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OPEN SCIENCE

Open science – what's the matter?

The first time I heard someone talking about open science a few years ago, I first thought naively: "What's the matter? Important values of science have been always openness, collaboration and sharing." When the first academic societies and journals appeared nearly 400 years ago, they aimed for the free sharing, circulation and spread of scientific knowledge. But, as Professor Brian Nosek from the Open Science Centre points out, information sharing within the scientific community has changed over the last few decades, becoming more "closed" and less accessible.

For example, if you are at a university in a developed country, you probably do not realize how costly it is to access scientific literature. Looking for data from other scientists is a headache-inspiring process as the amount of data available grows exponentially, there are multiple data formats and the metadata is not standardized. You are overloaded with grant and paper writing because that is how your scientific career is valuated, and you keep complaining when citizens do not understand why research requires so much investment.

Citing the words of European Commissioner Carlos Moedas, open science is a "new approach to the scientific process based on cooperative work and new ways of diffusing knowledge by using digital technologies and new collaborative tools". Since 2016, I have had the privilege of representing the EU-LIFE alliance (www.eu-life.eu) at the European Open Science Platform (OSPP). VIB and CRG, the institute where I work, are co-founders of EU-LIFE, an alliance of 13 European institutes in life sciences that want to have strong voices in European science policy. The OSPP is a multi-stakeholder group with representatives from universities, research centers, learned societies, publishers, libraries and funders to advise Commissioner Moedas in developing and implementing a European policy agenda on open science. Being part of the OSPP has been a very enriching experience that has allowed me to exchange views and build joint recommendations on open science.

We can think of open science as a growing tree branching out to bring open access to scientific literature and data to scientists and society, and

Michela Bertero

open participation with many different actors to enrich science with multiple views and methods. To make open science more "concrete", the OSPP is currently working on eight priorities: open access to publications, FAIR (findable, accessible, interoperable and reusable) data, the European Open Science Cloud, citizen science, research integrity, skills, rewards and incentives, and next-generation metrics. After spending a few years working in this field, I am now convinced that open science does indeed matter to all of us involved in research, as well as society at large. Are you sharing your data in FAIR databases? Are you publishing your work in preprint repositories? Are you enthusiastic about engaging the public in your research? I would be very happy to hear your views on these topics and trigger the discussion at EU-LIFE and the OSPP. Let's work together to make open science happen!

Michela Bertero
Head of International and Scientific Affairs, Centre for Genomic Regulation, Barcelona
Member of EU-LIFE strategy working group
Member of the European Open Science Policy Platform

OPEN SCIENCE

SCIENCE MEETS SCIENCE

SCIENCE MEETS TECHNOLOGY

SCIENCE MEETS BUSINESS

SCIENCE MEETS PEOPLE

EVENTS

On the cover:
Visit of Sir Greg Winter to the VIB-UGent Center for Inflammation Research
Front row from left to right: Hamida Hammad and Savvas Savvides
Second row from left to right: Dirk Elewaut, Greg Winter and Rudi Beyaert

HOW LENNART MARTENS AND PAOLA MASUZZO ARE SPREADING THE WORD WORLDWIDE:

OPEN SCIENCE IS HERE TO STAY

THE SOONER WE EMBRACE ITS PRINCIPLES, THE BETTER

In the last couple of decades, making research output public or using freely available data has become a widespread practice. But although open science is gradually but irreversibly becoming the new standard, much groundwork still needs to be done. To rally more people around the approach and to further integrate it into day-to-day lab work, the hearts and minds of individual scientists have to be conquered as well. That's what the recent paper titled "Do you speak open science?" by Lennart Martens and Paola Masuzzo of the VIB-UGent Center for Medical Biotechnology is all about: offering a handy open science user guide to researchers, laboratories and the scientific community at large.

In their highly acclaimed paper, Lennart and Paola describe why many researchers are often in the dark about how they can contribute to open science. Because the term has only gained momentum recently, its definition and implementation are constantly shifting and evolving. Nonetheless, four distinct pillars can be distinguished: open data (online data that is free to download, copy, analyze, re-process or use), open source (freely available software code), open access (unrestricted access to scientific papers and articles) and open peer review: reviewers' names and comments are published alongside the article, and sometimes review is even opened to anybody who wants to contribute through a process similar to commenting on a blog post.

STANDING ON THE SHOULDERS OF GIANTS

Obviously, Paola and Lennart walk the talk: their paper was published on PeerJ Preprints, an open access journal. Even more, they submitted the article as a 'preprint': a draft that wasn't submitted for formal peer review, yet allowed readers to leave comments and ask questions. The guide caused quite a stir among scientific communities, it was tweeted and cited all over the world, and it was even used as one of the source texts for a report of the European Commission's Working Group on Education and Skills under Open Science.

Lennart, how did you become such an ardent proponent of open science?
Lennart: "Around the year 2000, I was working in the software industry. As a keynote speaker at a Microsoft event, I met Marc Portier, a fellow IT specialist who was a great supporter of open source code. In software, making code freely available and building on each other's work has a long tradition: it clears the path to faster and better innovation. I became intrigued and delved into the subject, only to find out that the same principles apply to sharing data, articles and other output. When I began working at VIB a couple of years later, I designed PRIDE, the world's first public repository for proteomics data (see page 8, ed.). Witnessing the successes that we and other labs achieved with PRIDE only strengthened my belief in open science; this is how science was meant to be! After all, the metaphor 'standing on the shoulders of giants', describing the fact that it's easier to reach much further when you're able to climb on a solid foundation of existing work, dates back to the 12th century!"

Lennart Martens

Paola and you have been sharing your experiences and tips with the worldwide community through publications and talks. How important is this?
Lennart: "The battle for open science has already been won, and people need to realize that it is here to stay. The sooner you start embracing its principles, the better. All major funding agencies are moving towards open science as a prerequisite. Research under the Horizon 2020 umbrella, for example, requires publication in open access journals. And the Bill & Melinda Gates Foundation, one of the world's most influential funders, has even forbidden the publication of their funded work in journals such as Nature and Science. Other funders such as the Wellcome Trust may well follow this example. It's understandable that traditional publishers want to cling to their outdated but still very profitable business model. In due time, however, they will have no choice but to compromise."

Paola Masuzzo

Then what's next?
Lennart: "More and more funding bodies will follow. Eventually, top scientists will leave currently prestigious journals and adopt open access and open peer review. As a result, journal impact factors will shift, or even become obsolete. Let's be honest: we all know that JIFs are in no way representative of the value or impact of a single paper. Yet the pressure to publish in top journals pushes excellent scientists out of the academic world.

Having said that, the pace of this process is also determined from the bottom-up: researchers have to be aware of the possibilities of open science and identify what's in it for them."

The proof is, as usual, in the pudding. Can you give one example of a science domain or research field that has considerably benefitted from open science?
Lennart: "People with rare genetic diseases have benefitted tremendously from the Human Genome Project, which was assembled when scientists from around the world shared all their data. These findings have not just made it considerably easier to diagnose people, but also to pinpoint the exact cause of a genetic disorder – be it a spontaneous mutation or a hereditary issue."

How can individual researchers or labs join the growing community?
Lennart: "We can all take small steps. For example, you might try out open access journals or preprint servers, such as PeerJ Preprints or bioRxiv (see page 9, ed.). Furthermore, we need to train ourselves and our students to handle open data. There are numerous free data repositories out there, but sometimes it takes a while to get the hang of these. In terms of the required basic programming skills, data handling approaches, and statistics or machine learning methods, there's still a lot of work to be done at our universities. And my last practical tip is obvious: read our paper! (laughs)"

Masuzzo P, Martens L., PeerJ Preprints 2017

DEBUNKING OPEN SCIENCE MYTHS: HOW TO BUILD AN AIR-TIGHT CASE

When in a debate about open science, you might encounter some typical misconceptions. Here's how to tackle them:

1. "OPEN ACCESS WILL PAVE THE WAY FOR GARBAGE."

Why would it? Indeed, there are open-access journals that will publish anything, without peer review. But those media exist anyway, regardless of whether we make the final leap to open science or not.
By the way: fields like physics and mathematics run on open-access publications. So why wouldn't it work for life sciences?

2. "PARASITES WILL BE ABLE TO USE MY PRECIOUS DATA OR CODE."

If your work is used, you will normally get the same credit as you do now, through citations, tweets, endorsement, etc. In rare cases, source citation is forgotten – and even then, a polite request usually sets things straight. But in any case, it'll never negatively affect your future research.
By the way: shouldn't research produced with public funds belong to the public in the first place?

3. "EVERYBODY CAN TRASH MY RESULTS, MAYBE EVEN UNJUSTLY SO."

Below-the-belt comments are extremely rare. Just take a look at platforms such as PeerJ: they almost always spark interesting conversations. The concern is understandable, though, but it can work in a healthy way: scientists who open up their datasets usually take more ownership of their work and acquire their data with more scrutiny.
By the way: when did science stop being self-correcting anyway?

THE PERKS OF REPOSITORIES: WHY 'GREEN' OPEN ACCESS IS WINNING THE PLEA

To outsiders, open access may seem a no-brainer. But in academic spheres, the appropriate approach is subject for firm debate. There are roughly two avenues: green open access (self-depositing of articles in a repository), and gold access (journals as distributors). It goes without saying that the first approach is disrupting our current publication model much more, and that the second one is particularly popular among the publishers.

For scientists and institutes like VIB, green open access is, without a doubt, the preferred model. After all, freely available articles in the 'gold model' only meet the argument "publicly funded research belongs to the public" partially: in many cases, authors – in practice: their institution or funders – still have to pay publication fees. This means that governments or funders are paying double: for the research itself, and for the publication. In addition, this extra barrier can hamper the direct flow from research output to public knowledge.

REPOSITORIES ON THE RISE

The green open-access way relies on repositories, digital databases used to collect and preserve publications and data. There are three types:

- Institutional repositories collect the research output of scientific institutions. Depositing is only possible for researchers or authors affiliated with the institution.
- Subject repositories, or disciplinary repositories, collect the research output of one or several research fields.
- Data repositories are specialized in collecting and preserving data. Most are subject-based, although some of them collect data from all research areas. They can be found in the registry of data repositories: www.re3data.org.

