

University
of Luxembourg

2018

YEAR IN REVIEW



UNIVERSITÉ DU
LUXEMBOURG



In September 2018, the University inaugurated the new Luxembourg Learning Centre (LLC) with its breathtaking architecture combining cutting-edge learning facilities with the industrial design of the former steel mill. The new 14,000 m² structure is far more than a classical library. The objective was to create a comfortable and attractive environment that fosters new forms of collaborative learning. In addition to offering a vast (digital) collection of media, the LLC provides over 400 collaborative work places, many of which are equipped with multimedia functions. This flexible infrastructure with personalised services creates a stimulating learning environment oriented towards the digital demands of learning and research. The LLC is open to anyone in Luxembourg and the Greater Region as it aims to be a gateway for knowledge exchange between the University and Luxembourg society.



2018

YEAR IN REVIEW

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University Rector Stéphane Pallage

AIMING FOR EXCELLENCE IN THE BRAINS UNIVERSE

There was a time when universities were considered temples of knowledge where information, ideas, concepts and theories were instilled into brains. Students drank from the well of wisdom and were returned to the world, equipped with acquired portions of competence.

Today, institutions such as the University of Luxembourg are hubs of knowledge, inspiration zones, starting points. Their ambition is to connect students to manifold sources of teaching and resources for research, to cutting-edge lab work, using the power of digital technologies. The ambition is to be interdisciplinary, to make students gaze beyond their chosen disciplines of study and research, to challenge them and make them seek inspiration in other fields.

It is a great source of pride for me to be at the helm of this outstanding institution since January 2018. This University is at the centre of the brains business – and it aims for excellence, nothing less, in shaping the brainpower that

MESSAGE FROM THE RECTOR

“In 2018, the University of Luxembourg celebrated its 15th anniversary. Following a period of dynamic growth, the institution is now entering a phase of consolidation and of professionalisation”

will lead this country, its neighbouring regions, its businesses, organisations and institutions, and that will prepare the next wave of scientific breakthroughs.

Our University – connected, multicultural, international and interdisciplinary – is a powerhouse of scientific curiosity, humbly standing on the shoulders of giants. Allow me to quote the late Professor Stephen Hawking: *“Opening up the thrill and wonder of scientific discovery, creating innovative and accessible ways to reach out to the widest young audience possible, greatly increases the chances of finding and inspiring the new Einstein. Wherever she might be.”* *“Unleash your imagination. Shape the future.”**

2018 has been an eventful year in which the University of Luxembourg has lined up an impressive number of achievements. The Times Higher Education Ranking lists our University among the world's top 250 universities – an outstanding result. Our institution has made excellent progress in reaching core KPIs. In 2018, the University's researchers produced approximately 1,900 peer-reviewed scientific publications. We also closed in on our goal for 1st quartile publications. Two of our professors, Stéphane Bordas and Alexandre Tkatchenko, were ranked among the most influential scientific researchers in the “Highly Cited Researchers 2018” list.

The University obtained three new ERC grants. It has broadened its third-party funding and developed new partnerships with industry. The number of patents filed increases steadily. This is testimony to the distinguished quality of the

research work produced by the University's faculties and by its interdisciplinary research centres.

In other words, this young institution is gathering speed and momentum, and it is a great honour and pleasure for me to lead it into its next stage of development.

In 2018, the University of Luxembourg celebrated its 15th anniversary. Following a period of dynamic growth, the institution is now entering a phase of consolidation and of professionalisation.

A new University law, passed in 2018, has established a new framework that provides for increased participation by both the academic and the student community. A new four-year plan covering the period 2018-2021 was agreed with the Ministry of Higher Education; it significantly increases the public funding that is available to the University in the coming period. This illustrates the Luxembourg government's commitment to supporting the future development of the University.

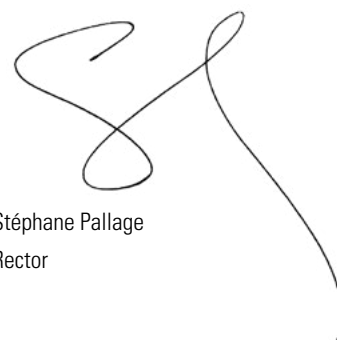
2018 also saw the official opening of our Learning Centre – a high-powered digital, collaborative and interactive version of a traditional university library – that has catapulted the University into the age of digital learning and provides a wealth of new opportunities to students.

We launched the University Incubator to help support aspiring student entrepreneurs. And we contributed to reshape the offer of lifelong

learning into a new Competence Centre. During the year, the University rewrote its internal regulations. A new University Council and a student delegation were elected. All these steps have contributed to make our institution more transparent.

We signed the very first collective bargaining agreement with the personnel delegation. And we launched a process to align the University's administration with the requirements of a fast evolving organisation and an increasingly diverse student and researcher community.

Much has been achieved in 2018; I look forward to helping to shape the next phase of the University's development as it aims for excellence in its teaching and its research activities.



Stéphane Pallage
Rector

*Stephen Hawking, Brief Answers to the Big Questions, 2018, Bantam editions

It is the ambition of the University to excel in all its areas of activity. Achieving excellence is one of our core guiding values. We seek excellence in teaching and research, as well as in our service to the staff and student community.

A HUB FOR EXCELLENCE



Paul and Sara Wilmes

Grand Prix 2018 in biological sciences

Paul Wilmes, Associate Prof. of Systems Ecology, was awarded the Grand Prix 2018 in biological sciences of Luxembourg's Institut Grand-Ducal, in recognition of his microbiome research work. Paul Wilmes and his team developed methodologies to analyse and define lifestyle strategies of microorganisms and ultimately to unravel the interactions between microbiomes and their hosts. Their research has led to applications in many different fields such as health, water treatment and bioenergy production.

The number

Times Higher Education World University Rankings 2019: the University of Luxembourg was ranked among the 201 to 250 top universities.

Rewarding academic excellence

Every year, the University support group Amis de l'Université du Luxembourg (Les Amis) rewards the best Master thesis of each faculty. Intended to encourage academic excellence, the Prix Germain Dondelinger is funded through numerous donations. In 2018, the prizes were given to: Jérôme Schank, Master in Logistics and Supply Chain Management, Max Zettl, Master in Psychology, Pietro Sgobba, Master of Mathematics.

Les Amis also rewards the best doctoral thesis with the Prix Rolf Tarrach. In 2018 Léo Perrin received the award for his doctoral thesis entitled "Cryptanalysis, Reverse-Engineering and Design of Symmetric Cryptographic Algorithms".



Jean-Sébastien Coron

Anja Leist

Daniele Brida

3 grants from the European Research Council

European Research Council – ERC Grants are among the most prestigious recognitions of scientific achievement and potential. In 2018, three scientists at the University of Luxembourg obtained ERC Grants:

In April, Prof. Jean-Sébastien Coron received the coveted Advanced Grant for his research on cryptography. The grant ensures up to 2.5 million euros of financing over a five year period for the project “CLOUDMAP: Cloud Computing via Homomorphic Encryption and Multilinear Maps”, which aims to reinforce the privacy and security of citizens’ and organisations’ data.

In September, Associate Prof. Anja Leist was awarded a Starting Grant for her work on dementia and cognitive impairment in older ages. She will receive 1.5 million euros over five years to lead her promising project CRISP – “Cognitive Aging: From Educational Opportunities to Individual Risk Profiles”, which combines traditional social sciences methods with new machine learning techniques.

Shortly after joining the University, Prof. Daniele Brida received a Consolidator Grant of roughly two million euros for his research in experimental condensed matter physics. With this grant, his team will be able to use sophisticated laser-based imaging technology to study the properties of materials in the project “UpTEMPO - Ultrafast tunneling microscopy by optical field control of quantum currents”.



Stéphane Bordas, Alexandre Tkatchenko, Dirk Zetzsche

Among the world’s brightest minds

Prof. Stéphane Bordas, Professor of computational mechanics, and Alexandre Tkatchenko, Professor of condensed matter physics, rank among the most influential scientific minds in the “Highly Cited Researchers 2018” list by Clarivate Analytics. Stéphane Bordas focuses his research activities on the development of data-driven numerical methods for engineering and medicine. Alexandre Tkatchenko investigates the interaction between molecules to better understand the properties and predict the behaviour of materials.

Prof. Dirk Zetzsche, ADA Chair in Financial Law (Inclusive Finance), has emerged among the top 20 legal scholars worldwide, according to the Social Science Research Network (SSRN). Measured by new downloads over the past 12 months, the September 2018 ranking sees Prof. Zetzsche in 20th place; he is the only European academic mentioned in the top 20.

BRAINS

“Use your brain”: this is what a University is about. We help students develop the capacity to process information, find knowledge and inspiration, develop competencies and go further. By shaping the brainpower of the next generation, the University enables its community to maximise its potential and gives its members the opportunity to stand out and excel.

New scholarship

In 2018, Les Amis de l' Université du Luxembourg set up a new student scholarship with the financial support of the Luis Portabella Y Conte Lacoste Foundation. The new scholarship is intended to cover one year of housing and living costs.

Four students were selected among forty applicants: Elissavet Chasomeri, Francesco Cascio, Arjana Gjeta and Mehri Baniyadi.

10 years of international student awards

The University celebrated the 10th anniversary of both the Top Student Prize and the U.S. Embassy – U.S. Enterprise Scholarship. The latter is awarded every year to students studying for one semester at one of the partner universities in the U.S. and is jointly sponsored by the U.S. Embassy and U.S. companies in Luxembourg. With the Top Student Prize, the University rewards nine students each year. The prize comes with a scholarship to an international summer school.



Pietro Sgobba

Beauty is in the eye of a mathematician

Excellence in studies requires not only skills and dedication but also a good deal of passion. This applies to Luxembourg student Tara Trauthwein and to Italian student Pietro Sgobba, who swept up a handful of prizes.

