



Magazine of the Brussels School of Engineering and its Alumni

JOINT ULB-VUB PROGRAMME:
10 YEARS ALREADY!

BRUFACE GENERATION

Alumni, professors, researchers... testimonials

AND ALSO

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Student, Alumni and professor:
a win-win Bruface trio / **p. 14**

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Bruface, ten years old already!

BruFacE – Brussels Faculty of Engineering – is celebrating its 10th anniversary! For ten years, the VUB and the ULB have been pooling their strengths to offer the engineers of tomorrow the best possible training. For ten years, French speakers and Dutch speakers have been talking to one another so that language is no longer an obstacle. For ten years, English has been used in the courses, enabling the School to open up to the world and welcome a growing number of foreign students. For ten years Brussels, the capital of Europe, a cosmopolitan, heterogeneous city, has had its very own faculty of engineering, without having created an extra one. United we stand. This is an achievement we can be proud of.

Multilingual polytechnic students and graduates - but more than that!

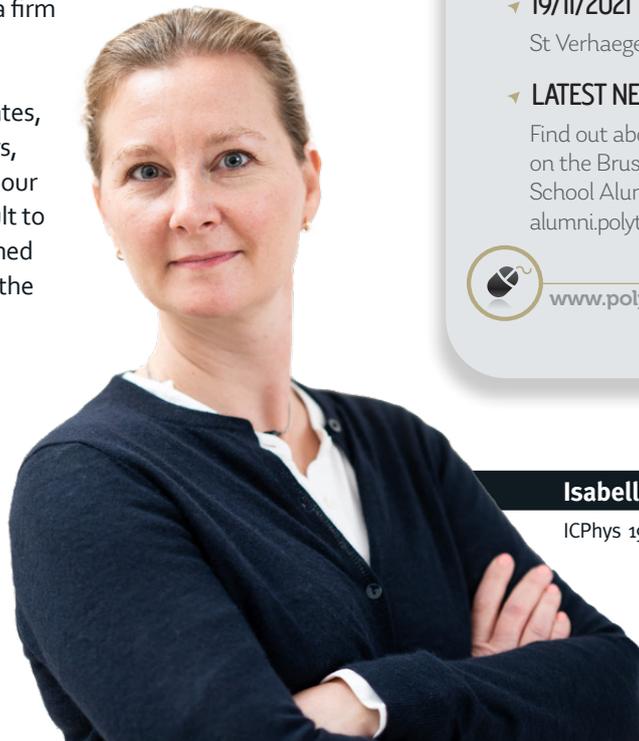
When I was a student 25 years ago languages, and English in particular, formed no part of our training. A glaring lack in a country with three national languages and a glaring lack in an international professional environment. Totally out of alignment with the technical standard of the studies on offer.

By developing Bruface, we have not only offered our engineers a language. We have also offered them a gateway to the world, the transformation of competition into co-creation, a firm footing in the world in which we live.

By developing Bruface, we have not only offered our society multilingual polytechnic students and graduates, but also committed engineers, better communicators, capable of establishing the link between scientific rigour and the reality of everyday life, a link that is so difficult to establish in an over-informed world. Engineers enriched by cultural differences. Engineers firmly anchored in the world in which they live.

Beyond the campus

In this new issue of G Square, we take you behind the scenes of these 10 years. You will meet the artisans of this collaboration. You will also find out about the researchers who have moved beyond the campus to implement their projects in practice, as well as the Belgian and foreign Bruface graduates developing their full potential in multilingual careers.



Isabelle Hendrickx

ICPhys 1999

OUR MEETINGS



- **01/10/2021**
Drinks at the UAE for full Alumni members
- **06/10/2021**
Commencement Ceremony at the Grand-Place in Brussels
- **11/10/2021**
Opening lecture of the BA1 project by Vincent de Ville de Goyet
- **13/10/2021**
6 hours on cuistax for the CP
- **18/11/2021**
PolytechLINK, "Missing Data"
- **19/11/2021**
St Verhaegen
- **LATEST NEWS**
Find out about upcoming events on the Brussels Polytechnique School Alumni website: alumni.polytechniquebruxelles.be

