new offices at Belval. The CVCE's integration follows the Government's decision to reorganise the country's research landscape in the field of humanities, particularly by setting up an Institute for Contemporary History within the University and pooling research activities in European integration studies and digital humanities.



## JULY

The government nominates Yves Elsen (right) as the third Chairman of the Board of Governors of the University. He will complete the mandate of Marc Jaeger (left) who has asked for an end to his mandate in July 2016, for personal reasons. Yves Elsen, who gained his engineering degree at ETH Zurich, holds an MBA from INSEAD Fontainebleau and acts as Managing Partner and CEO of HITEC Luxembourg S.A. Yves Elsen has been Chairman of the Board of the „Fonds National de Recherche“ from March 2010 to July 2016.



## AUGUST

The University of Luxembourg and Paul Wurth sign an agreement for teaching collaboration. Under that framework, highly qualified engineers and researchers from the Luxembourg-based company Paul Wurth will give lectures in engineering at the Faculty of Science, Technology and Communication.

## SEPTEMBER

The University of Luxembourg climbs to position 178 among the best universities in the world in the latest edition of the renowned Times Higher Education (THE) World University Rankings, improving its performance in all categories compared to last year.

## SEPTEMBER

At this year's "Rentrée Académique", the PhD graduates are spoiled with the presence of high-ranking dignitaries: the Prime Minister, three Ministers and a high-level European Official are present to personally congratulate them and also to celebrate the new academic year 2016/2017.





## OCTOBER

More than 400 former and current students, professors, researchers and industry and government representatives celebrate the 100th anniversary of engineering education in Luxembourg at a ceremony held on Belval campus. On this occasion, Their Royal Highnesses the Grand Duke and the Hereditary Grand Duke, grace the event with their presence.

## OCTOBER

The University establishes a new funded Chair in Capital Markets and Post Trade at the Faculty of Law, Economics and Finance in cooperation with six partners. The new Chair will be jointly funded by post-trade services provider Clearstream, law firm Allen & Overy, audit, consultancy, tax and advisory services company Deloitte, the European Central Bank, investment and banking services company Brown Brothers Harriman, private bank Lombard Odier and financial services provider State Street Corp.



## OCTOBER

The Board of Governors officially launches the Luxembourg Centre for Contemporary and Digital History (C<sup>2</sup>DH) as the third Interdisciplinary Centre of the University. The C<sup>2</sup>DH is headed by professor Andreas Fickers and will be composed of researchers and experts committed to investigating, analysing and promoting the contemporary history of Luxembourg and Europe.

## OCTOBER

University President Rainer Klump signs an agreement with the Confucius Institute Headquarters in China and Fudan University for the establishment of a future Confucius Institute at the University of Luxembourg. Prof. Klump was one of the members of the Luxembourgian delegation to China headed by HRH Crown Prince Guillaume.

## OCTOBER

The University signs an agreement with four other research institutions in Luxembourg, namely the Luxembourg Institute of Health, the Luxembourg Institute of Socio-Economic Research, the Luxembourg Institute of Science and Technology, and the Max Planck Institute Luxembourg for International, European and Regulatory Procedural Law, stipulating that they will cooperate in doctoral education.

## NOVEMBER

The month of November sees 998 students leaving the University of Luxembourg with a bachelor's or master's degree, as the University hosts its annual graduation ceremonies. Congratulations!

## NOVEMBER

Her Royal Highness the Hereditary Grand Duchess of Luxembourg officially inaugurates the new laboratory and disciplines of the "Scienceteens Lab - De Labo fir Jonker" on Belval Campus. Initiated in 2012 by the Luxembourg Centre for Systems Biomedicine (LCSB), the Scienceteens Lab has so far organised more than 108 workshops in biology, mathematics and physics for more than 1,700 secondary schools students.



2017

## DECEMBER

Higher Education and Research Minister Marc Hansen pays the Board of Governors a visit and addresses the governors and the rector with his views on the role of the University of Luxembourg in the Higher Education and Research landscape.

## DECEMBER

IEEE's CloudCom, the premier annual conference on cloud computing technology and science worldwide, is hosted by the Interdisciplinary Centre for Security, Reliability and Trust (SnT) of the University of Luxembourg and attracts more than 200 high-profile experts. The IEEE is the world's largest professional association with over 400,000 members in science and engineering.