Tara Trauthwein graduated from the “Bachelor en Sciences et Ingénierie – Filière Mathématiques” with a whopping course grade of 20/20 and 32 ECTS credits, a thesis mark of 19/20 and a “Mention Excellent”, for which she received the Prix de la Meilleure Mobilité, Zonta Club Luxembourg Award and the Luxembourg Mathematical Society Award.

Pietro Sgobba finished his Master in Mathematics with a course grade of 17.6/20, a thesis grade of 20/20 and a “Mention Très bien”. He received the Best Average Grade Award, the Germain Dondelinger Award and the Luxembourg Mathematical Society Award.



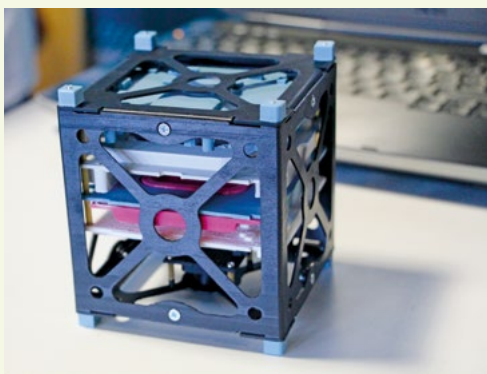
Tara Trauthwein

Plastic_Hack hackathon: Hack your way into a future with less plastic!

In November, five University members developed innovative solutions to reduce plastic waste at an international "Plastic_Hack" hackathon in Brussels. Sixty students from Belgium, Israel and Luxembourg participated in the event.

Alumni Dr Khadidja Chaib Draa, founder of the start-up Technoptiz, and her team came in first place with the proposal to use biodegradable, natural fungi as a sustainable alternative to plastic. *"I am very grateful to the University's Incubator for giving me the opportunity to participate in the Plastic_Hack. It was a great experience, and winning the first prize with my team has motivated us to continue working on bringing our idea to reality,"* she says.

Joni Beu and teammate Ricarda Braun came in second with the project "Fish for plastic". The scheme proposes that local fishermen should be remunerated for collecting plastic waste, and the harvested waste should be used to produce sustainable 3D printer filaments. *"During the competition, I established a whole new type of network, with people from different backgrounds and countries. Winning the second prize also involved mentoring sessions which motivated us even more to take our idea further,"* says Joni Beu.



The first CubeSat produced by the LuxCube team.

The Number



6315

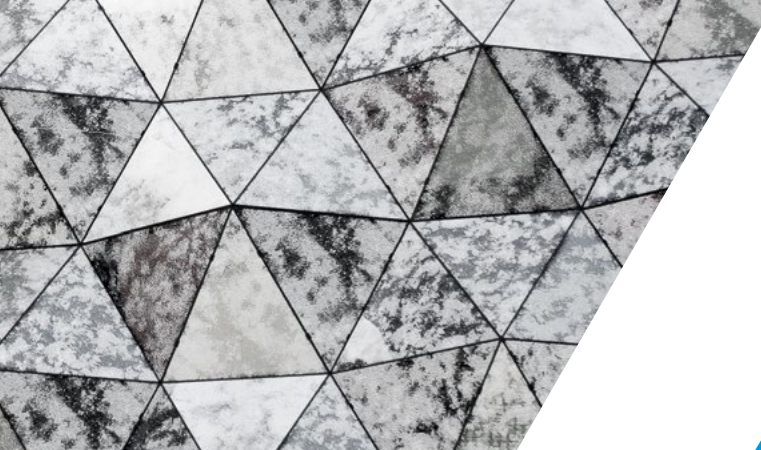
Students in 2018

Teaming up for a LuxCube satellite

In 2018, the University of Luxembourg joined the international CubeSat standard initiative. This project aims to facilitate access to space for university students using an international standard design, which can be integrated into most launch vehicles.

With the LuxCube project, students will learn to design, build, test, and operate space hardware. The Luxembourg initiative was launched in September with support from satellite manufacturers.

"A CubeSat is a miniaturised satellite that is made up of multiples of 10×10×10 cm and weighs less than 1.33kg. This is an incredible tool for high schools and universities, as well as for government agencies and private companies", explains Dr Edder J. Rabadan Santana, project leader and senior researcher at the University. A LuxCube satellite is expected to be launched at the end of 2020.



IMPACT

Madeleine Kayser and Camilla Cuppini, Luxembourg City municipality

The University of Luxembourg has a responsibility towards society. As a byproduct of its mission to advance research and to educate, the University expects to contribute to a better future and to have a positive impact on the communities that it operates in. The University takes this responsibility very seriously.



Guess who's coming to dinner?

Where do I find schedules for public transportation? Where can I spend my Sundays?
And what on earth is a Gromperekichelchen?

A fresh start in a new country can be as thrilling as it can be intimidating. To help new students and researchers find their way across Luxembourg, the University, in collaboration with the cities of Esch-sur-Alzette and Luxembourg, relaunched the "Wine & Dine" programme. In October 2018, 38 resident families paired up with 46 new University members to introduce them to their favorite spots in Luxembourg and exchange on culture, practical aspects and peculiarities of the Grand-Duchy.

"We believe the event is a great opportunity for residents to show their hospitality and introduce our new members to the country," comments Prof. Stéphane Pallage, Rector of the University.



LuxLI

In 2018, research associate Dr Livio Robaldo created LuxLI (Luxembourg Legal Informatics), a community of IT and legal experts from academia and industry. LuxLI's mission is geared around four areas of activity: law and ethics, data protection, RegTech and FinTech. *"LuxLI envisions a world where experts in law and artificial Intelligence work together on interdisciplinary research and industry technology transfer, towards novel and advanced legal services,"* explains Robaldo.

LuxLI establishes a dialogue between law and ICT experts on LegalTech services and fosters collaborations via the website www.luxli.lu, its Twitter handle @legalInfoLux and social events. *"These events are very useful to get in touch with local industry and institutions,"* says Robaldo. LuxLI also encourages the creation of legal tech start-ups and promotes industrial internships for PhD candidates. It collaborates with an international network of key players, facilitating researcher mobility.

Cooperation with universities in Mali

Since 2011, the University runs a cooperation programme with two partner universities in Bamako (Université de Sciences juridiques et politiques and Université des Sciences sociales et de gestion), which aims to contribute to advanced higher education and research in Mali.

The project is funded by the Cooperation Programme Mali-Luxembourg 2015-2019 and supports education, teaching and research in law and economics. This includes the joint organisation of doctoral seminars in law and economics, specific English courses and teaching seminars in statistics and econometrics. An annual colloquium on economics or law is organised in Bamako. The cooperation foresees research internships for PhD candidates of the partner universities at the University of Luxembourg; six PhD candidates were welcomed at the University in 2018. The programme further helps develop documentation through training for library staff and improves access to databases or software.

Ending violence against women

The University joined the national "Orange Week" campaign in November 2018, in support of the International Day for the Elimination of Violence Against Women.

Prof. Claus Vögele and PhD candidates Raquel Gómez Bravo, Charilaos Lygidakis, Vinicius Jobim Fischer, Alessandro Decarli and Violetta Schaan held a series of events at the University, in collaboration with external experts and stakeholders. These events included roundtables, a PhD Colloquium, the "NGO Day", during which nine NGOs working against violence engaged with the University community, and to wrap it up the first Forum on Violence Against Women.

Vote smart

In the run-up to Luxembourg's parliamentary elections in October 2018, Dr Raphael Kies and the [Centre for Political Education] Zentrum für politisch Bildung launched an internet-based platform designed to improve transparency of political parties' and candidates, programmes, and to facilitate the decision-making of each voter (www.smartwielen.lu).

Available in French, English, German, Luxembourgish and Portuguese, the website offered a detailed multiple-choice questionnaire allowing voters to assess their political proximity to the different parties and candidates. Roughly 50,000 users (i.e. between 20% and 25% of all voters) used this tool during the election period. Smartwielen is to be used again for the European elections scheduled for May 2019.



Melvin Drent

Towards eco-friendlier supply chains

For his proposal "Dual-sourcing strategies that create carbon efficient supply chains", PhD candidate Melvin Drent received an AFR individual PhD grant from the Luxembourg National Research Fund (FNR).

Melvin's project focuses on supply chain strategies that explicitly incorporate the environmental dimension into decision-making. By developing novel control policies for supply chains where companies can utilise both eco-friendly and polluting supply sources, the research will create supply chains that are cost-efficient, provide the required service and have a low negative environmental impact.



In the laboratory for photovoltaics, postdoctoral researcher Florian Ehré transfers samples into a vacuum system where semiconductor films for solar cells are deposited.



2018

Each year, the University realises significant achievements, is involved in extraordinary events and initiates major developments. These are the milestones of 2018.

An Incubator for the University community

The University inaugurates its Incubator to support aspiring entrepreneurs from the University community. At the event, guest speaker Chuck Robbins, CEO of global technology company Cisco, announces the opening of a Cisco Networking Academy on campus to support entrepreneurial initiatives.



A new University law

Luxembourg's Parliament passes a new University law that provides the framework for the country's only public University. The text lays the groundwork for the future development of the University in terms of structure, functioning, research and teaching. The new law enhances the University's governance, broadens the representation of the University community in key bodies of the institution, clarifies career paths and codifies student representation.

MILESTONES 2018

A new four-year plan

The Board of Governors approves the University's four-year plan for the period 2018-2021. The document describes the strategic development of the University over the period and outlines its future focus in research, teaching and learning, and outreach activities.



Confucius Institute opens

During the opening ceremony of the Confucius Institute at the University of Luxembourg, guests are treated to a traditional dance of the Chinese dragon, traditional music and cultural activities. The Confucius Institute provides Chinese language courses and organises cultural workshops. The Institute is a cooperation with the Fudan University in Shanghai.



Towards becoming a European University

The University of the Greater Region (UniGR) unveils its ambition to become one of the first "European universities." UniGR is a network that comprises the universities of Kaiserslautern, Liège, Lorraine, Luxembourg, Saarland University and Trier University. It projects the creation of cross-border alliances of higher education institutions in a bid to stimulate European mobility, education and research.