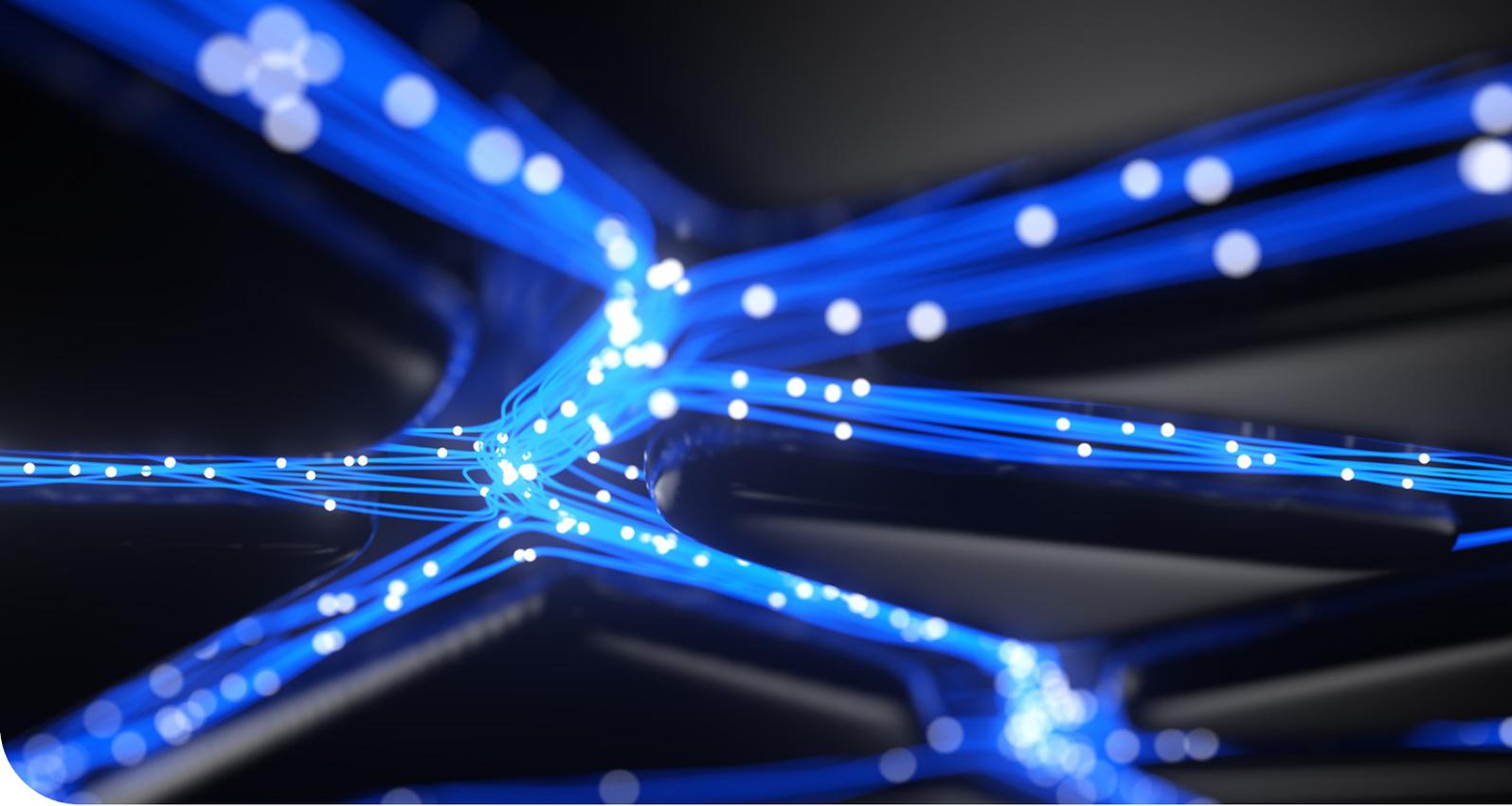


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SOLVAY AWARDS: 5 FOR THE SCHOOL!

Five of our young doctors, Frederic Colomer Martinez, Chloë Hebborn, Glenn Grauwels, Maurice Retout (PhD 2020) and Zhiyi Li (PhD 2019) have been recognized by the Solvay Company. They received a Solvay Award for their doctoral thesis on 12 September at the 17th Solvay Public Event in Flagey. Each year, these awards honour brilliant PhD students and minds from ULB and VUB for their groundbreaking research in chemistry and physics.

BA1 PROJECT: VIBRANT SUSTAINABILITY

Set aside in 2020 (G Square # 34) in favour of the Major Lazer project, one that is easier to complete at home, the project for recovering energy from vibrations will finally see the light of day after the start of the 2021 academic year for students at BA1. At its official launch, on 11 October, the School will welcome Vincent de Ville de Goyet, civil engineer in construction (1979), lecturer at the University of Liège and Scientific Director of the Bureau Greisch engineering firm, who will give a presentation on "Imagination and technology at the service of the art of construction in the field of civil engineering."



IRIDIA

The latest news in Science Robotics

The July issue of the prestigious journal Science Robotics, dedicated to the most advanced results in collective robotics, features two research studies led by members of the IRIDIA Lab, that shed light on the future of programming the behaviour of robot swarms.

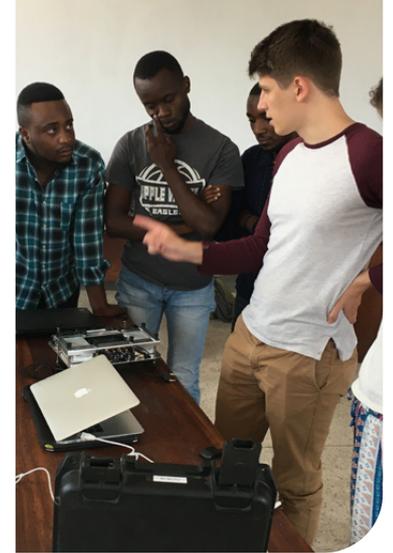
RESILIENT TO CYBERATTACKS

Marco Dorigo, Director of IRIDIA, Eduardo Castelló Ferrer and colleagues at the MIT of Boston, have shown how to program a robot swarm in order to make it resilient to potential cyberattacks. A sophisticated cryptographic protocol allows the robot swarm to share information, while at the same time securing any sensitive data. The aspect of security has been often neglected in swarm robotics. IRIDIA is leading the way in this line of research that is crucial to deploy robot swarms in the real world.

LESS WAS MORE

Andreagiovanni Reina, who recently joined IRIDIA as an FNRS Chargé de Recherches, led a team of researchers at the University of Sheffield (UK), to study how information spread in large robot populations. The research has brought to a counterintuitive finding: the less the robots were connected, the more the information spread within the population. Less was more. On the contrary, globally-connected robots were unable to discard outdated beliefs and adopt better available alternatives. This work lays the foundations for the design of large swarms of minimalistic robots that can operate hazardous and remote locations, such as nano-robots in blood vessels, or biodegradable robots for ocean cleaning.





 **CODEPO**

Four students assist MSF in Goma

Cécile Castiaux, Nathan Gartner, Margaux Mannaerts and Nicolas Wallemacq, MA1 students, left in early July to spend a month in Goma, Democratic Republic of Congo, to upgrade the portable wifi cases of Doctors without Borders (MSF). “These cases, designed by Venn Telecom, are very valuable on the ground, since they allow doctors to have a good internet connection wherever they are and to exchange information. The problem is that once the router is turned off, it is impossible to locate it, which leads to many losses», explains Nicolas, IT engineer. For the engineers, the challenge was thus to equip the cases with a small autonomous device that can last three months and transmit the GPS position and the level of battery charge via USSD.

RELIEVED AND PUT BEFORE A CHALLENGE

After several months’ work, the students were supposed to go to Goma. “With the public health situation and the eruption of the Nyiragongo volcano in May, we were not sure we would be able to go. So once on the plane, we were super relieved!”, remembers Margaux. After having met their Congolese fellow students, the team got down to work. Very soon, they were faced with new problems. “We had to find solutions and deal with the local realities and time constraints”, reports Nicolas.

THE PEOPLE’S BEACH

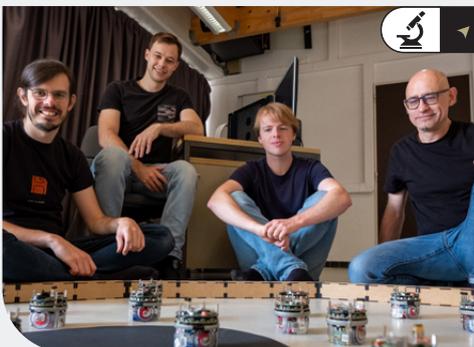
After a month of trial and error, the devices were ready. Even if they did not correspond 100% to the specifications, “the main requirements were met”, ensured Nathan. “Our only regret was not to have had the chance for more interaction with the Congolese students. We were very focused on our respective tasks. That did not prevent us from forming ties with them and having some good times together, in particular at the ‘Plage du Peuple’, according to Cécile and Margaux.



www.facebook.com/Codepolytech/



NEURO-EVOLUTIONARY ROBOTICS



A gap between simulation and reality

In a study published in Nature Communications, Ren Hasselmann, Antoine Ligtot, Julian Ruddick and Mauro Birattari compared some of the most popular and the most advanced neuro-evolutionary methods for the off-line design of swarm robots. If the operating software produced by most of the methods analysed yielded good results in simulation, things were quite different in reality. The researchers thus concluded that experiments on real robots are necessary to evaluate reliably the performance of neuro-evolutionary methods, and that the robustness of the gap between simulation and reality is the main problem to be solved to develop the application of neuro-evolution to the design of swarm robots.



iridia.ulb.ac.be/ne-swarm/

PAOLA VIVIANA PANTOJA ARBOLEDA
(Master of Science in Civil Engineering Bruface 2018)

From Pasto to Aalst



WHAT IS AN ENGINEER?