Most important data of the year 2016

# Facts and figures









# Bilan au 31 décembre 2016

Exprimé en euro

ACTIF	2016	2015
<b>C. Actif immobilisé</b>	<b>30.608.545,09</b>	<b>31.184.100,45</b>
I. Immobilisations incorporelles	5.716.728,96	4.935.263,92
2. Concessions, brevets, licences, marques, ainsi que droits et valeurs similaires acquis à titre onéreux	5.161.998,61	132.754,29
4. Acomptes versés et immobil. incorp. en cours	554.730,35	4.802.509,63
II. Immobilisations corporelles	24.776.814,13	26.248.833,53
1. Terrains et constructions	3.033.278,88	3.800.268,29
2. Installations techniques et machines	12.120.762,34	15.808.110,02
3. Autres installations, outillage et mobilier	6.298.475,98	6.640.455,22
4. Acomptes versés et immobilisations corporelles en cours	3.305.696,93	0,00
5. Autres immobilisations corporelles	18.600,00	0,00
III. Immobilisations financières	115.002,00	3,00
3. Parts dans des entreprises avec lesquelles l'établissement a un lien de participation	2,00	3,00
5. Titres ayant le caractère d'immobilisations	115.000,00	0,00
<b>D. Actif circulant</b>	<b>98.874.456,47</b>	<b>84.650.822,24</b>
I. Stocks	9.917.489,50	7.716.884,91
5. Travaux en cours pour projets	9.917.489,50	7.716.884,91
II. Créances	10.111.920,96	36.165.545,40
1. Créances résultant des activités de l'UL	4.489.717,04	6.229.455,82
a) dont la durée résiduelle est inférieure ou égale à un an	4.489.717,04	6.229.455,82
4. Autres créances	5.622.203,92	29.936.089,58
a) dont la durée résiduelle est inférieure ou égale à un an	5.622.203,92	29.936.089,58
IV. Avoirs en banques, avoirs en compte de chèques postaux, chèques et en caisse	78.845.046,01	40.768.391,93
<b>E. Comptes de régularisation</b>	<b>3.099.468,82</b>	<b>1.986.511,11</b>
<b>Total de l'actif</b>	<b>132.582.470,38</b>	<b>117.821.433,80</b>

PASSIF	2016	2015
<b>A. Fonds propres</b>	<b>53.066.329,23</b>	<b>48.860.897,36</b>
I. Dotation initiale	5.410.441,00	5.410.441,00
V. Résultats reportés	14.296.582,90	5.924.205,00
VI. Résultat de l'exercice	2.750.760,24	6.342.150,91
VII. Subventions d'investissement en capital	30.608.545,09	31.184.100,45
<b>B. Provisions</b>	<b>7.695.254,63</b>	<b>7.431.611,81</b>
3. Autres provisions	7.695.254,63	7.431.611,81
<b>C. Dettes</b>	<b>31.951.313,88</b>	<b>26.705.014,67</b>
4. Dettes sur achats et prestations de services		
a) dont la durée résiduelle est inférieure ou égale à un an	16.123.002,21	14.182.411,63
8. Autres dettes	15.828.311,67	12.522.603,04
a) Dettes fiscales	4.780.407,33	4.515.633,62
b) Dettes au titre de la sécurité sociale	5.764.997,29	3.124.492,18
c) Autres dettes	5.282.907,05	4.882.477,24
<b>D. Comptes de régularisation</b>	<b>39.869.572,64</b>	<b>34.823.909,96</b>
<b>Total du passif</b>	<b>132.582.470,38</b>	<b>117.821.433,80</b>



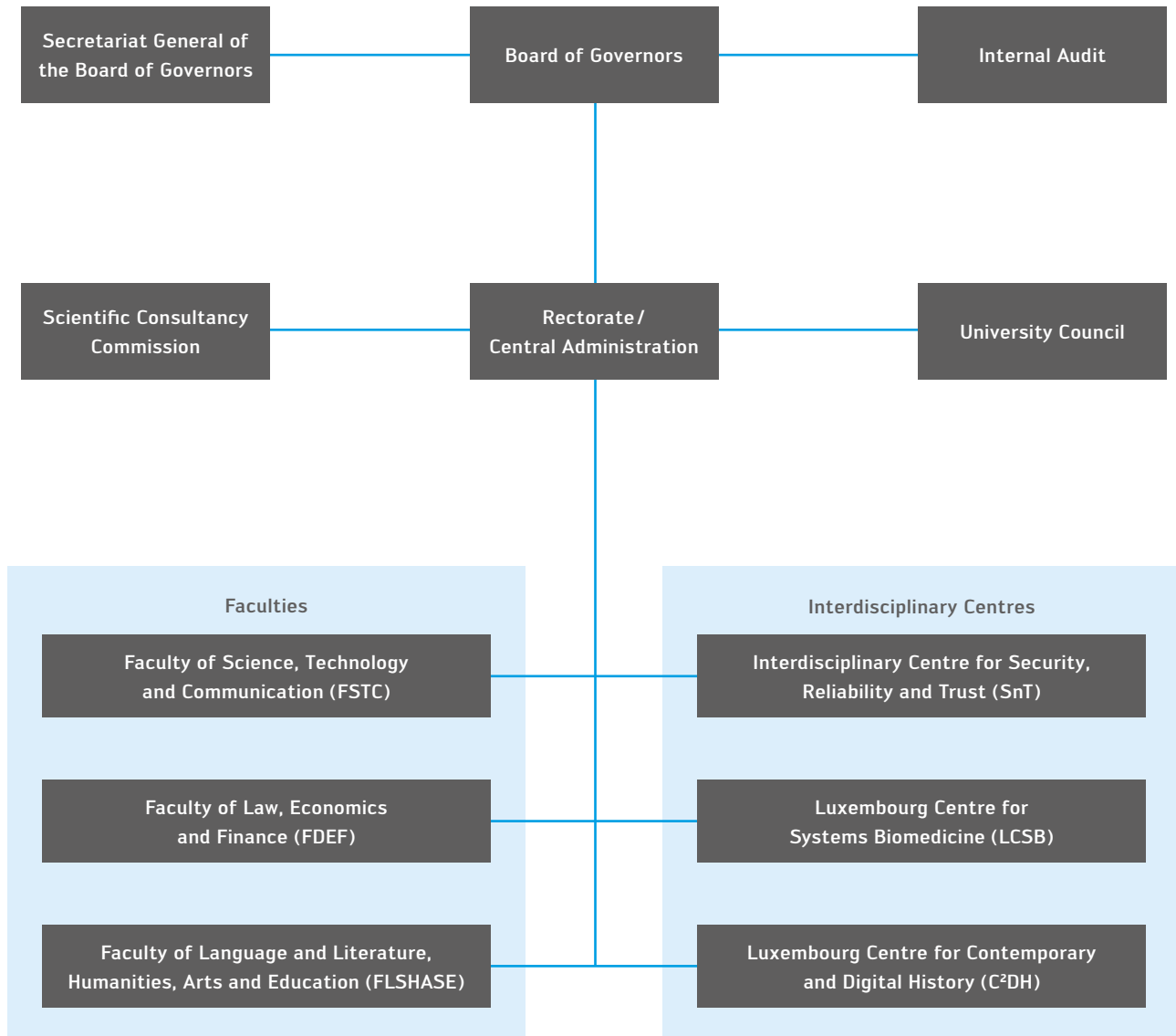
# Compte de profits et pertes au 31 décembre 2016