Because increasingly more repositories are emerging, there's also one repository to rule them all: OpenDOAR. To date, it hosts to over 2,600 registered open access repositories.

UNIVERSITIES SETTING THE STANDARDS

Another advantage of green open access lies in the accessibility of research output. According to Inge Van Nieuwerburgh (Department of Research Affairs at UGent and open access devotee), everybody profits from the availability of archived results. "A researcher's or organization's reputation is, among other things, based on the transparency and acknowledgement of their research. If peers or students hit a paywall when they want to access results, they are less likely to refer to the original output. A repository makes your research accessible, interoperable and reusable. And because it is optimized to be crawled by Google, the research is easy to find as well."

A lot of universities are encouraging students and academics to use repositories. "The UGent repository, biblio.ugent.be, is integrated into the academic bibliography," says Inge. "And it is quite easy for researchers to immediately deposit their publications in other repositories as well, thanks to, for example, easy to use export tools. As a result, a high percentage of UGent publications are submitted to repositories."

THE WORLD'S FIRST PROTEOMICS DATABASE, ROOTED IN VIB: **SOMETHING TO TAKE PRIDE IN**

Many VIB collaborators are familiar with PRIDE, the public data repository of mass spectrometry-based proteomics data. Maintained by the European Bioinformatics Institute, the PRoteomics IDEntifications database was conceived by Lennart Martens of the VIB-UGent Center for Medical biotechnology during his Marie Curie Fellowship in 2003.

The idea of PRIDE grew alongside the rapid improvement of mass spectrometers. Increasingly more data was obtained, but the bulk of it couldn't be interpreted at the time. Instead of throwing 85% of this research output away, Lennart believed that making all the 'redundant' data accessible via a public database could benefit the entire proteomics community. He got the ball rolling, and in 2005, he established PRIDE as the first real proteomics repository. Other, similar open data initiatives were emerging around the same time, such as PeptideAtlas and the Global Proteome Machine Database.

PRIDE DATA AS BUILDING BLOCKS

PRIDE's importance in research cannot be underestimated. A considerable number of papers on genome annotation benefitted from PRIDE data, such as studies on long non-coding RNAs and genome re-annotation. Another example is the study of O-linked glycosylation, which used phosphorylation data in PRIDE to show surreptitiously co-enriched O-linked glycosylated peptides.

Finally, a very recent example is the VIB-UGent project titled 'the online Tabloid Proteome'. Based on thousands of PRIDE datasets, this approach maps out co-occurrences of proteins. This enables researchers to discover biological associations between pairs of proteins that are strongly complementary to binary interactions. As you may have guessed, the Tabloid Proteome is freely available at www.tabloidproteome.com.

EU-LIFE, IN THE VANGUARD OF OPEN SCIENCE

Open science is here to stay, which is all the more reason to really get to the bottom of this paradigm. Much more than open access to publications or opening our labs to the public, open science is a total systemic change to how research is performed. The question is: are we prepared for it?

The answer is, as usual, not so straightforward. Open science is gradually gaining ground on different levels. While several individual researchers and/or labs are proactively engaging in open science practices, EU-LIFE (the alliance of top European life sciences research centers, see eu-life.eu) is pitching in as well. To support open science implementation in a meaningful manner, EU-LIFE is representing us at the European Open Science Platform (OSPP).

So far, the work being done is mainly at the policy level. Michela Bertero of the Spanish Centre for Genomic Regulation is doing a great job of representing the EU-LIFE institutes in the OSPP. Together with the European Commission, she is mapping out policies that take the realities, points of view and needs of researchers and institutions into account. At the same time, VIB is discussing and brainstorming with the other EU-LIFE members at the institute directors' level. In this way, we are gradually establishing guidelines on how open science should or could be implemented in our organization.

Stein Aerts and Sara Aibar

WHO'S AFRAID OF BIORXIV?

WEIGHING THE PROS AND CONS OF PREPRINT PUBLISHING

BioRxiv, a free online archive where scientists can post draft papers known as preprints, is causing quite a stir in the world of life sciences. Although sharing papers online before they have been formally peer-reviewed isn't new – physicists and computer scientists have been doing it for decades – the leap into preprints still gives rise to divided opinions among biologists.

Launched in 2013 by the Cold Spring Harbor Laboratory (CSHL) in New York, bioRxiv currently holds more than 15,000 papers. Proponents of preprint publishing argue that it accelerates the pace of science and improves its quality. Although high-profile scientists have endorsed the system, many biologists remain wary and have only just begun to share their unreviewed papers. Is the shift towards open publishing uncharted territory for you as well? Here are some pros and cons to consider.

"Publishing a preprint provides you with early feedback, which enables you to improve the final version of the paper."
Stein Aerts

PROS	CONS
Manuscripts are out in the open **much faster**. They can be cited or commented on immediately, without having to wait for the long review process of traditional scientific journals.	**Not all journals accept papers that have been submitted to a preprint server.** However, many journals are updating their policies because of the rising popularity of preprints.
Establishing primacy: being the first on bioRxiv gives you the initial recognition of the finding, even if the peer-reviewed publication is later than the competition. This diminishes the opportunity for unscrupulous referees to 'sit' on your paper while they rush to get their own version out.	**Risk of 'preprint wars':** there is no regulation on checking 'preprint data' yet, so it's not unthinkable that scientists rush to publish similar work after reading a publication in bioRxiv.
Preprint publishing **fosters open science:** people without access to the official journals can read, comment on and cite your work.	**Risk of embargo violations:** if the press publishes results from a preprint server, this might hinder later publications in traditional journals.

Q&A WITH A BIORXIV PROPONENT

The Stein Aerts lab (VIB-KU Leuven Center for Brain & Disease Research) has been using bioRxiv for a while. Stein and postdoc Sara Aibar Santos, avid believers in the system, share their thoughts and experiences.

How did you start using bioRxiv?
Sara: "Our fields, bioinformatics and genomics, were among the first to deposit preprints in bioRxiv. That's probably because of the link with physics and mathematics, where preprint publishing has been common practice since the early nineties. BioRxiv helps us find useful papers that aren't published in peer-reviewed journals until months later. In new and fast-moving fields like ours, that's very important."

"Publishing a preprint provides you with early feedback, which enables you to improve the final version of the paper."

Why is it interesting for you to submit papers to bioRxiv?
Stein: "When we talk about our methods at conferences, releasing the preprint allows researchers to read more about the validation and parameters of the method. Given the slow process of peer review, bioRxiv lets us reach our audience much faster, which increases our impact. The fact that papers under review are already available for selection committees is also a clear advantage for young researchers that are applying for positions. Some funding agencies even allow researchers to include preprints in grant proposals."

Your latest paper on bioRxiv was also published in Nature Methods. Did you get any negative feedback from them?
Stein: "No, to the contrary: thanks to our preprint on bioRxiv, we gained early exposure and we felt more protected from being scooped. We also feel that journals are adapting to the new paradigm. Most of them participate in bioRxiv's manuscript transfer service and some journals even provide scooping protection based on the bioRxiv submission date."

Do you think life scientists will start using bioRxiv more widely?
Sara: "Although peer review remains necessary, journals are no longer the only way to distribute research results. The co-existence of both channels is causing some confusion now, but I hope that we'll end up with a more efficient publication process. Preprints will probably remain complementary to journals, but they put healthy pressure on the traditional channels to improve their system."

Do you see any disadvantages?
Stein: "Well, although many journals are updating their policies, some may still not like preprint publications. Another possible drawback is that the final publication has a decreased 'surprise' effect."

But you would still recommend it to colleagues?
Sara: "We have experienced nothing but advantages, so yes, absolutely. If you are presenting results at conferences, competitors already know your work anyway. Publishing a preprint provides you with early feedback, which enables you to improve the final version of the paper."

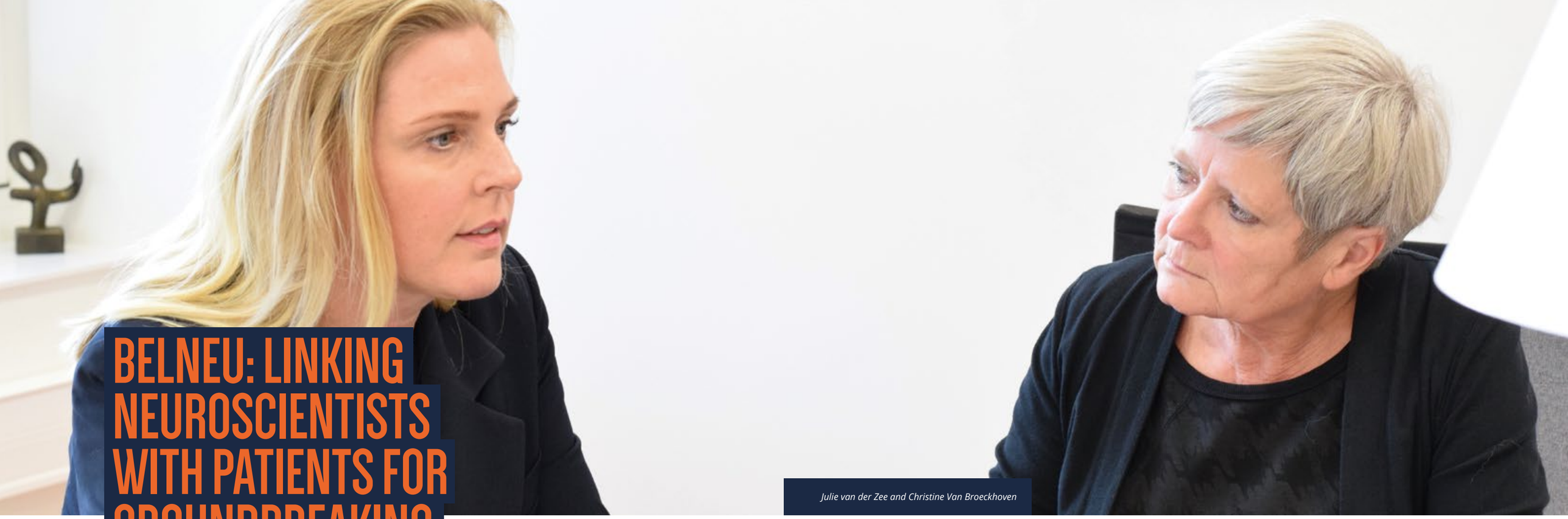
Aibar S *et al.*, Nat Methods 2017

"THINK TWICE WHEN IT COMES TO PATENTABLE INVENTIONS"

Although the benefits of bioRxiv are clear, VIB's head of IP Jan Demolder does make an important side note. "Scientists at VIB need to remain alert for potential inventions," he argues. "Once a preprint is uploaded, it becomes novelty-destroying for any future patent application. When the traditional publication route is followed, we usually start the evaluation of a novel invention when the paper is submitted for review. The review process, about 9 months on average, gives us more than enough time to prepare a patent application. Using bioRxiv changes this timeline, so scientists with a patentable invention that want to make use of the preprint publication route should contact our tech transfer team well before uploading the manuscript to the preprint server."