▶ AN AMBITIOUS CHARACTER

“An engineer is someone who has a passion for outcomes and who will use all means to find his or her way there.”

▶ FOCUSED ON PROBLEM-SOLVING

“The main tool is of course problem-solving by means of the scientific methods and knowledge learnt through study and at work.”

PAOLA PANTOJA

JUNIOR GEOTECHNICAL ENGINEER AT JAN DE NUL GROUP

Born on 30 March 1993 in Pasto, Paola Pantoja began her career in Colombia, where she felt the need to complete her studies with a Master of Science, and this led her to ULB. After graduating from Bruface, she decided to stay on in Belgium, where she has continued her professional career as a geotechnical engineer with Jan De Nul Group in Aalst since September 2018.



From near the Galeras volcano in southern Colombia to calculating the foundations of offshore wind turbines for Jan De Nul Group in Aalst: this was the journey Paola Arboleda travelled, thanks to Bruface, the programme that finally lived up to her expectations.

?: WHAT WERE YOUR MOTIVATIONS FOR STARTING CIVIL ENGINEERING STUDIES IN COLOMBIA, AT THE UNIVERSIDAD LIBRE?

Paola Pantoja: «At the beginning my goal was to become a biomedical engineering professional. But there was no university with biomedical engineering in my city, and my father told me to start out with any form of engineering. So that's what I did. Civil engineering was always my second option in any case, because my father is a civil engineer and since I was a kid I had gone with him to sites and buildings. I used to have a good time with him and all the workers and I would play with the construction tools... I was familiar with the topic (smiles). I then got a scholarship from the university to continue civil engineering... That was my destiny.»

?: ONCE YOU HAD GRADUATED IN COLOMBIA, YOU IMMEDIATELY BEGAN WORK. WHAT FINALLY PROMPTED YOU TO START NEW STUDIES IN BRUSSELS?

PP: «In Colombia I had a good relationship with the professor of geotechnics and when I graduated she suggested I should keep working and studying and offered me a position as a researcher. I worked in my university for some months, and I managed to publish my first article in the newspaper of the Civil Engineering Association in my city. After that, I went to a steel structure company. I worked there for a few months before this master's degree opportunity arose and I decided to go to Brussels! When I was studying in Colombia, I had some friends who did exchange programmes, but mainly in Chile, and this got me thinking that I also would like to study outside Colombia. I really wanted to explore the world more ... And I wanted to do it in a way that could build me up as a professional. So the best option was to do a master's degree abroad. When I began to work I started to focus more on that so I applied for scholarships everywhere: the US, Australia, Europe... The one with the programme that exceeded my expectations in

every way was Bruface. I applied and fortunately the OAS (oas.org) decided to select me and other Latin American students for a scholarship.»

?: WHEN YOU ARRIVED AT OUR UNIVERSITY, WHAT WERE YOUR FIRST FEELINGS?

PP: «I was scared (laughs). Because it was a country where I've never been before, with different languages that I really didn't know at all. And it was also a new culture, with new people, a new way of studying... It was quite scary! But then when you go to the first classes you notice a very nice environment. Fortunately we had a lot of students coming from everywhere so it really was an international environment. Everyone was speaking English so you could feel connected with people. At that moment I started feeling like: ok, this is not the end, I will really enjoy this and let's do it.»

?: DID BRUFACE KEEP ITS PROMISES?

PP: «Yes. When I came here, I was looking to explore the world more, and I also wanted a new master's degree that was of a high academic level. I really wanted to find that and I did in Brussels. I immediately noticed the very detailed content of the courses. Professors, laboratories, equipment... everything is at a very high level. You go into things in great depth. I found even more than I was expecting. And I also had the opportunity to travel because here it's very easy to travel to other countries even for a weekend. The location of the university in Brussels is a great advantage. That has given me the opportunity to explore more around Europe. And more: you can find so many international companies here specialising in very different sectors and involved in so many areas. This makes it the right place for any kind of professional. I think that everyone can find something they like.»





"I like my position at Jan De Nul Group! You start as Junior Geotechnical Engineer, and after some time or after some results you can take out the 'Junior', so I hope I'll be able to do that soon (laughs)."

HER BRUFACE YEARS (2016-2018)

▶ AN INTERNATIONAL ENVIRONMENT

«We were a lot of international students, so we became very close because none of us had very close family nearby. So we became like a family group and we were helping each other all the time. That is one of the best memories.»

▶ A HIGH ACADEMIC LEVEL

«The studies were very challenging. I was even close to stopping and going back to Colombia. But in the end you find people that help you, and support you and the ones that love you encourage you to continue, they make you see the good side and say just hold on!»

?: YOU ALSO HAD THE OPPORTUNITY TO GO ON AN INTERNSHIP IN BARCELONA DURING YOUR STUDIES.

PP: «Bruface offers you an internship in the summer. It was a good opportunity! I found the internship myself. My family has a friend working as a civil engineer in a company in Barcelona. I contacted her and she was willing to give me this chance. The internship program IAESTE (iaeste.org) helped me with all the papers I needed and also to find a place to live when I arrived. We were a little community of students there. I did the internship for three months and at the end a report was sent to the university, which gives you academic credits in the Bruface programme. I got a very good grade and the company even offered to take me back when I finished my master's (smiles).»

?: BUT YOU FINALLY DECIDED TO FIND A JOB IN BELGIUM. WAS THAT AN EASY STEP TO TAKE?

PP: «I had a door opened in Barcelona, so I would say it was easy to work in Europe. But I was trying to find a job here, in Belgium, which was not so easy... Previously a Bruface graduate had told me that it takes time, so I started applying about six months before I finished the thesis and everything. I had a lot of interviews and I found out that there are some challenges you need to overcome as a foreigner: the work permit and also the language requirements in the local companies, where you often need to know both of the official Belgian languages. These are two big filters you have to pass through. Fortunately with international companies this is not an issue. Because they know how to deal with applications from foreigners and what to do about the work permit and they tend to work in English, because they need to communicate with other countries.»