Exprimé en euro

A. CHARGES		2016	2015
2.	a) Matières premières et consommables	8.509.340,41	8.543.410,12
	b) Autres charges externes	51.980.051,06	44.459.325,17
3.	Frais de personnel	121.662.619,96	113.735.964,79
	a) Salaires et traitements	106.276.958,34	99.177.869,55
	b) Charges sociales couvrant les salaires et traitements	15.226.602,48	14.380.584,88
	c) Autres frais de personnel	159.059,14	177.510,36
4.	a) Corrections de valeur sur immobilisations corporelles et incorporelles	14.593.091,85	12.799.788,35
	b) Corrections de valeur sur éléments de l'actif circulant	204.891,97	306.595,55
5.	Autres charges d'exploitation	8.381.971,01	7.401.953,28
7.	Intérêts et autres charges financières		
	b) autres intérêts et charges financières	52.624,06	41.945,35
9.	Rémunération du personnel de l'Etat rémunéré par l'Etat	5.713.851,77	6.763.409,99
13.	Résultat de l'exercice	2.750.760,24	6.342.150,91
<b>Total des charges</b>		<b>213.849.202,33</b>	<b>200.394.543,51</b>

B. PRODUITS		2016	2015
1.	Produits des activités annexes	8.599.663,05	7.861.468,14
2.	Augmentation des travaux en cours pour projets	2.193.023,62	2.532.387,79
3.	Reprises de corrections de valeur sur éléments de l'actif circulant	28.677,88	165.450,65
4.	Autres produits d'exploitation	40.383.392,27	38.070.940,31
7.	Autres intérêts et autres produits financiers	73.138,47	70.803,27
8.	a) Contributions financières nettes reçues de l'Etat	156.643.769,81	144.858.471,23
	b) Financement du personnel de l'Etat rémunéré par l'Etat	5.713.851,77	6.763.409,99
	c) Contributions autres	213.685,46	71.612,13
10.	Résultat de l'exercice	0,00	0,00
<b>Total des produits</b>		<b>213.849.202,33</b>	<b>200.394.543,51</b>

# Organisation chart





## The Board of Governors

**Karin Langumier** (Assistant of the Secretary general of the Board of Governors), **Anne Christophe** (Deputy Secretary general of the Board of Governors), **Massimo Malvetti** (Secretary general of the Board of Governors), **Alain Kinsch** (Country Managing Partner of Ernst & Young Luxembourg), **Kristín Ingólfssdóttir** (Former president of the University of Iceland. Professor at the Faculty of Pharmaceutical Sciences, University of Iceland.), **Yves Elsen** (Chairman of the Board of Governors as of July 28, 2016. Managing partner and CEO of HITEC Luxembourg), **Rainer Klump** (President of the University of Luxembourg), **Yvonne Flour** (Former vice-president of the Board of Panthéon-Sorbonne University, France), **Gérard Hoffmann** (Chairman and Managing Director of Telindus Luxembourg. CEO for Proximus Luxembourg), **Michel Goedert** (Head of the division of neurobiology, Medical Research Council Laboratory of Molecular Biology, Cambridge, UK), **Léon Diederich** (Commissioner of the Government), **Stijn Lamberigts** (Student representative), **Danilo Zavrtanik** (President of the University of Nova Gorica, Slovenia), **Raymond Bisdorff** (Representative of the academic staff)

According to the law, the Board of Governors oversees the University's activities. It monitors in particular the fulfilment of the institutional contract with the Government. The Board of Governors' role is also to provide the institution guidance on its activities.