Further reading:
Bourne *et al.* Ten simple rules to consider regarding preprint submission. PLOS 2017.

Jan Demolder



Julie van der Zee and Christine Van Broeckhoven

BELNEU: LINKING NEUROSCIENTISTS WITH PATIENTS FOR GROUNDBREAKING RESEARCH

Part of the VIB-UAntwerp Center for Molecular Neurology, the research group led by Christine Van Broeckhoven has a long history of collaborating with neurologists and different neurological centers across Belgium. Multidisciplinary cooperation between molecular genetics research and clinical neurology has led to pioneering scientific breakthroughs. This network of researchers and clinics, called the Belgian Neurology (BELNEU) Consortium and coordinated by Christine Van Broeckhoven, has helped propel dementia and neurodegenerative brain research in Flanders into the global spotlight.

PhD students Sara Van Mossevelde and Hung Nguyen Phuoc, as well as staff scientist Julie van der Zee, collaborate with Christine Van Broeckhoven. They have only praise for the BELNEU consortium – which helped enable the pioneering success of two of their most recent publications.

Can you give us more details about BELNEU and its function?
Christine: "The BELNEU consortium is contributing to the systematic recruitment of well-documented research participants for clinical, molecular and genetic research. The consortium consists of partners active in 14 specialized memory clinics and neurology departments across Belgium."

Your lab recently produced two papers in collaboration with the BELNEU consortium. Tell us more?
Hung: "For our study, published in *Neurobiology of Aging*, we screened the gene NEK1, which is associated with increased risk of ALS. We discovered that NEK1 mutations were present in 1% of ALS patients in Belgium. Using cutting-edge sequencing technologies, we were able to identify several types of common and rare genetic variants in NEK1."

Sara: "Our paper, which was recently accepted for publication in *JAMA Neurology*, also features the genetic screening of patients. We studied 36 Belgian extended families with mutations in the C9orf72 gene, modeling age at disease onset, disease duration and age at death, and provided clinical evidence for disease anticipation of frontotemporal dementia and ALS in families with C9orf72 mutations, highlighting a decrease in onset age across successive generations."

Based on your results, what are the steps forward to new disease therapies?
Hung: "Our research supports a role for NEK1 in DNA damage response and repair processes within cells. We will further explore the cellular pathways of NEK1, since more insight into the pathomechanism will be essential to developing effective ALS therapies."

Sara: "A better prediction of onset age within a family segregating a C9orf72 expansion mutation might help doctors to define the right moment to start following up asymptomatic mutation carriers. Moving forward, doctors may be able to maximize patient quality of life and map out personalized treatment strategies."

What benefits does working with the BELNEU Consortium have on your research?
Christine: "Because of the collaboration with the BELNEU consortium partners, our lab has been able to significantly boost patient participation in our research."

Julie: "Large numbers of patients are necessary to obtain reliable genetic results. Consequently, we have several collaborative papers on behalf of the BELNEU Consortium that acknowledge both the scientists as well as the neurologists."

Nguyen, Van Mossevelde *et al.*, Neurobiology of Aging 2017
Van Mossevelde, van der Zee, *et al.*, Jama Neurology 2017

From left to right: Jean-Christophe Marine, David Nittner, Corinna Köhler and Florian Rambow

MELANOMA RESEARCH ACCELERATES WITH TWO NEW VIB BREAKTHROUGHS

The researchers of the Jean-Christophe Marine lab (VIB-KU Leuven Center for Cancer Biology) are continuously hard at work investigating cancer pathways – focusing particularly on melanoma. Their results have been nothing short of transformative, with two recent papers revealing key insights into the development of – and potential targeted therapies for – melanoma tumors.

Published in *Cell Stem Cell* and *Nature Cell Biology* the two collaborative papers are co-authored by (among others) Jean-Christophe Marine, PhD student Corinna Kohler, Staff Scientist David Nittner and postdoc scientist Florian Rambow. They're eager to give us the story behind their discoveries.

Jean-Christophe and Corinna, can you share a little bit about your paper?
Corinna: "We used a mouse model that recreates the early stages of melanoma development in humans. We observed mature melanocytes, or pigment-producing cells in the top layer of the skin, expanding, changing their appearance and then losing their normal 'melanocyte' characteristics before becoming malignant cancer cells. This was in direct contrast with the activities of other types of skin cells, such as nonpigmented or stem-like melanocytes."

What surprised you about these observations?
Jean-Christophe: "This data clearly shows that mature, differentiated cells can serve as the cellular origin of a tumor. This contrasts with most – if not all – other in vivo tumor lineage tracing studies to date showing that stem or progenitor cells are cells of origin – such as in intestinal adenoma and basal cell carcinoma."

Did you use any special techniques or technologies?
Corinna: "The up-and-coming single-cell RNA sequencing technique was an essential part of our study, as was in vivo time lapse imaging allowing us to monitor both morphological and molecular changes in melanoma-initiating cells from the moment they entered their very first cell division onwards. We were the first to combine these powerful techniques with in vivo lineage tracing approaches to study the very first steps of tumor initiation and development in vivo."

Jean-Christophe: "These mouse models set our study apart. By inducing cancer specifically on the tail skin of our mice, we developed a refined model that faithfully mimics key features of the human disease."

Florian and Jean-Christophe, your paper in *Nature Cell Biology* also yielded impactful results. Tell us more?
Florian: "We collaborated with the research group of Marie-Dominique Galibert at IGDR (Institut de Génétique & Développement de Rennes, France), discovering a new role for the protein-coding gene TYRP1. This gene is known to be involved in the production of pigment, but can also promote tumor growth in melanoma."

Did you find anything surprising about this discovery?
Florian: "What was most intriguing is that TYRP1 only promotes tumor growth through a non-protein coding function. A portion of the TYRP1 gene acts as a sponge, soaking up RNA molecules that fight tumors and making the environment more favorable to tumor growth."

Jean-Christophe: "Interestingly, we can use this observation to develop new therapeutics that block TYRP1's 'RNA-sponge' effect, restoring the RNA's potent antimelanoma activity. We demonstrated this possibility in our study using a well-accepted preclinical patient-derived xenograft (PDX) model."

How soon do you think we will see practical applications of this research?
Jean-Christophe: "The field of melanoma research is going through an exciting period, with more than 300 ongoing clinical trials. Targeted immunotherapy has made great strides in the last five years. However, resistance mechanisms that melanoma cells use to fight current treatment strategies remain important obstacles to overcome. The difficulties in treating melanoma stem from its very diverse tumor types and the plasticity of melanoma tumor cells. Single-cell genomics is emerging as a powerful tool for the study of individual cancer cells in high detail. This combined with our clearer understanding of the non-coding genome, we're closer than ever to thoroughly mapping melanoma dependencies and vulnerabilities."

"In other words: melanoma research is currently on a steep learning curve – we're gathering key information that will vastly improve the clinical management of melanoma patients."

Kohler, Nittner *et al.*, Cell Stem Cell 2017
Gidot, Migault *et al.*, Nature Cell Biology 2017

NEWLY DESCRIBED PROCESS IN PARKINSON'S PROTEIN AS A POTENTIAL NEW THERAPY ROUTE

Wim Versèes

An international group of researchers led by Wim Versées (VIB-VUB Center for Structural Biology) has unraveled the workings of an essential mechanism in 'Parkinson's protein' LRRK2. Their study demonstrates a direct link between the protein's 'dimerization' – two copies that are bound together –and mutations that lead to Parkinson's disease. This process could eventually lead to a promising therapy route. This research has been published in the leading academic journal Nature Communications.

Approximately 4 million people worldwide currently suffer from Parkinson's disease, and this number is only expected to increase. The most frequent genetic causes of the illness are mutations in the gene responsible for controlling the production of protein LRRK2, which includes two enzymes: a kinase and a GTPase. Because this kinase is at the root of neuronal problems, kinase inhibitors have already been clinically tested. However, these inhibitors eventually cause lung and kidney problems, making it imperative for scientists to seek alternative solutions.

Parkinson's protein comes in a single or doubled state

In close collaboration with Arjan Kortholt (University of Groningen), the team of Wim Versées sought a better understanding of LRRK2's complex structure. It is already known that the kinase portion of the protein is active in the protein's 'dimeric' or 'double' state, which involves two identical copies of the protein bound together.

Using this information as a starting point, the team investigated how this binding is established. To do so, the scientists observed similar proteins occurring in certain bacteria.

Wim: "The GTPase enzyme, a component of LRRK2, regulates the state of the entire protein. In doing so, it determines whether a LRRK2 protein is in its inactive 'single' state, or its active 'double' state. In addition, we saw a clear link between the protein dimerization and genetic mutations in Parkinson's disease. As a result, this regulation process constitutes an attractive new target for future drug development."