?: HOW DID YOU END UP JOINING JAN DE NUL GROUP?

PP: «During my studies I went to the job fairs organised by the university to which international companies are invited. I remember Jan De Nul Group stand where I saw all the videos showing offshore projects and I thought: wow, this is a very

big company (smiles)! My friends and I visited their vacancies web page but there wasn't really one that was a close fit for me, so I waited and applied to many other companies. About one month before graduating, I decided to have another look at their vacancies and this time there was one that really matched my profile! I was intimidated because you don't think that they will have a look at all the CVs they receive... But I said let's try it! From there things went very fast. They interviewed me, we communicated a lot and in less than one month they offered me a position starting in September 2018. It was perfect for me: it was the kind of opportunity that I was waiting for in order to grow further as an engineer, because it was a new area, a market that is booming right now and also something that is consistent with my ethics. I was so happy! I do calculations sometimes for the design of the foundations and sometimes for the installation of foundations of offshore wind turbines. I also have tasks related to the leg penetration of the vessels. And recently there has been a lot of interest in drilled foundations and also floating foundations.»

?: DO YOU HAVE ANY ADVICE FOR FUTURE CANDIDATES FOR BRUFACE FROM OUTSIDE BELGIUM?

PP: «My advice would be to enjoy that time as much as you can, and take the chances that you find. For instance if you have a chance to do an internship, just do it. If you find the chance to belong to the lab teams, go for it. Because all of that is going to give you more opportunities here. The second piece of advice is to keep in mind that this is a higher level. Yes, a different level from the one we were used to. So you have to come here with the attitude that it is going to be challenging and you have to be prepared to hold to the good things. You need to continue focusing on the good things that you have at that moment. In the end it's going to be very good for you, as a professional and also as a human. It's something that really makes you grow up in the right way (smiles). I would also like to inspire all the women dreaming of becoming a civil engineer, this field is also an open opportunity for us!» ▶



CANDIDATES, ACCEPTED, REGISTERED

Bruface in figures

Dean of the VUB Faculty of Engineering from 2008 to 2012, when Bruface was in its infancy, **Jacques De Ruyck** adopts a “paternal attitude” to the programme. Having become the coordinator, he has been recording the stats for almost six years now...

?: YOU STILL DEVOTE A LOT OF TIME TO BRUFACE, EVEN THOUGH YOU’VE RETIRED!

Jacques De Ruyck: ‘Yes, I still have a 10% post at the VUB, but I love it, so I don’t keep track of the hours I spend doing all kinds of coordination tasks; Bruface has marked my career. Our two faculties, Polytech VUB and ULB, wanted to move gradually towards teaching in English. Now, we weren’t going to compete with one another (laughs)! So as of 2009, Deans and Vice-Deans met regularly to look at ways of collaborating. And then the next year, I’ll never forget it: I had prepared a plan, we met in a restaurant and two hours later the Bruface draft was on the table! It was very fast (smiles); the programme started in 2011...’

?: NOW WORKING BEHIND THE SCENES OF BRUFACE, IN PARTICULAR RECORDING ITS STATISTICS FOR ALMOST SIX YEARS, YOU OBSERVE CERTAIN TRENDS. WHAT WOULD BE THE FIRST ONE?

J.D.R.: ‘This is probably the most striking one: registration applications just grow and grow! The Electromechanical Engineering section, for example, went from 48 applicants in 2016 to 120 in 2020. But this is the master’s course with the most candidates. The trend in the other sections is sometimes less substantial. Electricity went from 47 to 68, Chemical and Materials from 27 to 52, Civil from 49 to 72, and Architecture from 38 to 39...’

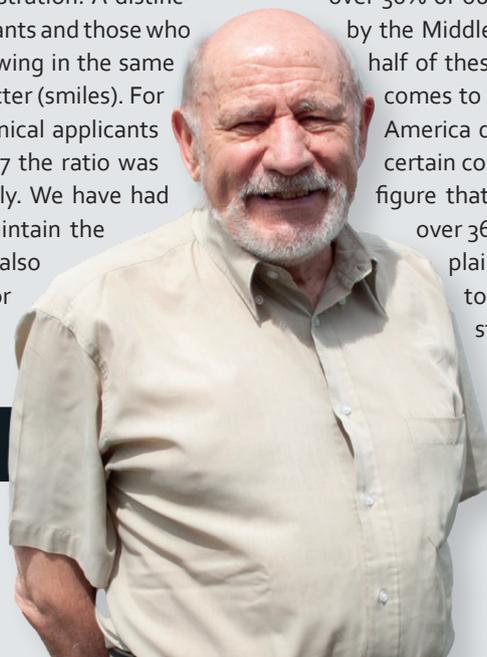
?: DOES THIS PROVEN APPEAL OF THE PROGRAMME LEAD TO A SIGNIFICANT EXPANSION IN THE RANKS OF THE STUDENTS?

J.D.R.: ‘No. Because there is a whole procedure to follow from filing the application to final registration. A distinction has to be made between the applicants and those who are accepted, and the latter aren’t growing in the same numbers because we have become stricter (smiles). For example, out of the 120 Electromechanical applicants in 2020, only 67 were accepted; in 2017 the ratio was very different, at 98 and 74 respectively. We have had to adjust the requirement level to maintain the high quality of the programme but also to increase the chances of success for everyone. I looked at the correlations

between the pass rates and various parameters; the striking thing is that the amount of mathematics taught to bachelor students plays a very important role. And then, after the admission stage comes registration. Now, international mobility also encourages some people to go what we might call university “shopping”, and they may then decide to join another institution. Usually for social reasons. For example, in some Scandinavian countries, despite their reputation for being expensive, the social benefits for foreign students are very developed: as soon as they have been accepted, they receive free student accommodation. From this point of view, we don’t compete (smiles). I said 67 students were accepted for Electromechanical in 2020. That led to 21 registrations. The figures for the next few months will tell us more about the consequences of the health crisis.’

?: IN 2011, WHEN BRUFACE WAS LAUNCHED, A TOTAL OF 27 FOREIGN STUDENTS JOINED ULB AND VUB STUDENTS. THEY CAME FROM IRAN, TURKEY, INDIA AND ROMANIA (G SQUARE #1, DECEMBER 2011). HAS THEIR NUMBER INCREASED OVER THE YEARS? WHAT ABOUT THE BREAKDOWN BY COUNTRY?