The Board of Governors is made up of seven members, at least four of whom currently hold, or have held, a position of responsibility within a university. The diversity of skills and competencies of all Governors as well as their dedication ensures informed and balanced decision-taking in the interest of the University and its internal stakeholders.

Mr Yves Elsen is Chairman of the Board as of 29th July 2016. He will complete the mandate of Marc Jaeger who has asked for an end to his mandate, for personal reasons. The University President, the Government Commissioner, a representative from the academic staff and a Students' Representative participate in a consultative capacity at meetings held by the Board of Governors.

One of the main priorities of the Board of Governors is to ensure that the University is accountable for transparent and efficient resource allocation and management, serving its core activities in research and higher education and for the benefit of all its students.



# Members of the University Council

## (31 December 2016)

Name	Institution
Rudi BALLING	Director of the Interdisciplinary Centre LCSB – Luxembourg Centre for Systems Biomedicine
Stefan BRAUM	Dean of the Faculty of Law, Economics and Finance (FDEF)
Marco Antonio DIAS DA COSTA	Students' Representative of the Faculty of Language and Literature, Humanities, Arts and Education (FLSHASE)
Caroline DÖHMER	Representative of the Intermediate Staff of FLSHASE
François-Xavier FLOTTERER	Students' Representative of the Faculty Science, Technology and Communication (FSTC)
Alfred FUNK	Director of Administration (with consultative voice)
Jörg GERKRATH	Representative of the Academic Staff of FDEF
Paul HEUSCHLING	Dean of FSTC
Adelheid HU	Representative of the Academic Staff of FLSHASE
Andreas IRMEN	Representative of the Academic Staff of FDEF
Pierre KELSEN	Representative of the Academic Staff of FSTC
Rainer KLUMP	University president
Romain MARTIN	Vice-President - as of 1st March 2016
Georg MEIN	Dean of FLSHASE
Ludwig NEYSES	Vice-President
Björn OTTERSTEN	Director of the Interdisciplinary Centre SnT – Security and Trust
Beth PARK-FURLONG	Representative of the Library Scientific Personnel
Berta RATO	Representative of the Scientific, Administrative and Technical staff of FSTC
Norbert RUGIRA	Students' Representative of FDEF
Vladimir SALNIKOV	Representative of the Intermediate Staff of FSTC
Georges STEFFGEN	Representative of the Academic Staff of FLSHASE
Antoine THEVENOUX	Students' Representative of FSTC
Edoardo TIBERI	Students' Representative of FDEF
Eric TSCHIRHART	Vice-President
Sonja UGEN	Representative of the Scientific, Administrative and Technical staff of FLSHASE
Tonie VAN DAM	Representative of the Academic Staff of FSTC
Anne-Marie VESDREVANIS	Representative of the Scientific, Administrative and Technical staff of FDEF
Christopher WEYER	Students' Representative of FLSHASE

# Research activity

## List of all accepted Horizon2020 projects at the University of Luxembourg\*

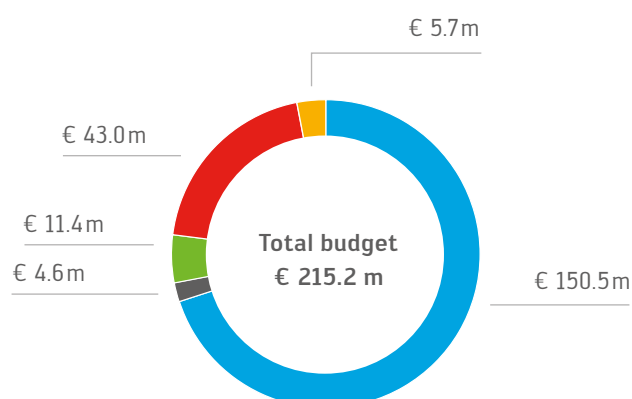
Horizon 2020 (H2020) is the biggest Research and Innovation programme of the European Union ever with nearly 80 billion euros of funding available over seven years (2014 to 2020). It promises more breakthroughs, discoveries and worldfirsts by taking great ideas from the lab to the market. For a research-centred and innovative university such as the University of Luxembourg it is an important goal to be part of the H2020 community and to continue to successfully apply for these funding opportunities.