Arjan: "Our study is a milestone in the long-term scientific discussion covering the dimeric state of LRRK2 and its link with Parkinson's. But although this is a significant step forward, it will be quite some time before we understand all the details enough to manipulate the process."

Deyaert, Wauters *et al.* Nature Communications 2017

RESOLVING TRAFFIC JAMS IN HUMAN ALS MOTOR NEURONS

Ludo Van Den Bosch

A team of researchers at VIB and KU Leuven used stem cell technology to generate motor neurons from ALS patients carrying mutations in FUS. They found disturbed axonal transport in these motor neurons, but also identified genetic and pharmaco-logical strategies that mitigate these defects in cells.

Amyotrophic lateral sclerosis (ALS) is a deadly, incurable neurodegenerative disorder. Patients experience progressive paralysis because both upper and lower motor neurons waste away.

There is no clear explanation as to why these motor neurons selectively degenerate. Several clues helped build the 'dying-back hypothesis', which postulates that ALS causes distal axons to lose their function and retract. It would explain why the longest and most energy-demanding motor neurons are among the most vulnerable ones.

FUS and transport defects

Genetic forms of ALS are rare, but can provide important insights into the disease mechanisms. One of the four major genes mutated in familial forms of ALS is FUS.

In collaboration with the Verfaillie lab at KU Leuven, the team of Ludo Van Den Bosch (VIB-KU Leuven Center for Brain&Disease Research) generated induced pluripotent stem cells from ALS patients with different FUS mutations. In this way, they could generate a new human neuronal model for the disease. Motor neurons derived from these stem cells showed typical cytoplasmic FUS mislocalization and hypoexcitability, but also progressive axonal transport defects of different cargoes, a pathological feature never observed before in these cells.

Wenting Guo from the Ludo Van Den Bosch group explains: "Distal axonal sites are highly dependent on the supply of energy-producing organelles and other cargo's from the cell nucleus, so the implication of axonal transport in ALS is not surprising. It is an important step that we can reproduce this feature of the disease in cultured human motor neurons."

Axonal transport problems of mitochondria were previously described in models of mutant SOD1, which is also linked to familial ALS. In the case of SOD1, the transport defects were attributed to morphological changes in the mitochondria, but FUS mutations do not lead to gross mitochondrial damage. Wenting: "Thanks to the expertise of our electron microscopy platform, we could demonstrate that mitochondria in FUS mutant neurons look healthy."

HDAC6 to the rescue

CRISPR/Cas9-mediated genetic correction of the FUS mutation rescues the axonal transport defects, underscoring the specificity of the pathology. However, more interestingly, pharmacological inhibition or genetic silencing of HDAC6 also restores the axonal transport defects.

Ludo: "HDAC6 deacetylates the building blocks of the microtubules, the tracks used for axonal transport. When HDAC6 is inhibited, acetylation increases and axonal transport is improved. This may prevent axons from dying back."

While he stresses that axonal transport dysfunction is only one aspect of the disease mechanism, Ludo is optimistic: "Axonal transport could play an important role in ALS pathology and HDAC6 inhibition could become a promising therapeutic approach, although stopping retraction alone might not be enough as a single therapeutic strategy."

Guo *et al.*, Nature Communications 2017

IDENTIFICATION OF A NOVEL CELL DEATH CHECKPOINT IN THE TNF SIGNALING PATHWAY

Inge Bruggeman, Tom Delanghe , Yves Dondelinger, Tinneke Delvaeye, Mathieu Bertrand, Peter Vandenabeele, Dario Priem, Diego Rojas-Rivera

Tumor necrosis factor (TNF) is a proinflammatory cytokine that plays a very important role in orchestrating the immune response. Nevertheless, inappropriate signaling by TNF can also be detrimental and implicated in a variety of human inflammatory diseases, such as rheumatoid arthritis, inflammatory bowel disease and psoriasis. The pathogenic role of TNF in inflammatory conditions has long been thought to result from the ability of TNF to induce expression of a wide panel of proinflammatory mediators, but more recent studies have demonstrated that binding of TNF to its cognate receptor also promotes inflammation by inducing cell death, in the form of apoptosis and necrosis. Interfering with cell death induction therefore emerges as a promising therapeutic approach for the treatment of inflammatory conditions.

The research team of Mathieu Bertrand in the group headed by Peter Vandenabeele (VIB-UGent Center for Inflammation Research), is investigating the molecular mechanisms that protect the cells from death, and which are dysregulated in pathologic conditions. In Nature Cell Biology, Mathieu Bertrand and his team reveal the existence of a new cell death checkpoint in the TNF pathway. Yves Dondelinger, Tom Delanghe and colleagues show that MK2 protects the cells from death by inactivating the kinase RIPK1 through phosphorylation. Importantly, they show that this protective mechanism is affected in some inflammatory conditions and consequently results in cell death. This cell death can however be completely prevented by pharmacological inhibition of RIPK1. Together with other studies, this work highlights the promising therapeutic potential of RIPK1 kinase inhibitor for the treatment of inflammatory diseases.

Dondelinger, Delanghe *et al.* Nature Cell Biology 2017.

VIB'S MOHAMED LAMKANFI SPOTLIGHTS THE INFLAMMASOME ON ITS 15TH BIRTHDAY

2002 marked the discovery of a protein complex, the inflammasome, which has revolutionized our understanding of the inflammation process. After 15 years of further study, scientists are now in the process of learning how to use the inflammasome in disease-fighting therapies. As VIB's Mohamed Lamkanfi (VIB-UGent Center for Inflammation Research) is deeply involved in this research area, he's perfectly cut out to highlight why the inflammasome continues to be front and center in ground-breaking immunology studies.

Mohamed Lamkanfi

What role does the inflammasome play in immunity?
Mohamed: "To provide some background, innate immunity allows our bodies to quickly respond to potentially harmful microbes and substances. The inflammasome is a protein complex that serves as the nerve center of innate immunity, activating and regulating inflammation. That's why its discovery was such an important breakthrough in our knowledge of how the immune system triggers inflammation. Now, researchers are focused on successfully modulating its activity to treat disease."

Do you see a bright future ahead for inflammasome research?
Mohamed: "Even though it's a relatively young field, inflammasome research has huge potential and has already led to the adoption of anti-interleukin-1 therapies as new treatment options for patients with certain forms of arthritis and those suffering from a variety of hereditary autoinflammatory diseases. Alongside our continuing investigation of inflammasome activity, our understanding of genetic mutations that affect it has grown by leaps and bounds. I'm confident that the inflammasome will continue to be one of the main targets of immunology research around the world – and also that it will continue to yield incredible benefits to patients suffering from autoimmune disorders as well as neurodegenerative diseases. We still have so many questions to answer, and we can't wait to tackle them."

In Retrospect: The inflammasome turns 15, Mohamed Lamkanfi & Vishva M. Dixit, Nature News&Views 2017

QUICKSCAN

1

#Glucocorticoid receptor #Second life as drug target #Cofactor profile fine-tuning

Glucocorticoids are steroid hormones with potent anti-inflammatory and immune modulating effects. Recent key findings of Sofie Desmet and colleagues from the Jan Tavernier Lab (VIB-UGent Center for Medical Biotechnology) include, paradoxically, both pro- and anti-inflammatory roles of the glucocorticoid receptor (GR). Unraveling how GR ultimately shifts the balance to a net anti-inflammatory profile is a future challenge. The consensus is that GR deserves a second life as a drug target. Novel ligand combinations are one way to approach this. Combining non-steroidal and steroidal ligands has shaped GR function towards a unique gene regulatory profile with stronger pro-inflammatory gene suppression and enhanced anti-inflammatory expression. The molecular basis hereof is a changed GR phosphorylation status concomitant with a unique cofactor recruitment profile.

Desmet *et al.*, J. Clin. Invest. 2017

2

#Virotrap #SFINX #ProteinComplex

The analysis of protein complexes remains an important challenge, since virtually all methods require cell lysis and thus obliterate the cellular context. With Virotrap, the Sven Eyckerman Lab (VIB-UGent Center for Medical Biotechnology) has pioneered the trapping of protein complexes in virus-like particles, avoiding the homogenization step. This protocol paper now supports scientists who want to try the system on their favorite proteins. Analysis of the datasets is easy and intuitive with the straightforward filtering index (SFINX), a powerful contaminant removal tool (http://sfinx.ugent.be) that is included to complete the protocol.

Titeca & Van Quickelberghe *et al.*, Nat Protoc 2017

3

#Pancreatic Cancer #autoimmunity #NOD

James Dooley and his colleagues of the Adrian Liston lab (VIB-KU Leuven Center for Brain & Disease Research) studied the effect of immunological responses on pancreatic cancer in mice by backcrossing the Ela1-Tag transgenic model of pancreatic cancer onto the pancreatic autoimmune-susceptible NOD strain. Through longitudinal magnetic resonance imaging, they found that the NOD genetic background delayed the onset of pancreatic tumors and slowed their growth. These findings suggest that immune checkpoint blockade therapies that unleash latent autoimmunity could be useful to target pancreatic cancer.

Dooley *et al.*, Oncotarget 2017

4

#Multi-domain protein #Acetylation #Intrinsically disordered protein

Protein acetylation modulates key functional protein interactions and gene expression in the cell. Accordingly, dysregulation of the underlying processes is involved in several diseases, such as Charcot-Marie-Tooth disease. One of the key proteins is the transcriptional coactivator CBP, which contains long intrinsically disordered regions (IDRs) thought to be passive “linkers” between its folded functional domains, such as the catalytic histone acetyl transferase (HAT) domain. Scientists of the Peter Tompa Lab (VIB-VUB Center for Structural Biology) showed that simultaneous interaction of the HAT domain and an ID region (ID3) with the substrate ZFP106 is required to target specific acetylation of ZFP106. They suggest that the regulatory phenomenon that arises might be a general mechanistic feature of the functioning of large multi-domain signaling proteins.