J.D.R.: ‘They may be considered to have almost tripled in number in ten years, because there were 71 non-European students for the 2019-2020 academic year. The representation of certain countries can evolve in line with the agreements concluded between universities, as was the case in 2011 with Romania. Our statistics are broken down by region of the world and the Far East comes out on top, with over 30% of our international Bruface students, followed by the Middle East with 25%. So they account for over half of these students. By way of comparison, Africa comes to slightly over 19% while South and Central America don’t reach 6%. The question of grants for certain countries can have an impact as well. But the figure that stays with me is that in five years, with over 360 students, I have only recorded one complaint (laughs)! It was about rather unsatisfactory results... But I like to guide and help the students. It’s very rewarding work.’



BARON JACQUES DE RUYCK
EMERITUS PROFESSOR VUB

JOINT PHDS

From ULB-VUB and beyond!

Future philosopher or engineer? Taking a pragmatic approach, **Maxime Defour** opted in favour of a Bruface Master's degree in Chemical Engineering and Material Science, without losing sight of the human aspect. He is now Group Transformation Project Leader at Solvay.

Maxime Defour, who comes from a small village in the La Louvière region where he was born on 1 October 1988, really embraced his studies at the School and the life around him... 'I met few people from different backgrounds in my little part of the world (smiles). Arriving in Brussels to start my bachelor's course in Civil Engineering in 2007 was a big change and an enriching experience, and the chance to take it a little further with Bruface was a logi-

cal choice.' Particularly after having chaired the Boards of European Students of Technology association (BEST, best.eu.org)! So he was part of the first group to start the programme, ten years ago now...

STARTING FROM SCRATCH

Having studied with the same classmates for three years during his bachelor's course, Maxime Defour does not feel that the Bruface master's course came as a culture shock, in the sense of a confrontation, once he came into contact with students from other countries and from the VUB. 'It was back to square one in terms of relationships with other people and this can lead to a certain distance at first, but the main thing is to get to know one another. Meeting peers whom we don't know, who have other ways of viewing studies - at the end of the day this is what prompts us to adopt an open-minded attitude, which we may have experienced less with a more traditional master's course.'

As well as this quality of the programme, like all those who have been through it he also points to the benefits of the international nature of the course and the opportunity to practice English. 'I wasn't very good at this language, so I was relieved to have a better command of it by the end of my time at university. Being unable to speak English properly is a real handicap in many companies.'

MULTIPLYING THE STRONG POINTS

His doctoral thesis proved to be a revelation. 'I did it at the VUB and I can tell you that I would not have considered this if I had not been aware of certain research underway at the VUB. Because that's the power of Bruface, too. Being able to take advantage of the strong points of both universities. In my view, that's when the real ULB-VUB path began.'

Eight years after having obtained his Bruface diploma (2013), and then his doctorate (2018), not forgetting an Advanced Master's degree in Management at the SBS-EM along the way (2016), after three years with McKinsey & Company, Maxime Defour joined the Solvay group. Do these experiences prompt him to make any recommendations for the future of Bruface? 'The programme should perhaps take more account of the realities on the ground in industry and business, by bringing people from professional spheres into the academic teaching staff from time to time. This could be combined with placements.' To be continued in the next issue... ▾

«The added value of Bruface took shape while I was doing my thesis in a lab at the VUB»

Maxime's advice for future Bruface students: 'Make the most of the student associations to gain positive experiences and learn to get to know one another.'



MUTUAL ENRICHMENT

▼ **The testimonials from these two Alumni** reveal the wealth of the ULB-VUB merger around Bruface, from classrooms to labs.

▼ **Brussels makes its mark as a great place** for a programme that is centred around multilingualism and multiculturalism.

▼ **Teaching in English,** is the link between students from around the world and a future international professional environment.

Upon completing secondary education, she saw herself as an engineer and an airline pilot... **Liesbeth Arnouts** finally ended up at the ULB-VUB. Having obtained a Bruface degree in Architectural Engineering in 2017, she is now working towards her double PhD degree as a researcher at the FNRS.

Originally from Aalter, Liesbeth Arnouts (b. 1992) began her studies at the Royal Military Academy (RMA) in Brussels in 2010. Her goal was to become a pilot in the Belgian Defence Forces, but she resigned after two years. "Although I was still interested in science and technology, I wanted to add an artistic element to my curriculum by studying architectural engineering. As I am interested in a variety of topics, I value a cross-disciplinary education." During her two years at the RMA, she fell in love with Brussels. "Being the capital of Europe, it has a unique atmosphere due to its variety of languages, cultures and nationalities. It was an obvious choice for me to stay in Brussels for my engineering studies in 2012. Although I chose to complete my bachelor studies at the VUB because of its location, I quickly embraced the VUB's values, such as critical thinking and freedom of research. I was thrilled to continue my Master's studies at both the VUB and ULB as part of the Bruface program."

TWO IN ONE

Liesbeth Arnouts was impressed by the international focus of Bruface and the expertise of the professors at both universities. Time proved her right. "The synergies became most obvious during my research for my Master's thesis. I had supervisors from both the ULB and VUB, which allowed me to combine their specific knowledge about computational mechanics (ULB) and deployable structures (VUB). Since my research on bistable scissor structures was at the crossroads of different disciplines, it would not have been possible without the collaboration between the two universities. After obtaining the highest grade for my thesis, and some awards during the graduation ceremonies (yes, there are two ceremonies for Bruface students), I obtained funding to continue my research as a PhD researcher. Doing a PhD at both the ULB and VUB has certain advantages, such as the availability of more expertise, a double PhD degree, two workspaces, and twice as many parties." But the downside is twice as many administrative documents, she adds with a smile.

FOLLOW YOUR PASSIONS

In conclusion, Bruface has helped her take flight. "A strong point of Bruface's architectural engineering program is the degree to which you can choose courses that are of interest to

you. The path I chose, for example, with courses on finite elements and structural optimization, gave me a particular profile as an architectural engineer that currently allows me to carry out research that is located between architectural, civil and mechanical engineering. I would recommend future students to enjoy their journey towards becoming an engineer. It might be a good time to determine or discover what kind of person you want to be." *vrer, au quotidien, de l'eau potable à la population.»* ▼

«My research would not have been possible without the ULB-VUB collaboration»



Liesbeth's wish for Bruface's future?
"The ULB and VUB each have their own administrations. My advice would be to try to combine both systems in a better way."

LOOKING BACK AT BRUFACE

From experience to programme

They were among the key figures in the establishment of Bruface when they were professors and then deans. Annick Hubin from the VUB and Gérard Degrez from the ULB. Assessing an initiative that moved the boundaries, internally and internationally, and still has more to offer....



Annick Hubin, Dean of the Faculty of Engineering VUB from 2012 to 2016, and Gérard Degrez, Dean of the École polytechnique de Bruxelles from 2014 to 2020.