At La Biennale in Venice

Florian Hertweck, professor of architecture, and Andrea Rumpf, Director of the Luxembourg Centre for Architecture (LUCA), curate Luxembourg's pavilion "The Architecture of the Common Ground Exhibition" at the 16th International Architecture Exhibition of La Biennale di Venezia. The pavilion attempts to address one of the most pressing issues in urban planning – the shortage of public land that creates social and ecological challenges.



A home for student life and the arts

The Maison des Arts et des Étudiants is inaugurated. The mission of the large building is to enliven the "Cité des Sciences" beyond the academic world: it houses new offices for student associations, a hall for events and festivities, rooms for creative activities, a luminous lounge area and the student lounge.



Royal visit to Belval campus

The King and the Queen of The Netherlands visit Belval campus during a state visit to Luxembourg. The Dutch delegation is treated to a visit of the iconic blast furnaces and the construction site of the future Luxembourg Learning Centre. Research teams demonstrate their activities related to space research.



Graduation Week

During Graduation Week, the Bachelor and Master students as well as successful PhD candidates receive their diplomas and have a party. In total, 637 Bachelor and 589 Master students as well as 151 doctoral students graduated in 2018.

Welcome to a new Vice-Rector

Prof. Jens Kreisel takes office as Vice-Rector for research and innovation. Prior to this appointment, Prof. Kreisel led the "Materials Research and Technology" department at the Luxembourg Institute of Science and Technology (LIST) and acted as honorary professor, then adjunct professor at the University.



Tri-national Master is launched

In September, the three Universities of Luxembourg and Strasbourg and the Johannes Gutenberg University Mainz launch a new joint Master of Science in Biomedicine.

With the growing importance of academic and industrial biomedicine laboratories in the region and in line with Luxembourg's strategy to support training and research in medicine, the Master programme offers a strong multidisciplinary education in the fields of cardiovascular and metabolic diseases, neurosciences and immunology. The tri-national diploma enables future graduates to work as entrepreneurs or in the pharmaceutical industry, health agencies, universities and hospitals at international level.



First collective bargaining agreement is signed

Yves Elsen, Chairman of the Board of Governors, Rector Prof. Stéphane Pallage, Virginie Mucciante, Head of the University's staff delegation, and Frédéric Krier of the OGBL trade union sign the University's first collective bargaining agreement. The agreement sets out the terms of employment and remuneration of its academic, research and administrative staff, with the exception of members of the management team, departmental heads of the administration, student assistants, and interns.



Scienteens Lab 5th Anniversary

The Scienteens Lab, founded by the Luxembourg Centre for Systems Biomedicine (LCSB), celebrates its 5th anniversary. Under the patronage of Her Royal Highness Crown Princess Stéphanie of Luxembourg, the Scienteens Lab offers hands-on experiments, supervised by experienced scientists, and aims to inspire potential students by providing insight into scientific research and laboratory work.

First TEDx University of Luxembourg

The first TEDx event at the University takes place in a packed room at the Maison du Savoir. The umbrella theme is "Ideas 4.0", a nod to the institution's mission to spark innovative solutions for a better future. Performers and speakers include experts in natural and social sciences, a world music band, medical doctors, a journalist, a dance ensemble, a FinTech expert, an entrepreneur and a Bachelor student – all sharing their vision to successfully embrace innovation and critical thinking.



Faculty welcomes new Dean

Prof. Jean-Marc Schlenker is appointed Dean of the Faculty of Science, Technology and Communication (FSTC). He joined the University in 2013 as professor of mathematics, and in 2018 became Head of the research unit in mathematics (RMATH).

Celebrating 15 years

The University celebrates its 15th anniversary. Since its inception, it has become an integral part of the country's mental landscape. According to a representative survey by TNS-Ilres, a large majority (91%) of the population acknowledges that the University contributes positively to the image and reputation of Luxembourg. 70 % believe that the University helps Luxembourg attract new businesses and that researchers bring added value to the country's major societal debates. An identical proportion of 70% of respondents would recommend their children to enrol at the University.



Luxembourg Learning Centre opens its doors

Designed to combine traditional and new learning methods, it offers, in addition to classic library services, a truly digital learning environment with a range of tools for individual or group use. The architecturally remarkable building combines the existing remains of the steel industry with an open and light-flooded spatial concept. The environment in itself is an invitation to work, think, relax or find inspiration, and is open to students, researchers and the public.



Publication of the National Education Report

In December 2018, the University and the Ministry for Education, Children and Youth present the second National Education Report for Luxembourg. This periodic report is coordinated by Dr Thomas Lenz, with contributions from 46 University and external authors.

It provides a unique and diverse insight into the national educational system in such areas as educational inequalities, skills development, multilingualism and STEM learning. It is a factual and transparent basis for the debate on national education and presents perspectives for future development. The report is produced at the University's LUCET (Luxembourg Centre for Educational Testing) and published every three years, in order to ensure independent research findings.

Photo: Thomas Lenz and LUCET's Antoine Fischbach and Isabell Baumann.

PILLARS OF EXCELLENCE

The University has established six research priorities and two interdisciplinary themes in its four-year plan 2018-2021. The University focuses on fields of research in which excellence and critical mass, as well as a high potential for international leadership, already exist (as confirmed by an external evaluation in 2016) or can be achieved. These fields of research must also satisfy two additional criteria: the ability to acquire competitive funding and relevance for the country. The priorities reflect the young age and the size of the institution and its strategic development.

European and international law

Major research areas include the regulation of modern social systems such as capital markets, media and communication, and health systems. Further competencies will be developed in compliance and law enforcement, data management and privacy, and intellectual property law. An interdisciplinary approach will be favoured, with research at the intersection of law and data management, intellectual property and biomedicine.

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Materials science

With internationally competitive research results and significant third-party funding, the University is strengthening its existing four research axes in soft and living matter, photovoltaics and semiconductors, magnetic and multiferroic materials, and theory and materials modelling. Additionally, cross-disciplinary initiatives build bridges to other research areas such as biology and computer science.

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Finance and financial innovation

New financial instruments, based on increased computing power, big data, digital innovation and access, require adapted ICT solutions and legal frameworks for the financial and banking sector. The University has increased its commitment to interdisciplinary research on financial innovation and has entered into long-term strategic partnerships to establish collaborative research.

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Education

Local relevance combined with international visibility – this is what characterises the University's research in such areas as cognitive science, digital assessment and sociology of education. The University will implement a cluster dedicated to special educational needs. It will also monitor the impact of national educational reforms and projects that focus on multilingualism and diversity in education.

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Contemporary and digital history

The four research axes are global histories of finance, digitising industrial heritage, digital history and hermeneutics as well as legacies of war, collaboration and resistance. These are relevant for Luxembourg's society and fill gaps in contemporary historiography. C²DH endeavors to innovate digital research methods, acquire external funding and continue to develop its digital research infrastructure (DRI).

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Computer Sciences & ICT security

Computer science, digital science and data modelling are today embedded across the University, transforming research, teaching, and knowledge transfer. The University will support collaborative research programmes, develop its Technology Transfer Office and train highly skilled professionals. The focus areas are: financial and regulatory technologies, space resources, compliant data management, machine learning, and artificial intelligence.

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Data modelling and simulation (DMS)

DMS is the practice of using models (physical, mathematical, or other logical representations of a system, entity, phenomenon or process) as a basis for simulations. This theme supports analysis, experimentation, and training. The DMS initiative creates a symbiotic research environment across a wide range of expertise: material sciences, mathematics, socioeconomics and environmental studies, digital humanities, finance and law.

Pages 24-25

Health and systems biomedicine

This is a research topic of high socio-economic relevance and has the potential to improve public health. The collaboration across traditional boundaries in biomedicine, social and behavioural sciences, environmental research and computational sciences will create research with a unique Luxembourgish profile.

With a strong link to law and finance, the University will be in an excellent position to tackle future health challenges.

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RESEARCH PRIORITY: EUROPEAN & INTERNATIONAL LAW

PREVENTING FUTURE FINANCIAL CRISES

The findings of a multi-year research project on the enforcement of European Union banking regulation were presented at a closing conference in November 2018 that saw the participation of the European Central Bank (ECB) and several national regulators from across the Eurozone.



Silvia Allegrezza

Dubbed "EUBAR", the project was launched in 2015 following a successful grant application with the Luxembourg National Research Fund (FNR). It aimed at developing proposals to facilitate the enforcement of banking supervision in the EU and within the Eurozone, focusing on the interactions between administrative and criminal enforcement. The project was based on findings that showed deficiencies in common supervision and enforcement, despite the introduction of the Single Supervisory Mechanism in 2014 with the aim of helping to prevent future large-scale financial crises.

Principal investigator, Associate Prof. Silvia Allegrezza, and her team identified a number of particular risks, for example in the discrepancies between national legal frameworks or the classification of sanctions. The results of the study were presented to the financial and banking sector as well as EU, national and international regulatory bodies, offering proposals for policy makers to improve on the existing legislation.

SCHOLARSHIP FOR INNOVATIVE RESEARCH

One of the junior researchers involved in the EUBAR project was PhD candidate Olivier Voordeckers.

Under the title "The single supervisory mechanism: towards a new interaction between European and national legal orders", Olivier Voordeckers explores the application of national legislation by the European Central Bank (ECB). In the process, he addresses questions such as who is vested with the power to interpret national legislation, how the ECB is controlled judicially, and whether the principle of effective judicial protection is respected.

In recognition of its innovative nature and the potential inherent in the research, he was awarded the Pierre Werner Scholarship. He has presented initial findings to the ECB and has also appeared at international conferences, for example at Stockholm University.

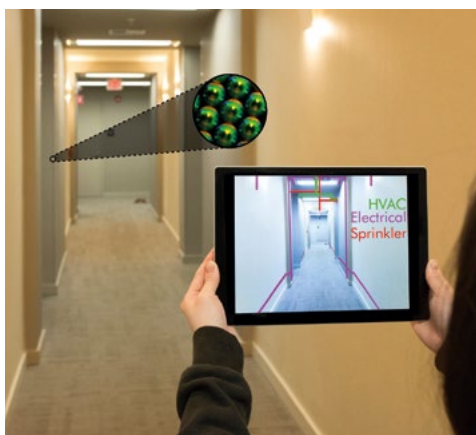


Dimitrios Kafteranis and Olivier Voordeckers receiving their Pierre Werner Scholarship. Dimitrios is a law PhD candidate at the University who researches on whistle-blower protection.