In a recent review, the Peter Tompa Lab also describes the ample evidence that the structural disorder of proteins (e.g. intrinsically disordered proteins/regions IDPs/IDRs) is prevalent in all organisms and plays important regulatory roles. However, the underlying evidence is mainly derived from in vitro biophysical studies. Here, the lab surveys direct and indirect in vivo evidence that structural disorder is in fact the physiological state of many proteins in the cell.

Contreras-Martos *et al.*, Sci Rep. 2017

Pauwels *et al.*, Cell Mol Life Sci. 2017

5

#Redox biology #Pathogens

Thienopyrimidine compounds such as TP053 are promising antitubercular drugs because they kill both replicating and non-replicating *Mycobacterium tuberculosis*. TP053 is a prodrug that must be activated by a bacterial endogenous enzyme whose function was previously unknown. Leonardo Rosado of the Joris Messens Lab (VIB-VUB Center for Structural Biology) characterized this enzyme and found that it is a mycoredoxin involved in the pathogen’s oxidative stress response. This mycoredoxin belongs to a new cluster of enzymes, paving the way for the correct classification of similar enzymes from other organisms.

Rosado *et al.*, J Biol Chem 2017

6

#Cancer #Macrophages #Glutamine

The team of Massimiliano Mazzone (VIB-KU Leuven Center for Cancer Biology) showed that inhibiting the metabolic enzyme glutamine synthetase (GS) in pro-tumor (M2-like) macrophages reverts their polarization towards an HIF1alpha-mediated anti-tumor (M1-like) state, ultimately favoring cytotoxic T cell recruitment and blocking angiogenesis. As a consequence of a more pronounced immunostimulatory and anti-angiogenic effect, genetic or pharmacologic inhibition of GS translates into the prevention of metastasis. These findings highlight the possibility of targeting this enzyme in the treatment of cancer.

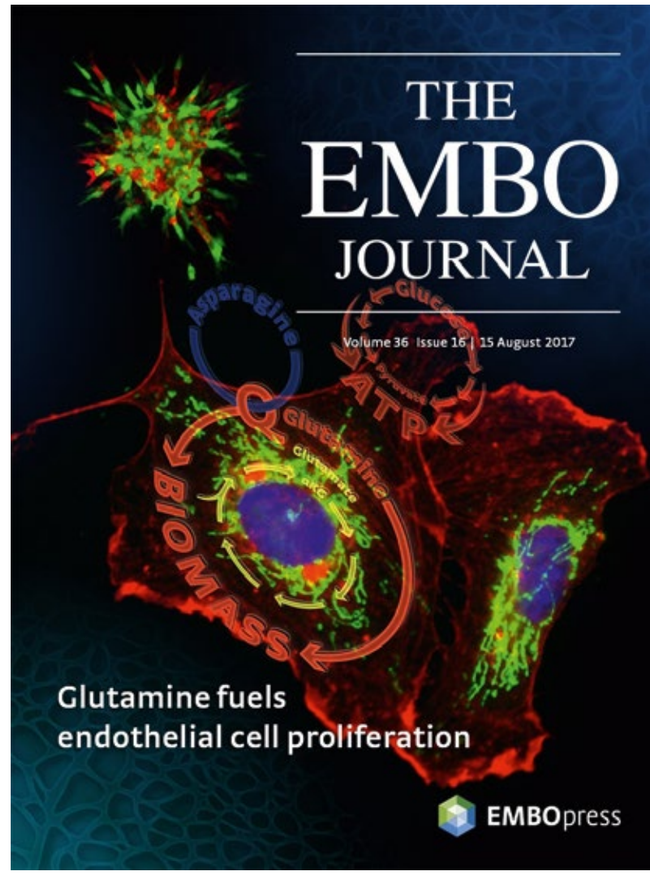
Palmieri *et al.*, Cell Reports 2017

7

#Angiogenesis #Endothelial cells #Glutamine

Endothelial cells (ECs) line blood vessels and are key players in the formation of new blood vessels (angiogenesis). Hongling Huang and Guy Eelen of the Peter Carmeliet Lab (VIB-KU Leuven Center for Cancer Biology) uncovered a crucial role for EC glutamine metabolism in angiogenesis. Glutamine-dependent synthesis of asparagine allows ECs to maintain cellular homeostasis. Interestingly, blocking EC glutamine metabolism reduces pathological angiogenesis.

Huang H *et al.*, EMBO J. 2017



Yves Van de Peer: “As computational biologists with an excellent reputation in evolutionary genomics and genome biology, we are increasingly asked to help turning new genome data into exciting biological stories. This is both a great honor and a true pleasure. The more because with every genome analyzed, we see Theodosius Dobzhansky’s famous adagium proven: ‘Nothing in Biology Makes Sense, Except in the Light of Evolution’.”

Zhang *et al.*, Nature 2017

8

#Orchid evolution #Genome duplication #Genomics

Scientists of the Yves Van de Peer Lab (VIB-UGent Center for Plant Systems Biology), together with researchers from China, Taiwan and Japan, have published the genome sequence of the orchid *Apostasia shenzhenica* in the journal Nature. Orchids represent about 10% of flowering plant species, are widely diverse in their morphology and lifestyle, and have successfully colonized almost every habitat on Earth. *A. shenzhenica* belongs to a small clade that diverged early and is a sister to the rest of the orchid family. Its genome revealed evidence of an ancient whole-genome duplication, which is shared by all orchids and occurred shortly before their divergence. Comparisons with other orchids and flowering plants enabled the reconstruction of an ancestral orchid ‘gene toolkit’, shedding light on the genetic mechanisms underlying key orchid innovations, such as the labellum (a ‘lip’ on the flower that attracts insects) and the evolution of epiphytism (the ability to grow on another plant).

9

#LRRK2 #Protein dimerization #Parkinson’s disease

Parkinson’s disease (PD) is the second most common neurodegenerative disorder. The most frequent genetic cause of the illness are mutations in the gene coding for the protein LRRK2. Using bacterial homologues of LRRK2, the research team of Wim Versées of the Jan Steyaert Lab (VIB-VUB Center for Structural Biology) showed that this protein cycles between a monomeric and dimeric form. This conformational cycle is regulated by the GTPase domain of LRRK2. The observation that PD mutations affect this cycle might open new avenues for future PD drug discovery.

Deyaert, Wauters *et al.*, Nat. Commun. 2017

10

#Asymmetric cell division #Spindle orientation #Physcomitrella patens

Cell division axis orientation is critical for differentiation and morphogenesis. In animals, centrosome-driven spindle orientation is key to orient divisions. However, in acentrosomal plants, the mechanism underlying spindle orientation is poorly understood. Ken Kosetsu and colleagues in the Daniel Van Damme Lab (VIB-UGent Center for Plant Systems Biology) and the Gohta Goshima Lab (Nagoya University, Japan) used asymmetrically dividing cells of the moss Physcomitrella patens and tobacco tissue culture cells for their research. They showed that de novo assembled prophase microtubule organizing centers are critical for spindle orientation assisting division plane orientation.

Kosetsu *et al.*, PNAS 2017

Silvie Van den Hoecke, Halina Novak, Wai Long Tam

THE INNOVATION LAB BRINGS TRANSFORMATIVE TECH RIGHT TO THE LAB

Technology Innovation is a hot topic, and our own Tech Watch team is working hard to facilitate the accelerated adoption of disruptive tech across VIB labs and Core Facilities. The team is scanning through papers, patents and press releases, for information about new innovations that could improve VIB’s research output. Its most recent science-boosting evolution? The creation of the ‘Flexible Innovation Lab’, a mobile trial center that allows scientists to get their gloves on the latest and greatest technologies, making it possible to incorporate them into their own projects even earlier.

IT’S ALL ABOUT IMPACT

The Flexible Innovation Lab doesn’t simply bring instruments to individual labs and Core facilities; it also supports early access instrument evaluations by facilitating troubleshooting processes and training initiatives, liaising with companies and VIB groups, managing budgets, ensuring the visibility of the tech across the institute and transferring best practices.

“By providing support and training, we aim to lower the threshold for VIB scientists to implement emerging technologies for their research, and thus impact scientific progress at VIB,” asserts Silvie Van den Hoecke, life sciences technology specialist at the Innovation Lab. “Technology has historically been a huge driver of major breakthroughs,” agrees Wai Long Tam, Silvie’s colleague. “It’s important for us to aid our scientists in getting access to the most advanced innovations.”

10X GENOMICS CHROMIUM

One example of a big success enabled by the Innovation Lab is 10x Genomics Chromium, a platform that enables long read and single cell sequencing to study tissue heterogeneity. After a

6-month evaluation phase and relocating every two weeks between Leuven and Ghent, the technology was accessed by over 8 VIB groups. Both the Ghent and Leuven facilities now have systems and a volume discount for consumables.

Martin Guilliams (Group Leader at the VIB-UGent Center for Inflammation Research) asserts “The Innovation Lab from Tech-Watch has been essential for getting access to the 10X Chromium single-cell RNA-Seq technology rapidly. In fact, we were among the first 5 institutes to get access to this disruptive technology in Europe and 10X Genomics has chosen the VIB to organize their first 10X Community meeting in Europe. It has been great to work together with labs from VIB-Leuven and VIB-Ghent to get the technology working and exchange protocols. The results from all teams are really breath-taking and it’s thanks to the Innovation Lab that we remain at the forefront of technological advances!”

BIOXP3200 FROM SGI-DNA

The BioXp3200, a benchtop DNA synthesizer, which allows you to go from sequence to synthesized fragment, clone or mutant library in 2 weeks, has dramatically reduced the time spent on waiting for standard DNA synthesis invested in traditional molecular cloning. The BioXp™ 3200 was placed in the lab of Thomas Jacobs as part of the Flexible Innovation Lab, where we opened DNA synthesis up to the whole institute.

Silvie Van den Hoecke (VIB Tech Watch): “In the first few months of the instrument placement, multiple mutant libraries have been successfully created and over 200 fragments have been synthesized in 13 VIB groups, across 5 centers.”