Faculty or Interdisciplinary Centre	Responsible PI within University of Luxembourg	Acronym	Funding Scheme	Role of University of Luxembourg
FSTC	Sauter, Thomas	MEL-PLEX	Partner	Partner
FSTC	Coron, Jean-Sébastien	HEAT	RIA	Partner
FSTC	Van Dam, Tonie	EGSIEM	RIA	Partner
FSTC	Lagerwall, Jan	INTERACT	ERC-COG	Coordinator
FSTC	Sieberttritt, Susanne	Sharc25	RIA	Partner
FSTC	Wirtz, Ludger	EJD-FunMat	MSCA-ITN-EJD	Partner
FSTC	Esposito, Massimiliano	Nano Termo	ERC-CoG	Coordinator
FSTC	Engel, Thomas	EXCITING	CSA	Partner
FSTC	Tkatchenko, Alexandre	BeStMo	ERC-CoG	Coordinator
FLSHASE	Karl, Ute	MOVE	RIA	Coordinator
FLSHASE	Vogele, Claus / Petersen, Sybille	CIP	MSCA-IF-EF-ST	Coordinator
FLSHASE	Ferring, Dieter	MinD	MSCA-RISE	Partner
FLSHASE	Nienaber, Birte	RELOCAL	RIA	Partner
FLSHASE	Vogele, Claus / Van Ryckeghem, Dimitri	PainDynamics	MSCA-IF-EF-ST	Coordinator
SnT	Engel, Thomas	FLYSEC	RIA	Partner
SnT	Engel, Thomas	PRIVACY FLAG	RIA	Partner
SnT	Engel, Thomas	TARGET	RIA	Partner
SnT	Engel, Thomas	F-Interop	RIA	Partner
SnT	Engel, Thomas	Atena	IA	Partner
SnT	Aouada, Djamila	STARR	RIA	Partner
SnT	Van der Torre, Leon	MIREL	MSCA-RISE	Coordinator
SnT	Le Traon, Yves	bloTope	RIA	Partner
SnT	Briand, Lionel	TUNE	ERC-AdG	Coordinator
SnT	Van der Torre, Leon / Livio, Robaldo	ProLeMAS	MSCA-IF-EF-ST	Coordinator
SnT	Chatzinotas, Symeon	SANSA	RIA	Partner
LCSB	Balling, Rudi	SysMedPD	RIA	Coordinator
LCSB	Krüger, Rejko	CENTRE-PD	CSA-TWINING	Coordinator
LCSB	Schneider, Reinhard	SYSCID	RIA	Partner
Central/Library	Pausch-Antoine, Marie-Pierre	OpenAIRE2020	RIA	Partner
DEIS	Jones, Catherine	CROSSCULT	IA	Partner

\* December 2016

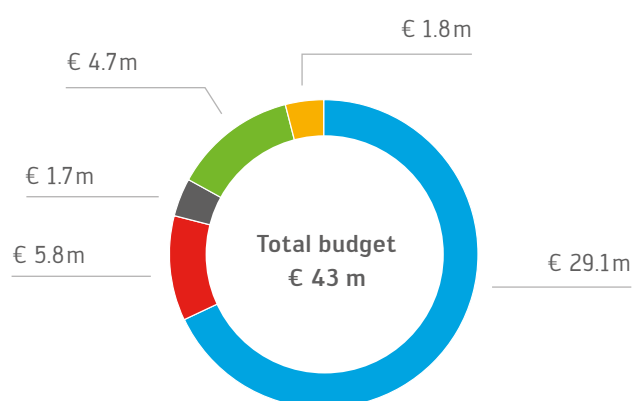
## University budget in 2016 \*

- State endowment
- Belval project
- Self funding
- Third party funding
- State personnel seconded to the UL



## Total third party funding in 2016 \*

- FNR
- Other partners
- Chairs
- European projects
- Ministries



\* Amounts received during 2016 in millions of euros.  
Figures above refer to the "Etat de recette et des dépenses"

## Endowed chairs since 2006

The University of Luxembourg benefits from a growing number of private and corporate donations. The most visible ones are the endowed chairs:

Chair	founded in	filled by
TDK Chair for New Materials in Solar Cells	2006	Prof. Susanne Siebentritt
City of Luxembourg Chair for Spatial Planning	2007	Prof. Markus Hesse
ATOZ Chair in European and International Tax Law	2009	Prof. Werner Haslehner
SES Chair in Satellite Communications and Media Law	2010 (prolonged in 2015)	Prof. Mahulena Hofmann
Arcelor Mittal Chair in Façade Engineering	2010 (prolonged in 2015)	Prof. Christoph Odenbreit
Deutsche Bank Chair of Finance	2010	Prof. Rajnish Mehra
City of Esch-sur-Alzette Chair in Social Business and Social Management	2013	Prof. Massimo Bricocoli
Chambre des Deputés du Luxembourg Chair of Legislative Studies	2014	Philippe Poirier
ADA Chair on Financial Law and Inclusive Finance	2014	Prof. Dirk Zetzsche (since 2015)
Chair in Capital Markets and Post Trade	2016	under recruitment



The University of Luxembourg has also been awarded:

Awarded
Three Jean Monnet Chairs on European Studies (for Prof. René Leboutte since 2009, for Prof. Herwig Hofmann since 2012 and for Prof. Eleftheria Neframi since 2013)
A UNESCO Chair in Human Rights (for Prof. Jean-Paul Lehnert since 2012)