RESEARCH PRIORITY: MATERIALS SCIENCE

“SMART” MATERIAL ENABLES NOVEL APPLICATIONS IN AUTONOMOUS DRIVING, ROBOTICS, AND SENSOR TECHNOLOGY

Liquid crystals, widely used in flat-screen TVs, are materials that are in a state between solid and liquid.



Cholesteric liquid crystal shells could be used for indoor navigation.

For several years, Prof. Jan Lagerwall and his team have been investigating the unique mechanical and optical properties of microscopic shells that are produced from liquid crystal. As a result of a multidisciplinary collaboration, they published a report describing potentially groundbreaking future applications for the material.

The liquid crystal shells are only fractions of a millimeter in size. They can easily be applied to surfaces, and they have several unique properties that make them interesting for use in engineering. Since they reflect light in a highly selective way, they can be arranged into patterns that are readable for machines. Similar to a QR code, information can thus be added to objects. “These patterns could be used to guide autonomous vehicles or to instruct robots when handling workpieces in a factory,” Prof. Lagerwall explains. In addition, the shells can be manufactured in such a way that they change their structure when they are exposed to pressure, heat or specific chemicals. Connected to computers, the shells could thus be used as sensors. The “fingertips” of robotic arms could be fitted with pressure sensors, enabling them to detect tactile stimuli, which is currently hard to achieve in robotic engineering.

HOW SWARMS OF NANOMACHINES COULD IMPROVE THE EFFICIENCY OF ANY MACHINE

Recent progress in nanotechnology has enabled researchers to understand the world on ever smaller scales. It even allows for the design and manufacture of extremely small machines.

The research team of Prof. Massimiliano Esposito has observed that under certain conditions those nanomachines start to arrange themselves in “swarms” and synchronise their movements. “There is evidence that these machines are far more efficient than large machines, such as cars. Yet in absolute terms, the output is low compared to the needs we have in daily life applications,” explains Tim Herpich, a member of Esposito’s group who worked on the subject as part of his PhD thesis. “That is why we studied how the nanomachines interact with each other and looked at how ensembles of those small machines behave. We wanted to see if there are synergies when they act in concert.”

“We found that the synchronisation of the machines triggers significant synergy effects, so that the overall energy output of the ensemble is far greater than the sum of the individual outputs,” said Prof. Esposito. While this is still basic research, the principles described by the scientists in their research could potentially be used to improve the efficiency of any machine in the future, Esposito explains.



Massimiliano Esposito

RESEARCH PRIORITY: FINANCE AND FINANCIAL INNOVATION

ALGORITHM TRADING AND FINANCIAL MARKETS

Digital technologies are proliferating in the financial markets. The increasing use of trading algorithms - using the aid of powerful computers and low latency communication networks to trade - proves the point.



Tibor Neugebauer

According to some estimates, algorithm trading commands about 80 percent of the equity trading volume in the US market. Prof. Tibor Neugebauer and his team are researching whether algorithm trading promotes or obstructs a healthy market. They also look into potential policy concerns relating to the regulation of algorithms, which impose adverse costs and potential risks for market participants besides improving liquidity. The EXPBOTS research project is co-funded by the Luxembourg National Research Fund (FNR), and the Economic and Social Research Council (ESRC).

In partnership with researchers from the universities of Durham and Manchester, Prof. Neugebauer hosted a workshop on algorithm trading and market behaviour in June 2018, where market researchers from multiple disciplines could discuss the state of algorithm trading.

Another workshop is scheduled in Durham for June 2019, and a policy forum at the University of Manchester in 2020 will highlight the achievements of this three-year project.

SPECIALISING IN ALTERNATIVE INVESTMENTS

Asset management is one of the University's key research areas.



Denitsa Stefanova

With a focus on alternative investments, Dr Denitsa Stefanova has been working with Prof. Roman Kräussl on investigating the drivers of performance in the asset management industry. A paper published together with Prof. Joshua Pollet (University of Illinois at Urbana-Champaign) studies signaling and marketing techniques and how they impact discount control mechanisms adopted by closed-end funds.

Asset management research at the University of Luxembourg received a boost in 2018 thanks to a FNR CORE grant for the three-year project "Performance and Risk Characteristics of the Alternative Investment Fund Industry", which Dr Stefanova will also be involved in. Dr Stefanova teaches in the Faculty's Master programmes and was chosen by her students as the winner of the 2018 Teaching Award.

RESEARCH PRIORITY: CONTEMPORARY AND DIGITAL HISTORY

A DIFFERENT WAY TO APPROACH HISTORY

100 years after the end of the First World War, the online exhibition “Éischte Weltkrich: Remembering the Great War in Luxembourg” offers a dedicated digital space for an important yet understudied period.

Launched in May 2018 as part of a national commemoration campaign, the exhibition is designed to engage users with varying degrees of expertise, and largely uses transmedia storytelling as a way to bring history alive. It draws on the collection and expertise of national museums, archives and cultural institutions.

Entering a virtual space, the user has the option to choose among four independent but connected modes of navigation: a thematic, story-driven mode; a digital archive; an interactive geo-referenced map and a timeline. The website also contains educational pages for school and academic articles. The project has progressively widened its scope to become a long-term digital resource for the public, teachers and students. (www.w1.lu)

TO GOOGLE OR NOT TO GOOGLE?

The transition from analogue to digital has made people increasingly dependent on search engines, including scientists. Internet users who need reliable information are in need of a new approach to source criticism.

The term “digital source criticism” refers to what historians have always done - critically assess the origin and value of a historical source - and they need to apply the same principle to the digitised and born-digital sources. Students and teachers are in need of new skills, starting with basic technical and mathematical understanding of digital phenomena. Faced with information on a screen, they must be encouraged to reflect on how that information has been created and perhaps modified.

This concern inspired researchers to envision an open source teaching platform. Named Ranke.2, the platform is a playful web resource that offers lessons on digital source criticism covering different data types. “Sources were always criticised by historians, but in the past those sources would be printed pages or objects. There is a big difference between something concrete and tangible and something that consists of digits. We want to teach students how to treat the digits and how to think about their origin,” explains Dr Stefania Scagliola, Project coordinator. (Ranke2.uni.lu)



Stefania Scagliola

RESEARCH PRIORITY: EDUCATION

SI X = DEUX Y, DANN IST Y = FENNËF + EEN DRËTTEL



Sophie Frédérique Martini

Learning mathematics in multilingual Luxembourg can be challenging. Here, two languages are used to teach maths. And language plays a role in numerical cognition and subsequent progression in mathematics.

Research has shown that pupils in this multilingual school system can solve very basic maths tasks that are presented to them in both languages. But when it comes to more complex tasks that require more language to be solved, pupils with increased exposure to the second instruction language continue to solve the tasks more accurately and faster in the first instruction language. For her PhD, Sophie Martini analyses the effects of using a single language of instruction compared to switching between two languages.

For her first study, she analysed large-scale data from national school monitoring (epstan.lu) to investigate the relation between home language, the choice of maths test language, reading comprehension in the maths test language, and maths achievement. Her next study will investigate linguistic features in mathematical word problems to find out which linguistic features make a word problem easier or more difficult to solve, and for which group of pupils.

KEEPING PUPILS MOTIVATED

Most of us spent around 12 years of our early lives at school, developing intellectual, emotional and social skills while making friends (and occasionally foes). Over the years, young people gradually bond less with their school and detach emotionally from educational goals and values.



Andreas Hadjar

In a joint project with the University of Bern in Switzerland, Prof. Andreas Hadjar and his team analyse factors and processes that contribute to school alienation. They particularly look at how it affects educational success of higher risk groups such as children of low-income families, boys and certain migrant groups.

The project SASAL (2015-2019) follows groups of pupils in Luxembourg and Switzerland simultaneously in primary and secondary schools. Additionally, group discussions with pupils and teachers analysed the transition from primary to secondary school.

Results indicate that school alienation is higher in secondary school than in primary school. A student-centered and supporting teaching style can prevent school alienation. The more students feel alienated from learning and teachers, the more deviantly they behave in school and the lower their academic achievement becomes.

RESEARCH PRIORITY: COMPUTER SCIENCE AND ICT SECURITY

IT WASN'T ME: DENIABILITY IN A POST-QUANTUM WORLD

Computing science is on the verge of a revolution ushered in by the dawn of quantum computing.



Team members Peter Roenne and Dimiter Ostrev.

Exploiting the properties of quantum physics, quantum computers will outstrip even the fastest classical mainframes when solving certain mathematical problems. Along with huge potential benefits, this also entails major threats to privacy, anonymity and security, as this new computing power could be used by attackers to crack most existing secure communication systems used for internet transactions.

In a quantum world, new ways must be found to ensure security in a wide range of tasks: from emails to financial transactions, from storing and processing personal data to maintaining national, critical infrastructures.

Prof. Peter Ryan's team is exploring how quantum techniques, available today, might be used to ensure that the originator, the recipient and the content of messages remain uncertain to the attacker. One strategy the team has pioneered to achieve this is called 'covert communication' where messages are hidden in the noise inherent in quantum communication.

FAST BUT SECURE PROCESSING FOR DNA

As our understanding of the human genome develops, our genetic make-up is used in medical research and even creates a global business for commercial DNA mapping. This raises a number of questions: Who controls the data? And: Is it stored safely?

PhD candidate Maria Fernandes and research associate Dr Jérémie Decouchant have developed a new methodology for human genome analysis. It has the advantage that it keeps 10% of the information that is produced truly secure (including the 3% of our DNA that is unique to us). The data can be processed either locally or in a secure enclave in the cloud. The new method is only marginally slower than the standard way of processing the human genome.