Thomas Jacobs (Group Leader at the VIB-UGent Center for Plant Systems Biology) asserts “The Innovation Lab enabled our group at the Center for Plant Systems Biology to be the first in Europe to have access to SGI-DNA’s new DNA synthesis machine, the BioXp™3200. Having the support of the Innovation lab team really made the experience of getting the machine relatively pain free. Their support in handling the negotiations, contracts, and ordering process has allowed the rapid uptake of DNA synthesis on the BioXp within our Center and across the institute in a matter of weeks”.

“The Innovation Lab truly enabled both the 10x Genetics Chromium, and DNA synthesis on the BioXp to be adopted at VIB so rapidly,” asserts Halina Novak, Technology & Innovation Manager. “Over the next year, we’ll be exploring a range of disruptive technologies such as in situ tissue omics platforms, Millifluidic devices for single cell isolation analysis & culturing, and 3rd generation sequencing instruments. As we did so successfully with 10x Genetics Chromium, we’re looking forward to working alongside VIB scientists to discover what these next-gen technologies are capable of!”

UPCOMING INNOVATION LAB PROJECTS

- GridION X5 and PromethION (Oxford Nanopore Technologies): enable real-time sequencing of DNA and RNA molecules, excluding amplification bias during library prep, and bringing new possibilities to epigenetic and epitranscriptomic projects.
- Millidrop: a high-throughput millifluidics device for microbiological analysis, this tech brings the advantages of petri dishes/ microtiter plates in a droplet format for culture preparation, sorting, incubation and analysis.
- CODEX (Akoya Biosciences): a high multiplex immunofluorescence staining platform that can measure up to 50 parameters in a single tissue slide using specialized oligotags.

Claude Libert

Numerous scientists rely on mice as model organisms for their research on a daily basis. By studying mutant genes in inbred mouse strains, they seek to answer complex questions. However, two issues compromise this strategy: a mutant gene can yield a different phenotype in different inbred strains, and different versions of a mutant gene can cause different results. The new platform mousepost.be aims to tackle these challenges.

MOUSEPOST.BE: CATALOGUING MOUSE GENES SINCE 2017

Claude Libert (VIB-UGent Center for Inflammation Research) and his team have been studying inbred mouse strains in models of inflammation for many years. They have successfully described various inflammation-resistant phenotypes, and even linked some of them to candidate genes.

Together with his team, Claude has now uncovered and displayed the full richness of the mouse protein-coding genome for the research community. He bundled those insights into an easily searchable website: mousepost.be. The database compares the genome of the reference standard mouse strain C57BL/6J to 36 often-used inbred laboratory mouse strains, and gives all deviant mouse genes a score which reflects how severely the protein has lost function.

YOUR FAVORITE MOUSE GENES AT YOUR FINGERTIPS

Claude: “The resulting dataset allows scientists to find out which proteins have lost function in a certain mouse strain, and vice-versa. If you are interested in a specific gene, you can use mousepost.be to scan all available inbred mouse strains to see which strains carry which sequence variations of this gene, compared to reference strain C57BL/6J. This way, mousepost.be stimulates a better global interpretation of genetic background effects.”

On top of facilitating existing studies, the rich dataset in mousepost.be also uncovers new mutant alleles of genes, opening up additional interesting research avenues.

Timmermans, Van Montagu and Libert, PNAS 2017

René Custers

REGULATORY UNCERTAINTY FOR INNOVATIVE PLANT BREEDING METHODS

Plant breeding is always on the move. Currently climate change, environmental concerns and changing consumer preferences are shaping the efforts of plant breeders. To tackle these challenges plant breeders have a growing toolbox of ever more precise plant breeding methods.*

Plant breeders can only use innovative breeding tools to the benefit of society when there is clarity about the regulatory environment that applies to them. Today that clarity is missing for a number of innovative breeding methods including gene editing. In the paper 'regulatory status of gene edited agricultural products' René Custers, VIB's Regulatory & Responsible Research Manager, unties the regulatory knot by clearly showing that the use of a method as such is not enough to trigger heavy legislation. That heavy legislation only applies when the resulting organism has a genetic composition that goes beyond what can occur by mating and/or natural recombination. This means that plants carrying small genetic alterations generated by gene editing that can also occur in nature, do not trigger legislation beyond what applies to conventionally bred varieties. In such a regulatory context also small and medium sized plant breeding institutions and companies would be able to use these innovations to the benefit of society.

René Custers, Emerging Topics in Life Sciences 2017

** For more information on these methods, we refer to our fact series document 'Past, present and future of plant breeding'.*

STIMULATING NEWS FROM THE VIB SPIN-OFF FRONT

Our spin-offs – 19 in total – are in constant motion. That's only logical: like every healthy start-up, each is busy building partnerships, looking for additional funding and developing groundbreaking solutions. Let's take a brief look at what three of them have been up to during the last couple of months.

CONFO THERAPEUTICS JOINS FORCES WITH LUNDBECK

VIB-VUB spin-off Confo Therapeutics is teaming up with Lundbeck, a global pharma company specializing in neuroscience research and development. Confo Therapeutics was originally founded on its patented Confo technology, which enables the stabilization of active GPCRs, thereby facilitating the drug discovery quest.

The partners aim to use the Confo technology to discover new therapies for schizophrenia, depression, Alzheimer's disease and Parkinson's disease. Johan Cardoen, VIB Managing Director: "This deal is not only important to developing medicines; it is also an appreciation and validation of the technology, knowledge and team of Confo Therapeutics. We are very proud of our spin-off."

MYCARTIS' NEW EVALUTION TECHNOLOGY PREPARES FOR TAKE-OFF

Last August, Mycartis raised EUR 10 million to expand its multiplexed immuno-assay platform. Simultanuously, the company obtained a EUR 1.15 million R&D subsidy from VLAIO – Flanders Innovation and Entrepreneurship.

MyCartis was founded in 2014 as a merger between a technological division of Biocartis and the VIB-UGent spin-off Pronota. The diagnostics company develops a platform to simultanuously quantify several biomarkers. Its flagship product is the EVALUTION™ technology, which allows researchers to analyze patient samples more quickly as to identify proteins and monitor diseases in a more efficient way.

Philippe Stas, CEO MyCartis: "The financial injection confirms that our shareholders support the continued development of diagnostic tools. On top of that, the innovative character of MyCartis was recognized in the form of extra funding from VLAIO, allowing us to expand our research efforts."

(ON)CURIOUS ABOUT NEXT-GENERATION DRUG DEVELOPMENT?

Oncurious, a ThromboGenics-VIB joint venture specialized in innovative cancer treatments, acquired exclusive licenses for five next-generation immune oncology assets. Those are based on the work of the Massimiliano Mazzone Lab (VIB-KU Leuven Center for Cancer Biology), the Gabriele Bergers Lab (VIB-KU Leuven Center for Cancer Biology) and the Jo Van Ginderachter Lab (VIB Center for Inflammations research at VUB).

"There are many synergies between the assets, so it makes sense to develop them all within one company," explains Johan Cardoen. "As a venture partner of Oncurious, we are looking forward to taking the spin-off to the next level." The VIB Discovery Sciences team will take the lead in the new projects, which are aimed at developing drugs that target a broad spectrum of cancers.

Greg Winter

Among his many accolades, 'the' Sir Greg Winter invented the use of antibody repertoires (used in conjunction with phage display) and founded Cambridge Antibody Technology, the company that helped develop Humira, a ground-breaking antibody therapy for arthritis. We had the unique opportunity to speak with this front-running father of human antibody research during a visit to the VIB-UGent Center for Inflammation Research. We found out more about his thoughts on top academic concerns today, from funding and collaboration to career planning and beyond.

INSIGHTS FROM PROTEIN PIONEER SIR GREG WINTER

"BASIC SCIENCE AND APPLIED RESEARCH ALWAYS GO HAND-IN-HAND."

Knighted in 2004 for his contributions to molecular biology, Sir Greg Winter is a pioneer in the fields of genetic and protein engineering. In addition to founding three widely successful medical technology companies, he has won numerous awards in the UK and abroad, including the Royal Medal in 2011. He is currently Master of Trinity College and a Trustee of the Kennedy Trust for Rheumatology Research.

What do you feel is the relationship between basic and applied research?
Sir Greg: "Before I began to focus solely on the humanization of antibodies, my research revolved around pure science. Basic research presents opportunities that can be further developed through applied research - indeed the structural insights into antibodies revealed by basic science were fundamental to my applied work."

In your opinion, what is key for success in fundamental research?
Sir Greg: "Collaboration is a huge source of inspiration in basic research. A concentration of other researchers in the same physical context promotes the exchange of information, observations and new ideas. In my opinion, research 'nodes' are important drivers of top research, and should be supported by governments. Our colleagues and peers provide us with that initial 'spark' that can lead us in fruitful directions."

"Further to that, having a big group of researchers is certainly important to moving things forward at a rapid pace, if the funding is available. However, the size of the group should reflect its needs. In my experience, working with a large group ended up being challenging due to the wide range of scientific interests, which led me to opt for a smaller group later in my career. As I established my reputation, I also found that researchers were joining my team to work with me on topics from my past, rather than on what I had planned for the future. A focused team is a very powerful thing in basic research."

What would you consider your 'best experiment'?
Sir Greg: "There are different ways to define 'best', but in my case, I feel strongly that the medicines created from my antibody humanization research were my personal 'best experiments'. In taking scientific insights and translating them into products that benefit a large number of people, you are doing something worthwhile for society."

"In addition, moving research beyond proof-of-concept and bringing it to the public in the form of a therapy for disease is also a validation of your work. Going 'all the way', so-to-speak, was personally important to me. Being fortunate in my support and the opportunities presented to me along my career path, I was able to contribute to successful translational science, from raw research insights all the way to clinical adoption."

What do you think are the key drivers of successful technology translation?
Sir Greg: "Time is of the essence in tech transfer. The ability to move quickly, and a lack of overregulated processes help bring therapies to the market in a timely manner. Even more important, however, is to enable an environment in which researchers and tech transfer people collaborate very closely. I have observed that VIB does an excellent job at ensuring a good connection between the science and business sides of the process."