Brussels University Alliance (ULB-VUB). Alain Delchambre, Chairman of the ULB Board of Directors at the time, announced the introduction of the first masters degrees in English as part of Bruface, an initiative of the École polytechnique de Bruxelles and its counterpart at the VUB, under this joint label in the G Square No 1 of December 2011. The Brussels Faculty of Engineering (Bruface) had just seen the start of its first academic year, with four Master of Science degrees (MSc): 'Architectural Engineering', 'Civil Engineering', 'Chemical and Materials Engineering' and 'Electromechanical Engineering'. 'Electrical Engineering' has since been added. Many students at the ULB and the VUB instantly opted for these programmes taught in English. One of these was Aurélie Bellemans (our inset), who was joined by 27 candidates from other countries (out of a total of 170 applicants). Alain Delchambre referred at the time to a 'pilot scheme' which has now reached its tenth year.

THE FORERUNNERS

A pilot scheme? Definitely, in the sense that various obstacles hampering its full implementation still had to be overcome. However, it was also the result of wishes and needs that had been clearly expressed for a number of years. "There were forerunners to Bruface", Gérard Degrez stresses. "One of the first of these was the agreement reached in the context of the Aeronautics specialisation, an initiative taken by Jacques De Ruyck (see p. 9) from 2006. It brought together not only the ULB and the VUB, but also the Erasmushogeschool Brussel, HE2B ISIB and the École Royale Militaire. The idea at the time was to pool courses so as to put together a more attractive programme. The Chemistry and Materials department then followed suit, first by sharing a few courses and then, a year before Bruface got under way, by putting in place a common programme."



AURÉLIE BELLEMANS, THE FIRST 'FEMALE BRUFACE PROFESSOR'

ONE OF THE FIRST GRADUATES

Thirty-one-year-old Aurélie Bellemans' career bears the Bruface seal. Having been fascinated by aeroplanes since she was very young, she naturally studied Civil Engineering at the VUB, in the Aeronautics section. "Bruface started in 2011 and many of us registered to take the master's course! Obtaining diplomas from the ULB and the VUB was advantageous, as was learning English, and we made some fascinating international contacts." She obtained her joint master's degree in Aeronautics and Electro-Mechanical Engineering in 2013.

BACK TO HER ROOTS

With the exception of a post-doctoral course at the University of Texas (Austin, 2018-2019), she has crossed back and forth between the ULB and the VUB. Their alliance has widened the scope of possibilities. "Coming from the VUB, through Bruface, I met professors from the School, Gérard Degrez and Alessandro Parente, who guided my scientific career." She saw herself working at Airbus or Dassault, but she was to choose an academic path. After an FNRS grant at the ULB, she was taken on as an Assistant Professor at the VUB. "I teach at the ULB, as well. It's like going back to Bruface!"

"It is indeed the result of a process that had already started," Annick Hubin confirms. "This joint programme also came about because our universities no longer had specialists in certain subjects. That's why I joined the initiative with my Electrochemistry course, to strengthen the programme at the ULB. "This is one of the Bruface innovations: pooling certain areas of competence made it possible to expand the course range, something which the universities would probably not have been able to achieve alone due to the reduction in available resources.

THE DIPLOMA

The Bruface 'laboratory' often settled temporarily in meeting rooms at the ULB and the VUB, at first falling victim to administrative hassle... The two institutions have different teaching platforms and different classroom management and timetable systems. In such conditions, it is sometimes difficult to bring together students on the same course, depending on whether they have registered via the ULB or the VUB... Once these practical headaches had been dealt with, the nature of the Bruface diploma had to be specified. "We were balanced between the Flemish Community on the one hand and the Wallonia-Brussels Federation on the other, and they had different rules. In administrative terms, to a certain extent we had no option but to award a double diploma rather than a joint diploma, which was embarrassing", Annick Hubin recalls... Some students seeking a double diploma with the Université de Lille or the Politecnico di Milano ended up with a triple diploma! It didn't make much sense." Another difficulty overcome... "Fortunately, the move to a joint diploma came while I was Dean, in September 2015," Gérard Degrez says.

The CTI accreditation makes Bruface an international course in its own right

INTERNATIONALISATION AT HOME

When Bruface was launched, the ULB and the VUB had decided to maintain full courses in French and Dutch alongside the course in English, so as to reassure the students. But reality was to get the better of these programmes. "We very quickly abandoned this idea, because all the students registered for the English-language course!" Gérard Degrez exclaims. That really is the major innovation of Bruface, to the point where, on the French-speaking side at least, most universities have followed suit, moving to English for their masters courses. In some cases this is a little artificial, when most of the teaching staff are French-speaking, and so are the students... Our programme, with its cohort of international students from every continent, brought together all sorts of languages and English, as the language of Engineering, is their common denominator." "It's what we call 'internationalisation at home'. Our students can follow a course abroad and all at once young people from every corner of the planet join them at university, with varied cultural backgrounds. These interactions are fascinating, both for the future engineers and for the professors", Annick Hubin stresses. Add to that the accreditation by the Commission des Titres d'Ingénieur, the Commission of Engineering Titles, and you have a fully fledged unique international programme: Bruface. What is more, by opening up to the world, it encourages more women to follow these studies. And we don't have enough female engineers (smiles)!»



A STUDENT'S JOURNEY

From Bruface to the first job



Take a professor, a recruiting Alumnus and a young Bruface graduate... The account of their shared story depicts the 'Bruface generation'. The joint ULB-VUB programme is still in the early stages of the promises it holds for education, research and industry.

Starting out: Murilo Borges Masalskas. This Brazilian graduated from the Universidade de Sao Paulo in 2017 with a Bachelor's degree in Materials and Manufacture Engineering (a five-year programme equivalent to the Belgian three-year bachelor's cycle followed by a two-year master's course). During his studies, he did a placement as a researcher in the Faculty of Mechanical Engineering and Naval Architecture at the University of Zagreb in Croatia. Here's a detail that adds a small romantic touch to our story: that's where he met his partner, who comes from Brussels!

COSMOPOLITAN AND HIGH STANDARD

Murilo Masalskas began his Bruface programme in 2018, in the Chemical and Materials Engineering section, won over by its cosmopolitan nature and the high standard of the courses. "I come from Brazil, a country where everyone is extrovert and open, and I thought I would face some sort of barrier. But that was not the case! The Belgians were really welcoming, and meeting international students, from Cameroon, Bolivia, China and many other countries was very interesting. Despite the cultural differences, everyone in my class helped each other. Bruface was very important and useful to me. Ceramic, polymers, metals... I saw a bit of everything, and thanks to that, I could make my choice for the future. It confirmed that I have always had a greater affinity for metallurgy!"