This puts control over the data where it belongs — in the hands of individuals. The new methodology would enable them to take any information that might be relevant to a nutritionist, for example, to their appointment without needing to reveal unrelated details. And insurance companies, hospitals and even employers cannot use a person's data to make decisions about premiums, eligibility or treatment options. Having filed a patent in 2018, Decouchant and Fernandes look forward to take their work a step closer to application. People may consider waiting just a bit longer before getting their genome sequenced. A better approach is just a short way off.




Maria Fernandes and
Jérémie Decouchant

The Odd COUPLES

What is a good life? Philosophers have pondered the issue over millennia without conclusive results. The economist Conchita D'Ambrosio now takes a novel approach to answering this question using Machine Learning. She is cooperating with theoretical physicist Alexandre Tkatchenko, who specialises in investigating the inner workings of molecular structures. They aim to develop a mathematical model of what determines a successful life. The model correlates subjective assessments of life satisfaction of individuals with a vast array of relevant factors, such as educational level, marriage status, or income.

The economist and the physicist are one of many seemingly odd couples working together at the University of Luxembourg. The linguist Peter Gilles cooperates with artificial intelligence specialist Christoph Schommer on methods to analyse texts in Luxembourgish and automatically detect the sentiment of a statement. Biologist Thomas Sauter and the engineer Stéphane Bordas develop a model to simulate tumor growth. The psychologist Anja Leist uses machine learning techniques



to capture the complexity of cognitive decline in dementia patients and identify risk factors. Lucian Trestioreanu from the University's SnT has been developing a system that could assist surgeons during operations. Using machine learning, the technology automatically recognises certain organs from 3D body scans and projects them through augmented reality smart lenses onto the patient's body together with additional real-time data.

The common approach of these projects is to generate complex mathematical models that simulate phenomena relevant to the research question. *"We conduct virtual experiments and develop models that depict reality. The challenge is to discern what is the essence of the system we want to describe and which factors determine its behaviour,"* said Andreas Zilian, Coordinator of the Doctoral Training Unit (DTU) in Data-driven Computational Modelling and Applications (DRIVEN) that aligns data-driven PhD projects and encourages cross-disciplinary cooperation. *"These models need to be validated and constantly updated with data from experiments or scientific literature. This*

iterative process enables us to constantly get closer to the real world," adds Zilian.

The use of advanced numerical simulations has a number of benefits for researchers, explains engineering researcher Stéphane Bordas who cooperates with space sector company Sparc Industries to model satellite propulsion in space. *"This is extremely useful in areas where it's either very expensive or dangerous to conduct experiments, such as in space or in many medical applications,"* he said. The coupling of these models with different forms of artificial intelligence can help to overcome some of the shortcomings of traditional statistical methods relying on historical data that might be outdated. *"Machine learning allows us a more dynamic approach, as it can be used to predict future developments and fill gaps in areas where no or only insufficient data is available,"* Bordas adds.

A side effect of the increasing number of research projects based on data science is the ever-growing demand for computational capacity. Since 2010, 138 million core hours -

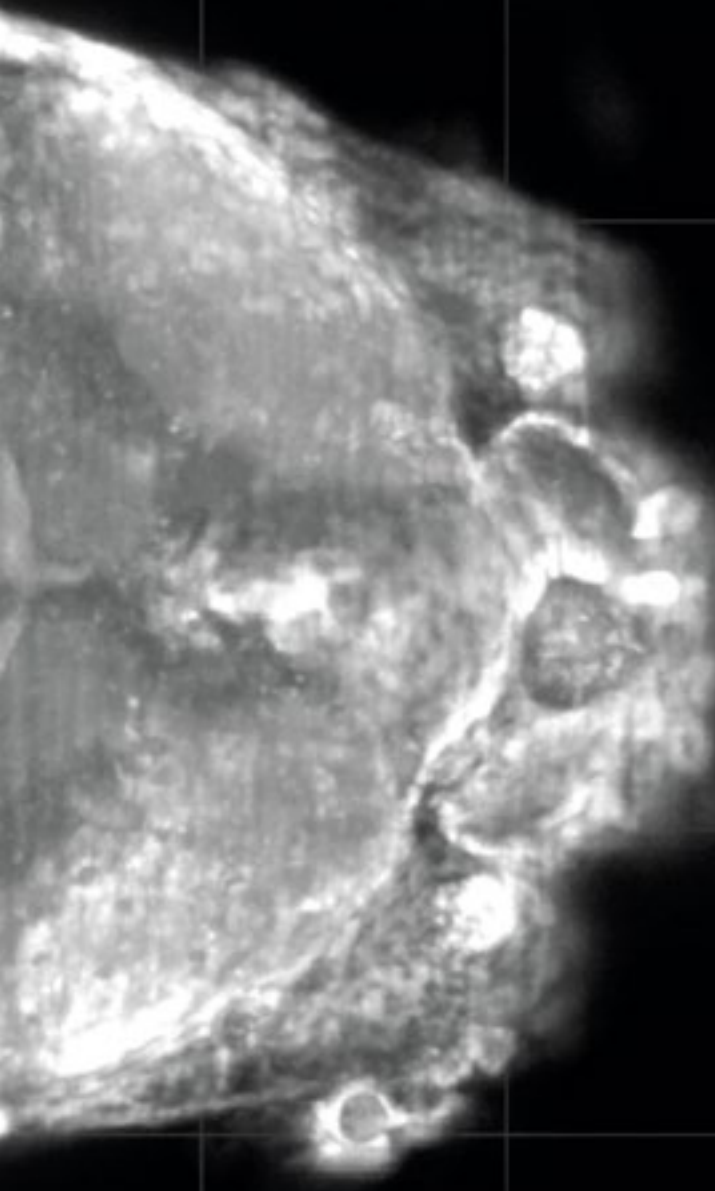
a measure of computational time used - have been delivered to research and education, growing from half a million in 2010 to 34 million in 2018, made possible by a large investment in hardware equipment. With storage capacity of over 10 PetaBytes and computing capacity of 1 PetaFlop, the University has strong internal resources and capabilities for its data science projects. *"In terms of hardware, we are very well-equipped for now. But, of course, as this technology becomes outdated very quickly, permanent investment will be necessary,"* said Andreas Zilian.

For Jens Kreisel, the University's Vice-Rector for Research, these new approaches are an important means of fostering collaborative research throughout the University and with outside partners. *"These diverse groups and sectors are brought together by data science and the question of how to process and use data for research. At our University, data science is a wonderful engine for interdisciplinarity, as it helps to break up silos and enables fresh thinking. Increasingly, it becomes an enabling science and technology for innovative research approaches,"* says Kreisel.

INTERDISCIPLINARY THEME: BIOMEDICINE

Changing PERSPECTIVES

The zebrafish model has relevant advantages for the study of epilepsy. One of these advantages is its optical transparency at the larval stage, which makes it possible to image brain activity at single cell resolution by using the single plane illumination microscope.



Prior to an epileptic seizure, nerve cells in some regions of the brain synchronise in an exceptional way before the system descends into a catastrophic state. A similar pattern can be observed in the run-up to a heart attack when the heart beats with high precision for a while without any natural variability. *“One can observe these characteristics in many systems – biological or otherwise – during critical transitions. The level of organisation inside a system increases significantly at first and then drops off at a critical moment,”* explains Dr Alexander Skupin, one of the coordinators of the Doctoral Training Unit (DTU) Critical Transitions in Complex Systems (CriTiCS).


Within this group, interdisciplinary teams of PhD students are looking at the dynamics of catastrophic events. For individuals, this could be the outbreak of diseases such as cancer or Parkinson’s disease or sudden bouts, such as a heart attack. However, the group also looks at such events at the societal level, such as stock market crashes. *“We look at common mechanisms and shared properties between these complex systems. The noise warning of turbulences in the stock markets can have similar properties to the noises in the dynamics of the brain,”* Skupin adds. *“By studying these phenomena, we develop models that might enable us to make predictions and determine early warning signals.”*

The Doctoral Training Unit that was funded under the PRIDE scheme of the Luxembourg National Research Fund (FNR) brings together junior researchers from different scientific fields such as biology, physics and computer science. At the beginning, the core competency of the biologists is to generate data through their experimental work and the job of the theoretical physicists and data scientists is to create models that simulate the systems. *“Over time, a kind of cross-fertilization takes place between those groups. While the biologists start to work with the algorithms and use machine learning approaches, the theoreticians become able to develop ideas for experimental designs,”* explains Skupin. This improves not only the results of the research projects but also the individual competencies of the DTU members and fosters an interdisciplinary mindset.

“At first, there were definitely communication problems between the different groups. One of the main challenges was to understand the projects of the others and the mathematical models that are behind them,” admits Alice Oldano, a doctoral candidate who uses experimental data from zebrafish trials to study the dynamics of epileptic seizures. *“But over time, you learn more and more to interact with scientists from the other fields, which opens a new array of opportunities. Many of the research problems are so complex they can only be tackled by gaining new interdisciplinary perspectives.”*



The first student delegation. Sitting, from left: Joël da Cruz Antunes, Sam Bernard, Oleksii Domin, Léa Neveux, Sigrid Heirbrant. Standing: Claude Ewert



STUDENT LIFE

A new University law, passed in 2018, sets the framework for a student delegation. The delegation represents the student community in the University's governing bodies and committees, advocates for key changes in the interest of students and promotes student life.

STUDENT LIFE



Making connections work



The Food Lab



Six universities of the Greater Region came to Luxembourg for a sports & culture day.

Students taking the initiative

The new 2018 University law has established new rules for the University's governance. The law strengthens student representation by creating a student delegation.

"Delegates represent the students in the governing bodies of the University, such as the Conseil de Gouvernance and the University Council, and are also members of University committees, such as the ethical committee or the appeal committee," explains Oleksii Domin, president of the student delegation. A PhD candidate in psychology, Domin started his work in the delegation along with seven other colleagues in November 2018. One of the priority tasks of the delegation consists in establishing permanent channels to communicate with students. "We want to inform students

about relevant decisions of the University management and gather their opinions and ideas concerning new initiatives," he explains.