## Research project applications accepted in 2016

FNR schemes	Projects accepted 2016	Funding awarded 2016 (€)
PRIDE	11	11,185,160.00
PEARL	1	412,159.00
ATTRACT	2	4,000,000.00
CORE	18	9,167,000.00
INTER MOBILITY	4	293,195.00
Open	2	1,200,000.00
AFR-PHD	14	2,237,032.00
AFR-PPP (PhD and PDR)	4	704,480.00
INTER	6	2,002,500.00
RESCOM	9	255,750.00
PoC	6	1,965,000.00
PSP	1	20,000.00
PSP flagship pilot	1	399,000.00
Researchers Days/Nights	9	17,141.90
<b>Total</b>	<b>88</b>	<b>33,858,417.90</b>

University of Luxembourg schemes	Projects accepted 2016	Funding awarded 2016 (€)
UL-IRP	25	5,425,000.00
UL-H2020-RISE	15	260,000.00
<b>Total</b>	<b>40</b>	<b>5,685,000.00</b>

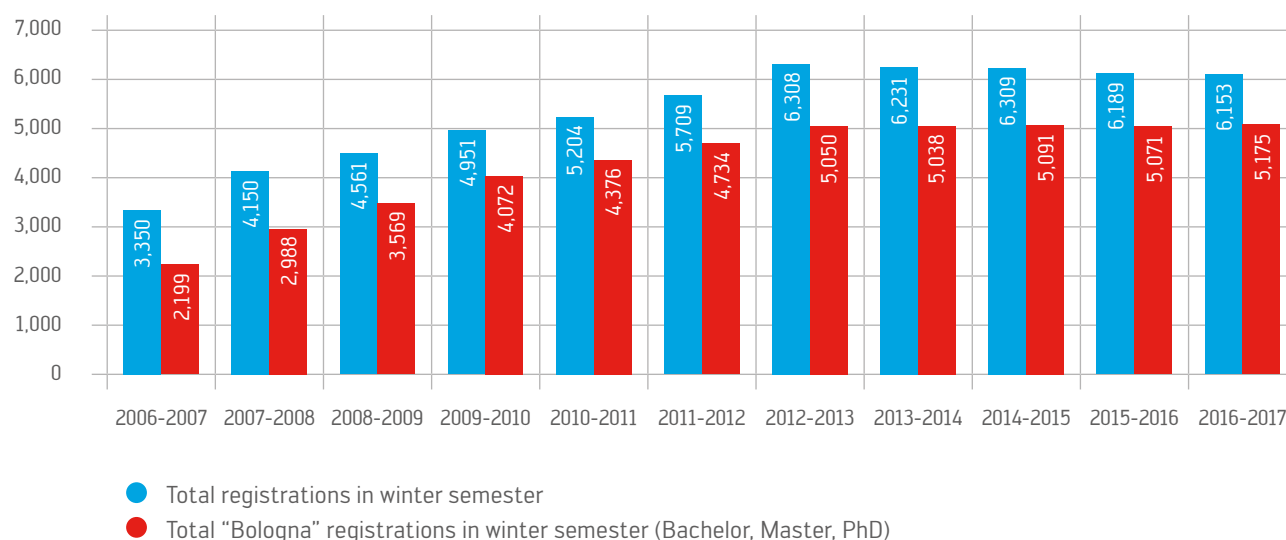
EU schemes	Projects accepted 2016	Funding awarded 2016 (€)
EU-H2020-ERC	1	4,199,582.00
EU-H2020-MSCA	1	172,800.00
Other EU-H2020	5	2,507,616.00
<b>Total</b>	<b>8</b>	<b>6,879,998.00</b>

## Publications

	2016
Authored books	34
Edited books	38
Chapters	261
Refereed articles	570
Refereed conference publications	569
Other scientific publications	302