Sir Greg Winter is a scientist, inventor and entrepreneur. His scientific career has almost entirely been based in Cambridge where his work has involved the development of technologies for making pharmaceutical antibodies by genetic engineering. Such antibodies have proved useful for treatment of cancer and immune disorders, and now comprise many of the world's top-selling pharmaceutical drugs. These include the "humanized" antibodies Herceptin (for treatment of breast cancer) and Lucentis (for treatment of wet acute macular degeneration), and the human antibody Humira (for treatment of rheumatoid arthritis), currently the world's top selling pharmaceutical drug.

In order to see his technologies applied, Sir Greg founded several successful start-up companies, including Cambridge Antibody Technology in 1990 (acquired by Astra Zeneca in 2006), Domantis in 2000 (acquired by GSK in 2006) and Bicycle Therapeutics in 2010, which is developing a peptide product for treatment of cancer.

Sir Greg is a Fellow of Trinity College, Cambridge and has been Master of Trinity since 2012. He was elected a member of the European Molecular Biology Organisation in 1987, a Fellow of the Royal Society in 1990 and Fellow of the Academy of Medical Sciences in 2006, as well as being a Fellow or Honorary Fellow of many other professional organizations. He has also been awarded numerous prizes and medals, and received a Knighthood for services to Molecular Biology in 2004.

WAVING HELLO AND GOODBYE: ENTRANCES AND EXITS AT VIB

Since the beginning of 2017, we've extended a warm welcome to several outstanding PI's embarking on journeys of excellent science and leadership, and bid farewells to the scientists pursuing opportunities outside VIB.

WARMLY WELCOMING OUR NEW PI's

Sha Liu

SHA LIU, VIB-KU LEUVEN CENTER FOR BRAIN & DISEASE RESEARCH
Hailing from China, Sha is the youngest PI to be hired at VIB this year. After obtaining his PhD from the Institute of Hydrobiology at the Chinese Academy of Sciences, he moved on to the Department of Neurology at Johns Hopkins University in the US for a postdoctoral trajectory of 6 years. Since high school, Sha has won award after award, from 1st prize at the China High School Biology Olympiad to the Alfred Blalock Young Investigator Award at Johns Hopkins. At the VIB-KU Leuven Center for Brain & Disease Research, he will take his first steps as junior group leader, seeking to understand the synaptic and circuit mechanisms underlying sleep and its function in the brain. Sha's current areas of interest include the roles of sleep in synaptic and network plasticity, and the molecular and cellular mechanisms underlying these sleep-dependent processes.

Lucia Chavez

LUCIA CHAVEZ GUTIERREZ,
VIB-KU LEUVEN CENTER FOR BRAIN & DISEASE RESEARCH
Lucia, born and raised in Mexico, completed her doctoral thesis in 2005 at the National University of Mexico, and then immediately moved to Leuven for a postdoc at the lab of Bart De Strooper. In this role, she gradually evolved towards a staff scientist position, which she held for eight years. Together with Thomas Voets, she was selected in 2017 during the call for new group leaders at the VIB-KU Leuven Center for Brain & Disease Research. Lucia's lab is interested in generating a quantitative understanding of the molecular mechanisms underlying Alzheimer's disease pathogenicity.

Thomas Voets

THOMAS VOETS, VIB-KU LEUVEN CENTER FOR BRAIN & DISEASE RESEARCH
A Belgian native, Thomas obtained his bio-engineering degree at KU Leuven, combining bachelor studies in piano and composition at the Lemmens Institute with a master's degree in cellular biology. This triggered his interest in biomedical sciences, leading to a PhD in physiology at KU Leuven and a postdoc at the Max Planck Institute in Göttingen at the lab of Nobel Prize winner Erwin Neher (patch clamp technique). He returned to Leuven in 2002 and became a full professor in the KU Leuven Department of Cellular and Molecular Biology, after which he moved to the VIB-KU Leuven Center for Brain & Disease Research, where he became a PI in July 2017. The general aim of his research group is to unravel the fundamental mechanisms whereby TRP channels operate at the molecular and cellular levels, and to clarify how these channels contribute to various (patho)physiological processes.

Mark Fiers

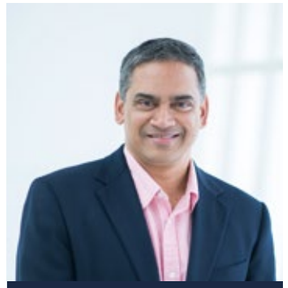
MARK FIERS, VIB-KU LEUVEN CENTER FOR BRAIN & DISEASE RESEARCH
Born in the Netherlands, Mark received his PhD from Wageningen University. In pursuit of his main interest, bioinformatics, he worked at Plant Research International in Wageningen for almost ten years before moving to New Zealand, where he worked for four years as a senior bioinformatician at Plant & Food Research in Christchurch. In 2013, he was chosen as a bioinformatics and integrative genomics specialist at the VIB-KU Leuven Center for Brain & Disease Research, appointed expert technologist to head the Bioinformatics Service Lab in 2017. The Bioinformatics Service Lab's goal is to bring data from many different sources together in a coherent spatial and temporal model of disease progression in the brain. The Bioinformatics Service Lab focuses on data analysis and the interpretation of sequence data, specifically spatial and single-cell transcriptomics, at different stages of pathology.

Martin Guilliams

MARTIN GUILIAMS, VIB-UGENT CENTER FOR INFLAMMATION RESEARCH
Martin, a native of Belgium, received his PhD from the VIB laboratory of Cellular and Molecular Immunology at VUB in 2008. He successfully applied for a Marie Curie IEF fellowship and an ARC postdoc fellowship to complete a postdoc in the lab of Bernard and Marie Malissen CIML in Marseille, France, where he stayed for three years. Armed with and FWO and a Belspo fellowship, he returned to VIB, but to the VIB-UGent Center for Inflammation Research. He continued as a postdoc there, and after successfully applying for an ERC grant, he was appointed group leader in July 2017. His research focuses on the development and functional specialization of macrophages and dendritic cells.

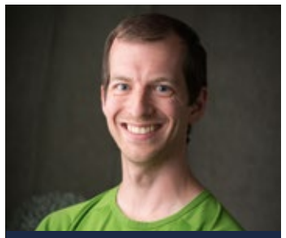
Mojca Strazisar

MOJCA STRAZISAR, VIB-UANTWERP CENTER FOR MOLECULAR NEUROLOGY
Mojca received her doctorate in molecular biology and biochemistry in 2008 from the University of Ljubljana, in Slovenia. She remained there for a few years, and then came to Antwerp to join the Center of Molecular Neurology in 2011. She initially worked as a postdoc, but then changed directions in 2015 when she joined the VIB Genomics Core first as a principle staff employee and then as an expert scientist and facility leader.



Kodi Ravichandran

KODI RAVICHANDRAN, VIB-UGENT CENTER FOR INFLAMMATION RESEARCH
Born in India, Kodi has lived in the US for many years. He successfully applied for an FWO Odysseus grant in 2016, and started his own research group at the VIB-UGent Center for Inflammation Research at the beginning of 2017. Kodi is working part-time in Ghent, as he is also the director of the Center for Cell Clearance at the University of Virginia in the US. He is the chair of the Department of Microbiology, Immunology and Cancer Biology at the same university. He received his PhD from the University of Massachusetts and completed a postdoc at Harvard Medical School. He has also published an impressive list of high-impact papers and has a longstanding career as a scientific leader in inflammation and immunity. Kodi's main research interest lies in apoptotic cell clearance mechanisms in health and disease.



Bert De Rybel

BERT DE RYBEL, VIB-UGENT CENTER FOR PLANT SYSTEMS BIOLOGY
Born in Belgium, Bert defended his PhD thesis in 2009 at UGent. He spent five years at Wageningen University, where he successfully obtained grant after grant: FEBS, Marie-Curie, NOW VIDI, and more. In 2015, he returned to Belgium with a FWO Odysseus return grant and was successful in obtaining an ERC starting grant, which begun in February 2017. This triggered Bert's promotion from postdoc to junior group leader at the VIB-UGent Center for Plant Systems Biology. The main interests of Bert are linked to plant developmental biology, plant vascular development, oriented cell divisions, transcriptional networks, auxin and cytokinin.

Jan Michiels

JAN MICHIELS, VIB-KU LEUVEN CENTER FOR MICROBIOLOGY
Jan defended his doctoral thesis in molecular microbiology back in 1993, and after several years of postdoc work, be became a group leader at KU Leuven in 2001. During this period, Jan was very successful in obtaining funding through competitive grants and is a member of a large number of scientific associations and research councils at KU Leuven. Jan brings in his expertise in the VIB-KU Leuven Center for Microbiology and focuses on bacterial genetics, evolution, ecology, interactions and pathogenesis, with a special emphasis on the mechanisms underlying tolerance to stress and antibiotics.

In addition, we're already looking forward to welcome two new PI's who will start their lab in the beginning of 2018: Pierre Vanderhaeghen (VIB-KU Leuven Center for Brain & Disease Research) and Klaas Vandepoele (VIB-UGent Center for Plant Systems Biology).

WISHING EVERY SUCCESS TO OUR OUTGOING RESEARCHERS

STEFAN MAGEZ,
VIB-VUB CENTER FOR STRUCTURAL BIOLOGY
After eight years as group leader in the Brussels 'contingent' of VIB, Stefan has taken a new step in his career by accepting a position as group leader and professor at the South Korean branch of UGent. He will be holding this appointment for the next five years at the very least.

MASSIMO SANTORO,
VIB-KU LEUVEN CENTER FOR CANCER BIOLOGY
A group leader for the last four-and-a-half years, Massimo will return to Italy to continue his career as a group leader and professor at the University of Padua.

IN MEMORIAM

Nico van Nuland

Nico van Nuland

It is with deep sadness that we report the untimely passing of our friend and colleague Prof. Dr. Nico Van Nuland, Group Leader in Biomolecular NMR at the VIB-VUB Center of Structural Biology.