"I feel that I am taken seriously in the University's governing bodies. I was delighted to see in practice that I was accepted as a member when the voting in the Conseil de Gouvernance took place," says Oleksii Domin. Among the pressing issues that the student delegation intends to address are an extension of the opening hours of the University's Learning Centre, the establishment of an ombudsman's office and interior adjustments to the newly opened Maison des Arts et des Étudiants (MAE). In order to reinforce the "art" and the "student" aspects, the delegation initiated a project to make the interior more student-friendly and met with University management and Fonds Belval to discuss changes to the furniture settings and décor.

"Student life in Belval is developing," he concludes. "The important thing for students, however, is that they shouldn't expect someone else to take care of everything for them. If you want to change things, you have to take the initiative and make the first step."



New student associations

Being part of a student association contributes to a positive student life and the “University experience”. Student associations provide a lively environment to meet like-minded people and try new activities, engage with the University beyond academics and to belong to a family away from home. In 2018, the University supported 11 student associations.

ASA – Architecture Student Association – fosters relations between students in architecture and interested public, and serves as a point of reference for new and incoming students of the department of architecture. **CEST** – Cercle des Étudiants de la FSTC – represents all students at the Faculty of Science, Technology and Communication and supports them in every aspect of their academic and social life. **ELSA** Luxembourg is the local node of the European Law Student Association, an international network that provides law students with professional experience through moot court competitions, summer and winter law schools and law-related activities. **LEF** - Law and Economics Fraternity – represents all students from the Faculty of Law, Economics and Finance. It helps new and incoming students to find their way around in the new environment and enlivens student life on Belval campus. **LMA** - Limpertsberg Masters Association – caters to students on campus Limpertsberg and organises the Friday’s Parties, work meetings, study-group sessions, and other activities. **ESN** – Erasmus Student Network – helps international students to integrate in Luxembourg and makes them feel at home in the country. **EWB** – Engineers Without Borders – facilitates research projects and dedicated activities for young engineers so that they can put their skills to benefit in low-resource settings. Historic University of Luxembourg organises networking and cultural events for the University’s history students and third parties, such as museums and cultural institutions. **JELux** – Junior Enterprise Luxembourg – supports entrepreneurial minds with networking events and advice. **RSG** – International Society for Computational Biology’s Regional Student Group – facilitates dialogue between students and experts in biology and guides students in their future career choices. **ULESSA** – University of Luxembourg English Studies Student Association – creates a space for exchange of ideas through academic and social events such as roundtables and pub quizzes.

Two new associations joined the ranks in 2018.

In November 2018, the **CCSA** – Conscious and Cultural Student Association was born. Through various events and meet-ups, CCSA’s ambition is to open students’ minds to culture and multiculturalism, especially Luxembourgish culture. The association also wants to raise awareness of the ecological challenges of the future.

ISAL – the Indian Student Association Luxembourg – helps Indian students integrate at the University of Luxembourg by organising various cultural and social meetings. It also encourages and facilitates direct contact and cooperation between the University staff and student communities.

Making connections work

Using the potential of public spaces in order to redefine social connections in encounters – this was the task posed to students in their 2nd year of the “Bachelor en Sciences Sociales et Éducatives”. During a brainstorming session with teachers Claude Haas and Thomas Marthaler, a group of students came up with the idea of reinventing the public space in front of a supermarket in Bonnevoie/Luxembourg as a camping site in order to experiment with “new” connections between supermarket customers and homeless people.

“Our project was an experiment to rework stereotypes and social connections linked to poverty or social exclusion,” explains one of the students. The student projects were carried out in collaboration with the community service of Inter-Actions. A multitude of activities, involving fifty students, took place in the Bonnevoie quarter.

Food Lab opens on Belval campus

November 2018 saw the opening of the Food Lab, the third University restaurant on Belval campus. With a seating capacity of 254 on two floors, it offers a dining room and a space equipped with microwave ovens.

Luxembourg Legal Hackers: at the intersection of law & technology

Legal Hackers is a global network of people who are passionate about emerging topics at the intersection of technology, law, and design (such as legal design, smart contracts, big data ethics) and who are keen to tackle pressing contemporary issues (like the EU copyright directive and blockchain regulation). PhD candidate Arianna Rossi teamed up with enthusiasts from financial institutions, law firms, start-ups and companies to set up a Legal Hackers node in Luxembourg and start organising debates, seminars and workshops.

“We organise events based on the open culture movement,” explains Rossi. “We intend to create a dialogue between people from different backgrounds around a shared issue or topic. This is how Legal Hackers helps to develop solutions to problems or explore innovations, it is community-driven”. The young group largely uses its Twitter handle @legalhackerslux and other social media to build an active community.

FACULTIES

Faculty of Law, Economics and Finance (FDEF)

The FDEF features three research units – the Centre for Research in Economics and Management (CREA), the Luxembourg School of Finance (LSF) and the Research Unit in Law (RUL). The faculty also incorporates the Luxembourg School for Logistics and Supply Chain Management (LCL) and the Robert Schuman Institute of European Affairs.

Members of the faculty work across more than a dozen research areas. A key common theme is a resolutely European and international outlook that is rooted in the Luxembourg context.

FDEF offers three Bachelor and 13 Master degrees as well as lifelong learning/vocational programmes. It aims to shape critical thinkers able to provide solutions to the challenges of today and tomorrow in Luxembourg and beyond.

2,352

Number of students

200

Staff (incl. PhD candidates)

269

Number of publications

Faculty of Language and Literature, Humanities, Arts and Education (FLSHASE)

The FLSHASE covers a wide range of areas in the fields of humanities, linguistics, cognitive sciences and social and educational sciences.

The Faculty's research and teaching focuses on social, economic, cultural, political and educational issues. Its ambitious interdisciplinary research addresses key topics such as education in multilingual and multicultural environments, interactions between health and behaviour, migration and identity, social inequalities, and sustainable development.

Its four Bachelor and 17 Master degrees and a doctoral school provide an innovative approach and attractive prospects for the next generation of academics and professionals.

2,143

Number of students

444

Staff (incl. PhD candidates)

570

Number of publications

Faculty of Science, Technology and Communication (FSTC)

The FSTC contributes multidisciplinary expertise in the fields of mathematics, physics, engineering, computer science and life sciences. The FSTC trains new generations of responsible citizens and leaders in order to better understand, explain and advance the society and the environment we live in.

With five Bachelor and 12 Master degrees, one doctoral school in Science and Engineering and lifelong learning programmes, the FSTC offers opportunities with multilingual and small-group courses, early involvement in research projects and close connections with institutions and industry. Its five research units undertake cutting-edge science and innovation in collaboration with local and international partners.

1,904

Number of students

477

Staff (incl. PhD candidates)

747

Number of publications

INTERDISCIPLINARY RESEARCH CENTRES

Luxembourg Centre for Systems Biomedicine (LCSB)

The LCSB is accelerating biomedical research by closing the gap between systems biology and medical research. In 15 research groups, collaboration between biologists, medical and computer scientists, physicists, engineers and mathematicians is offering new insights into complex systems such as 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 such as Parkinson's disease and the description of diseases as networks are 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.

212

Staff (incl. PhD candidates)

138

Number of publications

Interdisciplinary Centre for Security, Reliability and Trust (SnT)

The SnT conducts internationally competitive research with high relevance in information and communication technology (ICT), creating socio-economic impact. In addition to long-term research, the SnT engages in demand-driven collaborative projects with industry and the public sector. The centre has set up a Partnership Program with 43 members targeting strategic areas addressing 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.

The SnT has undergone rapid development since its launch in 2009, recruiting top scientists, launching over 70 EU and ESA (European Space Agency) projects, creating a technology transfer office, protecting and licensing IP, launching four spin-offs, and creating a dynamic interdisciplinary research environment.

230

Staff (incl. PhD candidates)

479

Number of publications

Luxembourg Centre for Contemporary and Digital History (C²DH)

The C²DH focuses on the history of Luxembourg and Europe in the 20th and 21st centuries. It also focuses on digital history, analysing the impact of digital technology, tools and working methods on historical research [the impact of the digital turn on the practice of historical research, conceptualising the use of digital methods and tools]. The Centre serves 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 focus of the centre's approach. Under the heading Forum Z (Z as in "Zeitgeschichte", German for contemporary history), a series of events offers a platform for the discussion of current issues related to contemporary Luxembourgish and European history. The C²DH doctoral school in Digital History and Hermeneutics is committed to training the next generation of history scholars in digital literacy.

64

Staff (incl. PhD candidates)

153

Number of publications

FUNDRAISING

The central office for fundraising started operations in November 2018. The new office consists of a team of four and is headed by Dr Philippe Lamesch.

The team has big ambitions: to make some of the University's research programmes increasingly self-sustaining by building up the support of private donors towards faculties and interdisciplinary centres.

From left: Ken Fukino, Philippe Lamesch, Annick Spellini, Nathalie Klopfenstein

MAKING DONORS PROUD



Philippe Lamesch,
Head of Fundraising.

In 2018, external funds from private donors supported dozens of research projects and educational programmes.

Philippe Lamesch holds a PhD in Molecular Biology from the Dana Farber Cancer Institute (Harvard Medical School). He worked as scientific curator at Stanford University in California and as biotech consultant for the Luxembourg Trade & Investment Office in San Francisco. From 2013 Philippe led the fundraising office of the University's Luxembourg Centre for Systems Biomedicine (LCSB), focusing on donations for experimental and computational research in Parkinson's disease and other neurodegenerative diseases.

The University is a public institution. What is the scope of fundraising?

Philippe Lamesch: Fundraising is extremely important for the University, on several levels. The University of Luxembourg has managed to quickly join the group of top-ranked young universities worldwide and attracts some of the brightest minds to Luxembourg. Excellent researchers expect to work with cutting-edge infrastructure and technologies. In order to stay at a top level in research and teaching, the University needs to be able to provide top notch facilities. Private funds supplement the budget provided by the government and the funding agency FNR (Luxembourg National Research Fund). We are currently also working with FNR on a 'matching programme' where some of the private donations will be matched 100% by the funding agency.