# Student statistics

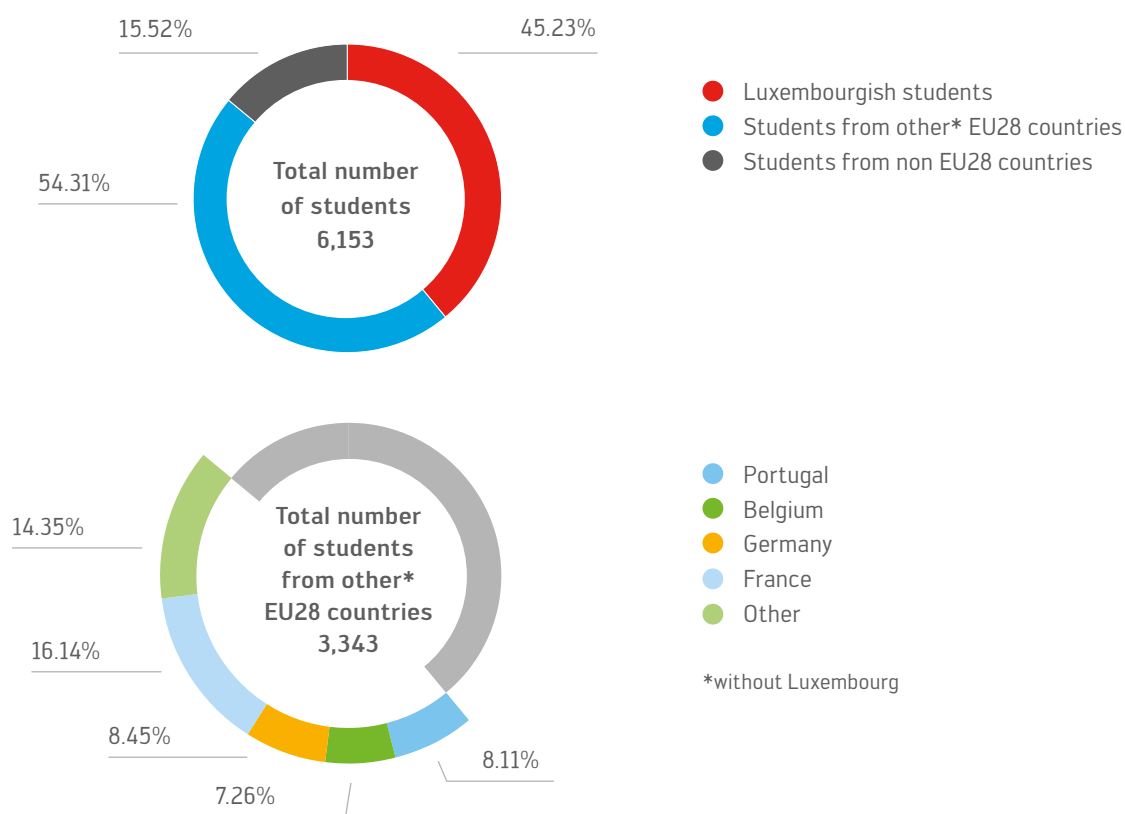
## Total number of student registrations over time



## Number of students

	Winter term 16/17	Annual evolution
<b>by faculty</b>		
FSTC	1,512	-11
FDEF	2,562	-10
FLSHASE	2,079	-37
<b>by programme level</b>		
<b>Bachelor</b>	<b>3,015</b>	<b>-29</b>
Bachelor - Education	2,831	-60
Bachelor - Training	184	31
<b>Master</b>	<b>1,519</b>	<b>103</b>
Master - Education	1,168	120
Master - Training	351	-17
<b>PhDs</b>	<b>641</b>	<b>30</b>
<b>Vocational programmes and lifelong learning</b>	<b>978</b>	<b>-140</b>
LLL - Education	0	-131
LLL - Training	978	-9
<b>TOTAL</b>	<b>6,153</b>	<b>-36</b>
TOTAL - Education	4,640	-41
TOTAL - Training	1,108	5
Bologna index	41.7%	4.4%
Master +PhDs	2,160	6.6%
All Bologna students	5,175	2.1%
Guest students	219	25

## Total student nationalities



In total **113** different student nationalities.

Note: as of the AY 15/16 double nationalities are observed. The percentage is therefore not based on the total number of students.

## Graduates over time

	2015-2016	Annual evolution
<b>Total UL degrees</b>	<b>1538</b>	<b>-58</b>
<b>Total Bologna degrees</b>	<b>1134</b>	<b>11</b>
Bachelor	601	-25
Master	439	49
PhD	94	-13
Vocational programmes and lifelong learning	404	-69
<b>Total FSTC</b>	<b>318</b>	<b>75</b>
<b>FSTC Bologna</b>	<b>212</b>	<b>-5</b>
Bachelor	78	-5
Master	85	8
PhD	49	-8
Vocational programmes and lifelong learning	106	80

	2015-2016	Annual evolution
<b>Total FDEF</b>	<b>762</b>	<b>58</b>
<b>FDEF Bologna</b>	<b>556</b>	<b>35</b>
Bachelor	322	39
Master	220	-2
PhD	14	-2
Vocational programmes and lifelong learning	206	23
<b>Total FLSHASE</b>	<b>458</b>	<b>-191</b>
<b>FLSHASE Bologna</b>	<b>366</b>	<b>-19</b>
Bachelor	201	-59
Master	134	43
PhD	31	-3
Vocational programmes and lifelong learning	92	-172



# Staff statistics

## Personnel 2014-2016

	2014	2015	2016	ETP 2016
<b>Central administration</b>				
Rectorate	5	5	6	6.00
Academic staff	4	4	1	1.00
Administrative staff	163	189	247	226.80
Technical staff	43	31	30	28.13
Project collaborators	1	2	4	3.30
<b>Total</b>	<b>216</b>	<b>231</b>	<b>288</b>	<b>265.23</b>
<b>FDEF</b>				
Dean's office	1	1	1	1.00
Project collaborators	3	10	11	10.20
Academic staff	50	47	55	52.30
Intermediate academic staff	83	72	73	73.00
Administrative staff	30	34	39	35.10
Scientific staff	10	8	9	8.30
Technical staff	-	1	1	1.00
<b>Total</b>	<b>177</b>	<b>173</b>	<b>189</b>	<b>180.90</b>
<b>FLSHASE</b>				
Dean's office	1	1	1	1.00
Project collaborators	87	76	67	60.70
Academic staff	96	97	98	96.25
Intermediate academic staff	149	145	131	130.50
Administrative staff	41	48	54	51.05
Scientific staff	38	47	57	50.60
Technical staff	7	9	10	8.90
<b>Total</b>	<b>419</b>	<b>423</b>	<b>418</b>	<b>399.00</b>
<b>FSTC</b>				
Dean's office	1	1	1	1.00
Project collaborators	38	57	67	65.00
Academic staff	70	76	74	73.80
Intermediate academic staff	152	179	186	184.90
Administrative staff	27	31	35	29.70
Scientific staff	31	32	39	37.75
Technical staff	28	31	33	31.65
<b>Total</b>	<b>347</b>	<b>407</b>	<b>435</b>	<b>423.80</b>