A positive assessment from him! But if something nevertheless had to be improved? "I think that the improvements have already been made in the past. The standard of the international students' curriculum was good. Everyone was collaborative, with good background and ready to share it, so that they were able to follow the lectures and to keep up with the level of the ULB and the VUB. Nothing to complain about (smiles)."

THE NETWORK WORKS

And what if Bruface were, so to speak, to redynamise or even broaden the network of the School and its Alumni? Philippe Harlet (ICME 1979), CTO of CRM Group (Centre de Recherches Métallurgiques), senses a chance to extend recruitment sources here. "My job is to maintain contacts with European and other universities. We employ a lot of engineers and technicians from all around the world. We have a special contact with Stéphane Godet, professor in the Chemical and Materials Engineering section, for whom I was the industrial supervisor of his thesis (1998-2003). When he recommends a candidate to us, they always turn out to be good (smiles). I needed a metallurgist and Murilo Masalskas' profile seemed interesting. He got off to a fairly exceptional start in the company after his studies. He picked up on the way of working straight



▼ STÉPHANE GODET

CIVIL ENGINEER, MATERIALS SCIENCE, UCL 1998, PROFESSOR AT THE ULB AND HEAD OF THE MATERIALS ENGINEERING SYNTHESIS, RECYCLING SERVICE (4MAT)

«Whether you come from the VUB or the ULB, it's always a pleasure to present the philosophy behind Bruface and the strengths of this programme open to international students. It's very attractive to the outside world! Perhaps we should have created it a lot earlier? It showcases what is happening in Brussels universities in terms of their capacity to federate energies and resources, with a view to providing students with the best possible education.»



▼ PHILIPPE HARLET

CIVIL ENGINEER, METALLURGY, ULB 1979, CTO AT CRM GROUP

«Bruface widens the scope of recruitment sources for organisations with a strong multinational culture, like the Centre de Recherches Métallurgiques, the CRM Group. We are often on the lookout for specialised profiles to fill job vacancies in Belgium, even though we develop activities throughout the world, including in South or North America, Asia and South Africa. So the CRM Group can contribute to the international mobility of young graduates.»



▼ MURILO BORGES MASALSKAS

MASTER'S DEGREE, CHEMICAL AND MATERIALS ENGINEERING BRUFACE 2020, PROJECT LEADER AT CRM GROUP

«You can see the different backgrounds of people, the different ways of interacting. Besides the scientific background, I feel that Bruface really taught me how to deal with the world and with some environments where I'm going to work with people from different cultures. This is something that cannot be taught, it's like an environment that you are in and that was really important for me in a very cosmopolitan city such as Brussels, and also for working at CRM Group, a company with many international workers.»

away, inquiring about experiences around him. I think he's had very good training. This is our first international Bruface student and it's very encouraging for the future. Not only because of his personality, but because he easily gets into metallurgy problems that he has never encountered before."

OPTIMISATION THROUGH RESEARCH

Let's remember that the creation of Bruface will also have provided an opportunity to rethink the courses in the five master's degrees concerned by pooling resources. As regards Chemical and Materials Engineering, Stéphane Godet is delighted with the work accomplished. "There is clearly a wish to offer a course that benefits from the expertise of our universities, the ULB and the VUB. And because this is a master's programme, to provide it with the research activities developed by the different services. For example... Marie-Paule Delplancke and I, in collaboration with Iris De Graeve, Herman Terryn and Tom Hauffman from the VUB, we have combined the hours set aside for practical work so that the students, working in small groups, can try out a research project for six weeks, supervised by doctoral and post-doctoral students in the laboratories, a project that is directly linked to the topic of the researchers' work. So it's a sort of 'mini-thesis' bringing together ULB, VUB and international students in the same group. Hence the importance, stressed by Murilo Masalskas, of having students of a certain standard, opened to mutual aid. It works very well!"

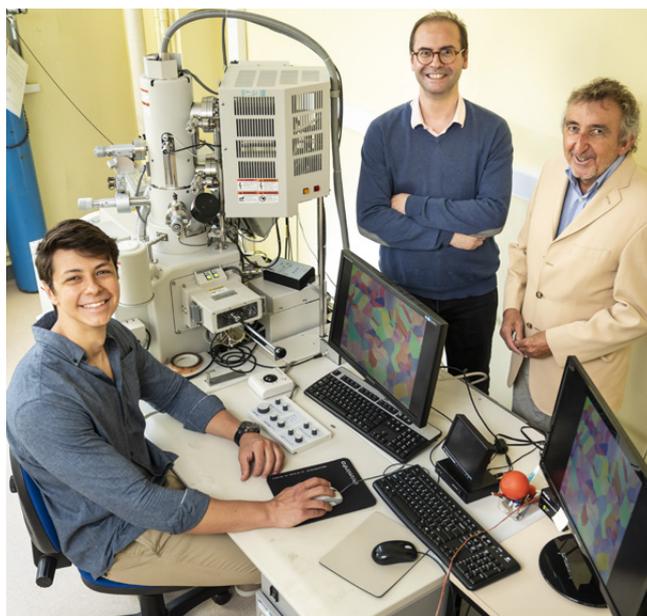
This represents a major investment in terms of experimental resources (provision of laboratory equipment), human resources and time... "That's right, the researchers agree to invest in this and in return, it has to be a 'win-win' situation: the results produced by the working groups have to be of use for the research work under way." A particular feature that appeals to Philippe Harlet: "This is perhaps one of the reasons why Murilo Masalskas found his feet in the CRM Group straight away. In the past, the practical work was far more individual and targeted, less focused on resolving a problem. This problem-based teaching method seems to me to be far more in line with the way things work in industry."

UNITED WE STAND

The Bruface programme also makes it possible to conclude new agreements with engineering schools beyond our borders... "Again with my colleague Marie-Paule Delplancke," Stéphane Godet goes on, "we devised a joint Chemical and Materials Engineering diploma with the École Européenne d'Ingénieurs en Génie des Matériaux (EEIGM), in Nancy. It's an extremely international school! The students there receive very good language training. The authorities

at the EEIGM were immediately won over by the philosophy behind Bruface, established in a cosmopolitan capital. Since then, we have welcomed around a dozen students from Nancy to Brussels every year, representing a melting pot of nationalities!"