Private donations often represent the so-called 'seed funding'. This allows scientists to run pilot programmes to collect the necessary data to then apply for public funding.

Fundraising is also extremely important to open up the University to Luxembourg society. Fundraising activities have a ripple effect. Through numerous outreach events such as Art2Cure, townhall presentations and specific donor events, more and more of our research colleagues interact with potential donors. We also give our donors the opportunity to visit the research laboratories and interact with researchers on a regular basis. It is important to be transparent about the use of funds, to inform on progress and stimulate dialogue.

There are hundreds of research and educational projects at the University. How exactly are funds allocated?

Philippe Lamesch: The fundraising office supports all our faculties and interdisciplinary centres. The University's new four-year plan outlines eight research priorities and these have precedence for fundraising initiatives. But it goes without saying that the donor has the last word, and they can choose to support any existing research project or educational programme at the University.

Donations can range from ten euros to a million euros or even more. It is our responsibility to ensure that all donations are used properly. Typically, donors who make a four or five figure donation already have a good idea which research area they might want to support; usually we can identify existing projects that match their wishes. Some donors have made contributions large enough to support an entire project or research instrument. We are also very fortunate to have raised strong interest from some very large donors, with whom we are currently talking about extremely large donations in the millions of euros. In such cases, donors are of course much more involved in the decision-making process of how these funds would be used as they would allow for the creation of entire new programmes or research units.

Over the last couple of years, the University has received an increasing amount of donations through obituaries. A good example is the NCER project – a long-term study of Parkinson's disease where patient participation is required. These accumulated funds represent an important additional funding source for this project.

Regardless of the amount of the donation, the most important thing is that the funds are well allocated and that each donation has a true impact.

What incites people or organisations to support a University?

Philippe Lamesch: Many people in Luxembourg are looking for local causes to support. In fact, many of our donors are families. They may donate directly, or they may have created foundations to support a cause. About 65% of private funds received by the University to date (excluding Professorial Chairs) originate from foundations.

In a time that celebrates instant gratification, one might expect that the time that it takes for a research project to show results might be a turn-off for potential donors. Experience has taught us otherwise: people understand that a new cancer drug is not developed overnight, but they are very interested in the process of getting there. Hence, as long as you give the donor the opportunity to be involved, to meet the scientists and talk to them about their successes but also their failures, donors are usually quite satisfied and also very proud to be part of such an effort. This is reflected in the 70% retention rate of major donors.

Service clubs have also proven to be superb partners: every year, organisations such as the Rotary Club, the Lions Club and Club FiftyOne make important donations to the University.

To me, the challenge is not to incite people to donate but to ensure that they are aware of the opportunities that exist at the University with regard to philanthropy.

GOVERNANCE

BOARD OF GOVERNORS

The Board of Governors decides upon the University’s general policies and strategies and oversees the University’s activities. It has 13 voting members: 11 members are appointed by the government (of which two are proposed for nomination by the University Council). The head of the staff delegation and the president of the student delegation are also voting members of the Board of Governors. The University Rector and the Government Commissioner participate in a consultative capacity in meetings.

President		Vice-President	
Yves Elsen Managing partner and CEO of HITEC		Kristín Ingólfssdóttir Professor and former Rector at the University of Iceland	
Members			
Yvonne Flour Professor and former Vice-Rector of Université Paris I Panthéon Sorbonne	Michel Goedert Programme leader at Medical Research Council Laboratory of Molecular Biology in Cambridge, Honorary professor of Cambridge University	Gérard Hoffmann Chairman and CEO of Proximus Luxembourg	Paul Lesch Director at the Centre national de l’audiovisuel
Claudine Moulin Professor at the University of Trier	Virginie Mucciante President of the staff delegation	Anke Müßig Professor at the University of Luxembourg	Georges Steffgen Professor at the University of Luxembourg
Jeannot Trampert Professor at the University of Utrecht	Sandra Visscher Director of UNICEF Luxembourg committee	Oleksii Domin President of the student delegation	
Advisory participants		Secretary General	
Stéphane Pallage Rector of the University of Luxembourg	Léon Diederich Government Commissioner	Massimo Malvetti Secretary General	Anne Christophe Deputy Secretary General

From left to right: Oleksii Domin, Massimo Malvetti, Anne Christophe, Gérard Hoffmann, Sandra Visscher, Yvonne Flour, Georges Steffgen, Stéphane Pallage, Paul Lesch, Yves Elsen, Jeannot Trampert, Kristín Ingólfssdóttir, Michel Goedert, Claudine Moulin, Léon Diederich, Anke Müßig, Virginie Mucciante.



UNIVERSITY COUNCIL

The University Council assists the rector in the organisation of teaching and research activities, decides on the orientation of study programmes and issues opinions on internal regulations, appointments of rectorate members, the four-year plan, the budget and other strategic decisions.

President			
Paul Heuschling			
Voting members			
Sam Bernard	Tegawendé Bissyande	Sami Bouraoui	Pascal Bouvry
Audrey Collard	Elena Danescu	Claude Ewert	Antoine Fischbach
Anne Grünewald	Sigrid Heirbrant	Paul Heuschling	Ruben Jacobs
Jacques Klein	Anke Müßig	Léa Neveux	Andreia Pinto Coelho da Costa
Christoph Purschke	Elisabeth Schaffner-Reckinger	Ariane Scheffer	Jang Schiltz
Janine Silga	Adolfo Sommaribas	Georges Steffgen	Véronique Weber
Advisory members			
Rudi Balling	Christophe Dierendonck	Andreas Fickers	Jens Kreisel
Katalin Ligeti	Massimo Malvetti	Romain Martin	Georg Mein
Erica Monfardini	Björn Ottersten	Stéphane Pallage	Jean-Marc Schlenker
Tonie van Dam	Skerdilajda Zana	Joanna West	

THE RECTORATE

The Rector is the executive authority of the University of Luxembourg and in this capacity works closely with the other members of the rectorate.

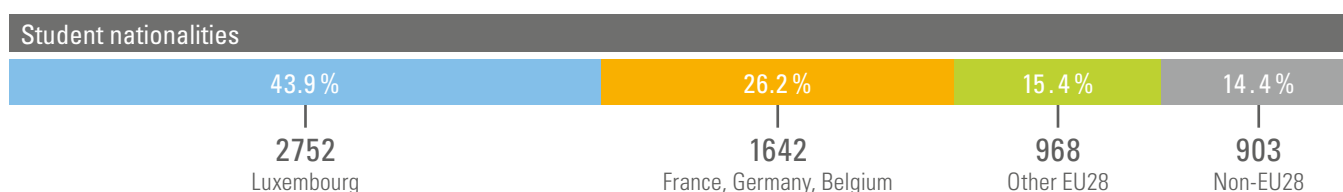
Rectorate			
Stéphane Pallage Rector	Tonie van Dam Vice-Rector	Jens Kreisel Vice-Rector	Romain Martin Vice-Rector
Director of Administration and Finance			
Erica Silvia Monfardini			

FACTS & FIGURES

STUDENT STATISTICS

Students by degree		Students by faculty	
Total	6423	Total	6423
Bachelor	3000	FSTC**	1904
Master	1651	FDEF***	2352
PhD	821	FLSHASE****	2134
other degree*	951		

* Vocational and Lifelong learning programmes; ** Faculty of Science, Technology and Communication; *** Faculty of Law, Economics and Finance; **** Faculty of Language and Literature, Humanities, Arts and Education.



UNIVERSITY GRADUATES

Graduates by degree			Graduates by faculty		
	2016-2017	2017-2018		2016-2017	2017-2018
Total	1510	1620	Total	1510	1620
Bachelor	581	677	FSTC**	307	329
Master	447	553	FDEF***	746	747
PhD	128	127	FLSHASE****	457	544
other degree*	354	263			

UNIVERSITY STAFF 2018

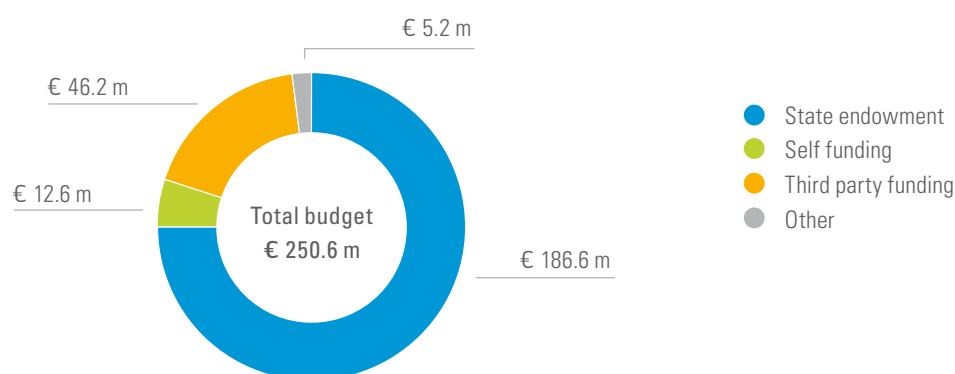


PUBLICATIONS



FINANCIAL INFORMATION

UNIVERSITY BUDGET IN 2018



BUDGET EVOLUTION 2016-2018



ENDOWED CHAIRS

ATOZ Chair for European and International Taxation

SES Chair in Satellite Communications and Media Law

ArcelorMittal Chair of Steel and Façade Engineering

Ville d'Esch-sur-Alzette Chair in Social Business and Social Management

ADA Chair in Financial Law
(Inclusive Finance)

Chair in Capital Markets and Post-Trade
(co-financed by European Central Bank, Clearstream International S.A., Allen & Overy LLP, Deloitte General Services Sàrl, Brown Brothers Harriman, Lombard Odier (Europe) S.A., State Street Bank Luxembourg SCA)

PayPal PEARL Chair in Disruptive Financial Technologies

The University has also been awarded:

UNESCO Chair in Human Rights
Two Jean Monnet Chairs in European studies

FACTS & FIGURES

ACCEPTED HORIZON 2020 PROJECTS

Horizon 2020 (H2020) is the biggest European Union Research and Innovation programme ever with nearly 80 billion euros of funding available over seven years (2014 to 2020). It promises more breakthroughs, discoveries and world firsts by taking great ideas from the lab to the market. For a research-centered 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/IC	Responsible PI within UL	Acronym	Role of UL
CCDH	Andreas Fickers	TIME MACHINE	Partner
Central/Gender	Toni Van dam / Christel Baltes-Löhr	Genderaction	Partner
Central/Library	Marie-Pierre Pausch-Antoine	OpenAIRE2020	Partner
Central/Library	Marie-Pierre Pausch-Antoine	OpenAIRE Advanced	Partner
FDEF	Angelo Marletta	ADCRIM	Coordinator
FDEF	Katalin Ligeti	Jude-IT	Partner
FDEF	Silvia Allegrezza	FIGHTER	Partner
FLSHASE	Claus Vogele	CIP	Coordinator
FLSHASE	Birte Nienaber	MOVE	Coordinator
FLSHASE	Deter Ferring	MinD	Partner
FLSHASE	Claus Vogele / Dimitri Van Ryckeghem	PainDynamics	Coordinator
FLSHASE	Birte Nienaber	RELOCAL	Partner
FLSHASE	Catherine Jones	CROSSCULT	Partner
FLSHASE	Birte Nienaber	CEASEVAL	Partner
FLSHASE	Birte Nienaber	LU EMN NCP	Coordinator
FLSHASE	Josip Glaurdic	ELWar	Coordinator
FLSHASE	Anja Leist	CRISP	Coordinator
FSTC	Toni Van dam	EGSIEM	Partner
FSTC	Ludger Wirtz	EJD-FunMat	Partner
FSTC	Jean-Sébastien Coron	HEAT	Partner
FSTC	Thomas Sauter	MEL-PLEX	Partner
FSTC	Susanne Siebentritt	Sharc25	Partner
FSTC	Thomas Engel	EXCITING	Partner
FSTC	Christoph Odenbreit	REDUCE	Partner
FSTC	Stephane Bordas	DRIVEN	Coordinator
FSTC	Alexander Tkatchenko	ML Potentials	Coordinator
FSTC	Stephane Bordas	MORPhEM	Coordinator
FSTC	Stephane Bordas	Rainbow	Partner
FSTC	Jean-Marc Schlenker	SANDAL	Coordinator
FSTC	Daniele Brida	MUSIQ	Partner
FSTC	Pascal Bouvry	PRACE-6IP	Partner
FSTC	Stéphane Bordas	RealTCut	Coordinator
FSTC	Jan Lagerwall	INTERACT	Coordinator
FSTC	Massimiliano Esposito	NanoThermo	Coordinator
FSTC	Alexander Tkatchenko	BeStMo	Coordinator

Faculty/IC	Responsible PI within UL	Acronym	Role of UL
FSTC	Daniele Brida	UpTEMPO	Coordinator
LCSB	Rejko Krüger	CENTRE-PD	Coordinator
LCSB	Rudi Balling	SysMedPD	Coordinator
LCSB	Rudi Balling	Clinnova	Partner
LCSB	Reinhard Schneider	SYSCID	Partner
LCSB	Reinhard Schneider	FAIRplus	Partner
LCSB	Reinhard Schneider	BIOMAP	Partner
LCSB	Paul Wilmes	CIRCLES	Partner
LCSB	Jens Schwamborn	CONNECT	Partner
LCSB	Paul Wilmes	EUROoC	Partner
LCSB	Ines Thiele	PoLiMeR	Partner
LCSB	Carole Linster	SinFonia	Partner
LCSB	Reinhard Schneider	Smart4Health	Partner
LCSB	Ines Thiele	BugTheDrug	Coordinator
SnT	Thomas Engel	FLYSEC	Partner
SnT	Thomas Engel	PRIVACY FLAG	Partner
SnT	Leon Van Der Torre	ProLeMAS	Coordinator
SnT	Symeon Chatzinotas	SANSA	Partner
SnT	Thomas Engel	TARGET	Partner
SnT	Thomas Engel	Atena	Partner
SnT	Yves Le Traon	bloTope	Partner
SnT	Thomas Engel	F-Interop	Partner
SnT	Leon Van Der Torre	MIREL	Coordinator
SnT	Djamila Aouada	STARR	Partner
SnT	Thomas Engel	SAINT	Partner
SnT	Thomas Engel	5G-DRIVE	Partner
SnT	Peter Ryan	FutureTPM	Partner
SnT	Thomas Engel	5G-MOBIX	Partner
SnT	Radu State	CONCORDIA	Partner
SnT	Paulo Verissimo	CyberSec4Europe	Partner
SnT	Radu State	FIN-TECH	Partner
SnT	Leon Van Der Torre	LAST-JD-RloE	Partner
SnT	Paulo Verissimo	SPARTA	Partner
SnT	Lionel Briand	TUNE	Coordinator
SnT	Björn Ottersten	AGNOSTIC	Coordinator
SnT	Jean-Sébastien Coron	CLOUDMAP	Coordinator

Data from end December 2018



University of Luxembourg 2, avenue de l'Université, L-4365 Esch-sur-Alzette

Communications Department: T+ 352 / 46 66 44-6525

Project coordination: Laura Bianchi, Jean-Paul Hoffman, Thomas Klein

Realisation: scienceRELATIONS, Layout: www.spezial-kommunikation.de

Photos: Michel Brumat (5, 6, 9, 13, 14, 15, 18, 19, 20, 22), Sophie Margue (1, 2, 10, 12, 14, 15, 16, 21),

University of Luxembourg (5, 7, 8, 13, 15, 19, 21, 24, 27, 28, 30, 35), scienceRELATIONS (15, 22, 34),

Restopolis (30), Kary Barthelmy (23), Eric Chenal (5, 20), Victor Fischbach (4), Yaph (5), LUCA

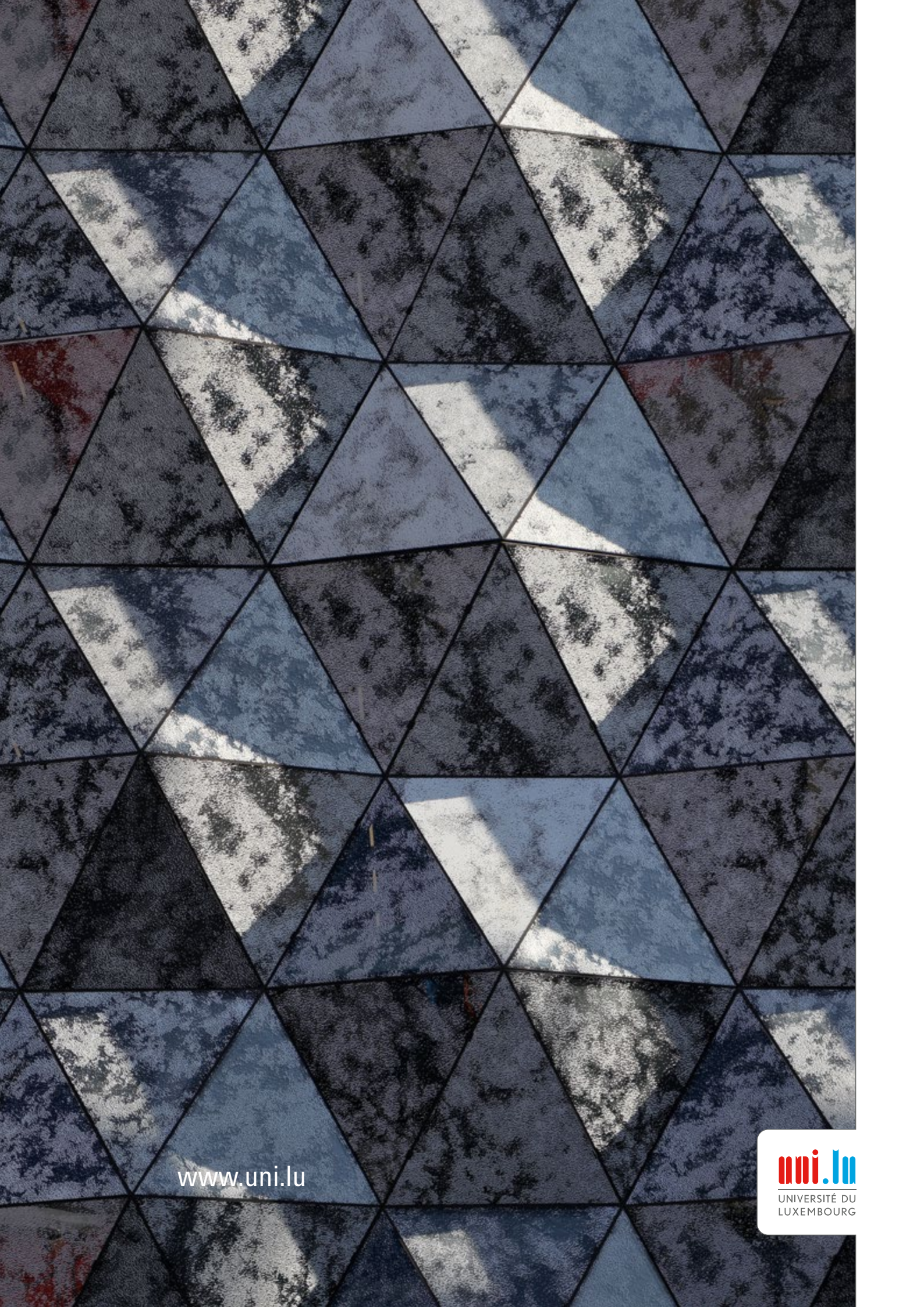
Luxembourg Center for Architecture / Alberto Sinigaglia – OpFot (13), Stuart Rockens (1).

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