	2014	2015	2016	ETP 2016
<b>SnT</b>				
Management	1	1	1	1.00
Project collaborators	55	63	79	77.70
Academic staff	4	6	7	7.00
Intermediate academic staff	92	77	73	73.00
Administrative staff	13	17	18	17.80
Scientific staff	8	6	9	9.00
Technical staff	-	-	-	-
<b>Total</b>	<b>173</b>	<b>170</b>	<b>187</b>	<b>185.50</b>
<b>LCSB</b>				
Management	1	1	1	1.00
Project collaborators	94	93	99	96.20
Academic staff	5	3	3	3.00
Intermediate academic staff	44	50	47	47.00
Administrative staff	16	23	28	25.55
Scientific staff	6	13	13	13.00
Technical staff	8	15	17	16.50
<b>Total</b>	<b>174</b>	<b>198</b>	<b>208</b>	<b>202.25</b>
<b>C<sup>2</sup>DH</b>				
Management			1	1.00
Project collaborators			-	-
Academic staff			-	-
Intermediate academic staff			3	3.00
Administrative staff			1	0.50
Scientific staff			-	-
Technical staff			1	1.00
<b>Total</b>			<b>6</b>	<b>5.50</b>
<b>Total number of staff</b>	<b>1,506</b>	<b>1,602</b>	<b>1,731</b>	<b>1,662.18</b>
thereof PhD students with work contract	416	423	429	
Guest professors	24	14	12	
Adjunct teaching staff members	794	825	945	
<b>Grand total</b>	<b>2,324</b>	<b>2,441</b>	<b>2,688</b>	

**Note: student jobs**

198

213

195

## Nominations or renewal of nomination of guest professors and honorary professors

Name	G/H	Provenance	Decision of the Board of Governors	Faculty	Field	Duration	Start
Schneider, Hilmar	H	LISER / FLSHASE	09/07/2016	FDEF	Economy	1 year	01/09/2016
Fayol, Michel	G	Université de Clermont Blaise Pascal	01/10/2016	FLSHASE	Psychology	1 year	01/10/2016
Gumbrecht, Hans Ulrich	G	Stanford University	28/05/2016	FLSHASE	Humanities - focus on Comparative Literature / Philology	1 year	01/02/2017
Mehra, Rajnish	G	Arizona State University	01/10/2016	FDEF	Finance	2 years	01/01/2017
Meij, Arjen	H	Tribunal de l'Union Européenne	09/07/2016	FDEF	Law	3 years	01/09/2016
Peters, Bettina	H	Zentrum für Europäische Wirtschaftsforschung (ZEW)	28/05/2016	FDEF	Management	3 years	01/09/2016
Valsiner, Jaan	G	Clark University - USA	09/07/2016	FLSHASE	Psychology	3 years	01/09/2016
Wagner, Christian	G	Université de la Sarre	09/07/2016	FSTC	Physics	3 years	01/10/2016
Hilger, Jean	H	BCEE	09/07/2016	SnT	Finance	3 years	16/10/2016
Van der Geer, Gerard	G	University Amsterdam	01/10/2016	FSTC	Mathematic	3 years	01/09/2017
Dubois, Philippe	H	LIST	09/07/2016	FSTC	Chemistry	Mandat LIST	01/09/2016

G: Guest professor, H: Honorary professor



## University of Luxembourg

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## Communications Department

T+ 352 / 46 66 44-6525

Project coordination: Britta Schlüter, strategic communications advisor

**Realisation:** scienceRELATIONS, Hannover/Berlin, Germany

**Layout:** [www.spezial-kommunikation.de](http://www.spezial-kommunikation.de)

**All texts:** scienceRELATIONS. Except: 1, 4, 13, 29-31, 33, 35, 37, 39-45, 51

**Photos:** Michel Brumat (1, 10-11, 14, 19-21, 25, 28, 31-32, 41-47, 51), Michel Brumat / Foersom sàrl (10), Cargolux (17), Eric Chenal (15, 30, 41), Luc Delflorenne (42), Jock Fistick (43), Alexandre Germain (33), Hitec Luxembourg S.A. (43), David Laurent (7), Ministère de l'Enseignement supérieur et de la Recherche (4), Christophe Olinger (12), scienceRELATIONS (5, 16, 22-24, 26-27, 34-39, 41, 45), UniGR (6), University of Luxembourg (12-13, 18, 21, 29, 40), Jianda Wang (18)

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