One example of the many prospects that still await the joint ULB-VUB Bruface programme, among others, such as the budgets allocated to research by the European funds, etc. Meanwhile, we wish Murilo Masalskas an exciting and enriching career! ▶



CHEMISTRY AND MATERIALS: THE ORIGINS OF THE CONVERGENCE

- ▶ As Gérard Degrez points out in this issue (see p. 12), Bruface had forerunners. «These include Stéphane Godet's Chemistry and Materials Science section... "We began to forge closer ties with the VUB over ten years ago now, first with joint courses in English and then with the development of a joint section programme.»
- ▶ The Bruface dry run? «The idea was to see whether the formula could take in a medium-sized section. We opened up the way a little by showing that we can teach together and that this can lead to joint research.»
- ▶ After this positive outcome «A working group was formed to set up a joint 'polytech' study programme combining courses taught at the ULB and the VUB. The rest is history. Read all about it in this issue of G Square...»



Live from the labs



JOINT ULB-VUB RESEARCH



Prof. Alessandro Parente:
"We underestimated the added value of interacting together."

A BRITER FUTURE

Convergence is at work in education, via Bruface, and in research. With BURN, Alessandro Parente enlisted the School in the dynamic of the Joint Research Groups created by the ULB and the VUB. His next step: to establish a joint institute, BRITE, which starts today.

September 2014. The ULB and the VUB pool their strengths through a strategic collaboration project called Joint Research Groups. All the faculties at the two institutions are asked to develop tandems here with a view to welcoming PhD students, publishing work and increasing their visibility and appeal under a single banner. In the project, the School comes together with the CHsB (Brussels Research Centre for Construction Histories, chsb.ulb.be), involving the BATir service... "We followed the flow, in January 2015, when Francesco Contino at the VUB and I created BURN, a research group on combustion and robust optimisation", says Alessandro Parente.

Critical mass and team building

By pooling their teams and their resources, the Aero-Thermo-Mechanics department (ATM) at the School and the Department of Mechanical Engineering (MECH) at the VUB

strengthened their cooperation, of course, but they also introduced five Joint PhDs and increased their international representation. "Presenting ourselves as a large research group gave us an advantage both at national level, to respond to calls such as the one from the Energy Transition Fund financed by the federal government (the Best project), and at European level, explains the one who, in 2016, obtained a Starting ERC Grant, support for young European researchers to build a team (the VADEMECOM project, VALIDation driven DEVELOPMENT of Modern and Efficient COMbustion). At personal level, I also took part in projects supported by the Marie Skłodowska-Curie programme." With seven permanent professors and 45 PhD students, BURN was to attain a critical mass that does not go unnoticed... "When you apply for funding, it is important to display a sound background. Pooling our forces puts us in a stronger position in terms of international competition." Without obscuring the friendly relations that are so important at the heart of the teams... "When a Joint Research Group is set up, the ULB and the VUB provide support funds. We used this for team-building activities. I realise that we underestimated the added value

of interacting together. Each time, we come away with ideas for papers and new research (smiles)."

The Bruface philosophy

Emulation that today brings us a new Joint Research Group, made official last June and set to become an umbrella structure: BRITE, the Brussels Institute for Thermal-Fluid Systems and Clean Energy. "BURN will become part of this, because we aim to set up a project more broadly dedicated to energy, open to all the teams at the VUB and at the School that invest in it. This institute is to become a centre of excellence in the Brussels region that will give us access to more resources to cope with the next scientific challenges, and will further increase our visibility on the international scene. This is fully complementary and in line with the Bruface philosophy."

So what does Alessandro Parente think about Bruface? "It does a lot of good! On two levels... From the point of view of education, this programme in English opens us up to international students who come and enrich our entire community. Plus it makes us more attractive when it comes to recruiting professors. Some talented individuals would perhaps not apply if Bruface did not have an international dimension." / **Hugues Henry**



burn-research.be

**▼ VÉRONIQUE HALLOIN**

The Ambassador of France in Belgium awarded the Legion of Honour to Véronique Halloin (ICChi 1986), secretary-general of the FNRS, former professor of the EPB, director of the Department of Chemical Engineering and president of the EIB. This distinction honours a woman of science whose commitment to knowledge and cross-border cooperation has been constant and remarkable.

**▼ JULIEN GARCÍA ARENAS**

Julien García Arenas (ICEM 2020) won the 2020 price of the Electricity and Gas Regulatory Commission (CREG), which was awarded to the best Belgian thesis devoted to the energy sector. Co-led by Patrick Hendrick (ATM) and Pierre Henneaux (BEAMS), the work, developed under the Paris Agreement on climate change, focused on the exploitation of synergies between energy vectors in integrated systems for the transition to a carbon-free energy economy. Julien now works as a researcher at ATM.

DEARLY DEPARTED...

- ▼ **Jacques Decamps** (ICMET 1966)
- ▼ **Edgard Goelen** (ICC 1952).
- ▼ **Prof. Pierre Servais**

We extend our sincere condolences to the family and loved ones.



Frédéric Raevens

Homage to Pierre Servais

Pierre Servais passed away on 7 August. Professor at the Faculty of Sciences, he was director of the Department of Ecology of Aquatic Systems in the Interfaculty School of Bioengineers (see G Square #39). His research, both fundamental and applied, focused on the activity and diversity of bacteria in various types of aquatic environments and has been the subject of impressive scientific production and international recognition. His collaborators will always keep in mind the image of Pierre as a passionate and rigorous scientist. His researchers remember, in particular, the numerous, tiring sampling campaigns carried out in rivers or at sea, but which Pierre organised with remarkable efficiency and great conviviality.

Pierre was a teacher greatly appreciated for his pedagogical qualities. He set up and contributed significantly to the master's degree in Bioengineering in Environmental Sciences and Technologies and, as president of the jury, always ensured its management and development through successive higher education reforms.

He also chaired the Interfaculty School of Bioengineers from 2012 to 2014. He was a very active president, attentive to everyone, and he passed on to his successor his enriched vision of the future of our School. He has always been concerned with maintaining a strong cohesion between its members and has, through his attitude and his work, greatly contributed to the serene atmosphere of the School. We will retain his numerous interventions in the various councils and commissions in which he systematically participated until the end of his career. Perfectly targeted and supported, his interventions provoked energetic and enlightening discussions. Even when he disagreed, Pierre listened to the arguments of others and was always open to compromise.

Beyond the brilliant scientist, the much-appreciated professor and the efficient and relevant manager of our School, we will also remember his human qualities. Pierre took part with pleasure in all the Agro balls and barbecues, proclamation dinners, EIB festivities and other traditional drinks and meals that we organised. He never failed to create an opportunity to join us and spend unforgettable convivial and festive moments during which he forged true friendships. Through his desire to bring people together, he has greatly contributed to developing a team spirit, which is a great strength of our School.

We will always be very grateful for all that he has achieved for our institution and all that he has brought on a personal level to many of us. His commitment, his foresight, his modesty and his humour will be missed. / **Charles De Cannière, Isabelle George, Dimitri Gilis, Frédéric Debaste and Philippe Bogaerts**





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