Nico van Nuland (born in 1961) obtained his Master degree in Molecular Sciences from the University of Wageningen, the Netherlands in 1990. After completing his doctoral studies at the Department of Biochemistry at the University of Groningen in 1994, Nico continued his research career in biological Nuclear Magnetic Resonance (NMR) spectroscopy as postdoctoral research assistant in the laboratories of Prof. Chris M. Dobson (University of Oxford, UK), Dr. Ruud M. Scheek (University of Groningen, The Netherlands), and Prof. Pedro L. Mateo (University of Granada, Spain). In 2000 Nico van Nuland became manager of the European Large-Scale NMR facility at the University of Utrecht and obtained the position of lecturer in 2003, before moving to the University of Granada as "Ramon y Cajal" research fellow in 2004.

In 2009 Nico moved to Brussels, Belgium to become a Group Leader at the VIB-VUB Center of Structural Biology and build out the Jean-Jeener NMR facility, the first Belgian high resolution NMR center for protein structural studies, from scratch. Scientifically, he is best known for his work on the isotopic labelling of proteins and development of triple-resonance NMR experiments for the assignment and structural analysis of proteins, methods that have become routine and nowadays constitute the backbone of modern biomolecular NMR spectroscopy. His most recent work focused on the structure and dynamics of SH2 domains.

In the prime of his scientific career, Nico was diagnosed with Amyothrophic Lateral Sclerosis - ALS, a progressive neurodegenerative disease that affects voluntary muscle function. Despite his illness, Nico kept working until this became physically impossible. On the evening of November 4, 2017 he lost his long fight with ALS and passed away in the presence of his children Mara and Nicolas and his closest family. Nico will be remembered as an excellent scientist, but above all as a mediator and a warm colleague and friend.

Fotis Kafatos (16 April 1940 - 18 November 2017)

Fotis Kafatos

It is with great sadness that we inform you of the passing of Professor Fotis Kafatos, a brilliant and wise man. Fotis Kafatos was a true scientist in every sense of the word. Driven by excellence he inspired many institutes such as EMBL, ERC and VIB as chair of our International Advisory Board. This is a gigantic loss for science.

A VIB FIRST: ALUMNA FABIOLA OSORIO NAMED HHMI INTERNATIONAL RESEARCH SCHOLAR

After her return to Santiago de Chile, Fabiola Osorio, an alumna of the VIB-UGent Center for Inflammation Research, was selected to be among the first group of HHMI International Research Scholars. Together with 40 other scientists from 16 countries, she was chosen from a pool of 1,400 candidates as an 'exceptional early-career scientist poised to advance biomedical research across the globe'. With the recognition comes a five-year research grant worth $650,000.

Fabiola Osorio

Can you tell us more about the HHMI International Research Scholar program?
"Alongside the Howard Hughes Medical Institute, the Bill and Melinda Gates Foundation, the Wellcome Trust in the UK and the Calouste Gulbekian Foundation in Portugal were involved in this initiative. These four philanthropic institutions teamed up to create this special grant for young scientists with creative projects. However, the program funds people, rather than specific projects," explains Fabiola Osorio.

Which researchers can apply?
"To be eligible, you have to be trained in the US or the UK, be an independent researcher for fewer than 6 years and conduct your current and future research in a non-G8 country."

"For me, it was an opportunity that suddenly popped up. As an assistant professor and young PI, I was continuously looking for money to set up and expand my own lab. I was pre-selected and invited to the Wellcome Trust in London for a three-minute presentation in front of a jury of experts from many different disciplines. And fortunately, I hit the jackpot," Fabiola laughs.

At the same time, she admits: "I have been so lucky, though! First of all, I was trained in Caetano Reis e Sousa's lab at the Cancer Research UK –UCL Centre. Caetano is a leading immunology researcher. And then, when working in London, Bart Lambrecht crossed my path. He had this provocative idea to study the role of cellular stress in immunity and gave me the opportunity to do a postdoc in Ghent from 2011-2013. It was in his lab and under his mentorship that I defined my current line of research, which also formed the basis for the HHMI application."

Is this research line linked to the Nature Immunology paper that you published together with Bart Lambrecht and Sophie Janssens in 2014?
"Absolutely. We discovered that a very basic biological mechanism in homeostasis, the unfolded protein response (UPR), is one of the key regulators of dendritic cell activity in modulating the adaptive immune response to foreign invaders as well as tumor cells and in autoimmunity," explains Fabiola. "The accumulation of unfolded proteins in the endoplasmic reticulum (ER) causes ER stress. Three molecular sensors trigger this response. One of them is IRE-1alpha. We found that dendritic cells spontaneously turn on this arm of the UPR in the absence of ER stress and that this mechanism is crucial in the activation of dendritic cells."

"This paper was the start of a completely new research line for me: understanding the interactions between cellular stress, preserving cell homeostasis, and regulation of the immune system. In the last 20 years, we've learned a lot about the processes triggering inflammation, but we barely know anything about how inflammation is regulated or stopped."

What are the potential clinical consequences of these new insights?
"These pathways may play a decisive role in the anti-tumor immune response. The tumor environment – with its low oxygen availability and high demand for energy – is highly stressful for dendritic cells. Dendritic cells control essential processes in the anti-tumor response, including antigen presentation and induction of T lymphocytes. This is just one example, but it's likely that intracellular stress is involved in calibrating the immune response in inflammation and infection contexts."

"I am convinced that we are making history with this new field of immunology," concludes Fabiola, "at a time when most discoveries will generate completely new insights. For this reason, I stay in close contact with Sophie and Bart. The VIB-UGent Center for Inflammation Research is not just an advanced research lab; it's also a warm social environment. This unique combination makes VIB an ideal place to pursue scientific research. From the moment I arrived in Ghent, I felt at home. In retrospect, I can even appreciate Belgian weather!"

Wim Goemaere

RETURNING IN STYLE: WIM GOEMAERE, VIB'S VERY FIRST COO

More than ever, VIB is in full motion: our reorganization into 8 research centers needs logistic follow-up, we're approaching new agreements with our partner universities, the need for new infrastructure is growing, and the list goes on. To streamline all these tasks and challenges, at the interface of operations and strategy, we needed somebody special. We found the right person for the job in Wim Goemaere, who's making a comeback after 10 years: "It honestly feels great to return to an organization that is more dynamic and energetic than ever." Jo Bury: "Wim is a charming man with great social skills. I'm convinced that he will be able to reconfirm and strengthen our partnerships with the universities."

Our managing director Jo Bury approached Wim last spring. It was clear that we needed an extra pair of hands – and an extra brain – to take the lead on our reorganization while managing a wide array of other projects as well. Jo: "Wim's clear-cut organizational profile was the first big factor in our choice. Highly skilled and respected, he has great social and persuasive skills, a broad network and the ability to decisively steer an organization in the right direction. Secondly, Wim is familiar with VIB's ins and outs. Anyone else would need a couple of months to get the hang of our rather particular organizational model. Wim was warmed up after day one!"

GREAT MEMORIES, HIGH EXPECTATIONS

The new function of COO will pool together different tasks and projects previously done by other collaborators at our headquarters. Adding Wim to the team doesn't just mean a strong new operations manager; it also allows other people to focus more on their core activities.

Wim, which tasks and projects are awaiting you?
Wim: "The recent reorganization, for example, requires a lot of logistical work for our research centers. Different infrastructure projects are planned for Ghent, Leuven and Brussels. Another job is optimizing support functions, from both VIB headquarters and the universities, for our centers. This fits within the agreements we are concluding with our partner universities. I'll also look into how we can meet the need for infrastructure to support our biotech start-ups. And a third big project is to plan how to tap into new sources of potential revenue, such as charity foundations, for our research."

Did it take a lot of convincing to 'sell' you all these responsibilities?
Wim: "Well, I was already considering working closer to home with the ambition to improve my work-life balance. So, I was definitely intrigued, but I still gave it some serious thought. A clear perk was that VIB had matured and rejuvenated while I was away. I was also attracted by the switch to a full-time operations role, something I was able to get a taste of in the course of my mainly finance-related career. And last but not least, I have great memories. In the end, the decision wasn't so hard."

And did we meet your high expectations?
Wim: "In all honesty, it feels great to be back: VIB is more dynamic and energetic than ever. It's nice to see both new and familiar faces. Even more, it's exciting to observe continuing traditions as well as things that have changed and evolved for the better. Of course, I have my hands more than full – but, for the record, that's a good thing!"

WIM GOEMAERE

Back since: 1 October 2017
Previously: Bone Therapeutics (CFO) and Devgen (CFO)
Previous VIB life: 1996 – 2008 (CFO)

TRUST ME, I'M A POSTDOC

Despite the diversity of fields in which they work, VIB's postdocs also have a lot in common with each other. That's why connecting on both a scientific and a personal level with your colleague, yields nothing but advantages: you get to share knowledge, discuss your career path and make friends for life. VIB is keen to develop the postdoc community across all centers, an initiative spearheaded by the Postdoc Committee (PDC).

***Front row** (from left to right): Charlotte Scott, Rita Cacace, Emanuela Pasciuto, Inge Van Molle and Antonella Fioravanti **Second row** (from left to right): Astrid Gadeyne, Dieter Demon, Bert Schepens, Vinoy Vijayan, Petya Georgieva and Maria Dzialo **Back row** (from left to right): Francis Santens, Jos Wendrich and Kris Pauwels*

WHAT IS THE POSTDOC COMMITTEE?

The postdoc committee (PDC) currently consists of 15 scientists from across the VIB centers. Originally from Belgium, the Netherlands, Ireland, Italy, Bulgaria, the US, India and Australia, they represent a diverse group of postdocs with many different experiences. Chairperson Petya Georgieva (VIB-KU Leuven Center for Cancer Biology): "The aim of the committee is bridging the gap between the centers – both in terms of location and research fields, to create a true community".

The members regularly meet to discuss ideas and organize scientific and social events throughout the year, such as the recent workshop on collaboration, the postdoc community session during the annual VIB Seminar and, of course, the annual Postdoc Day.

You can connect with the Postdoc Community, engage in discussions and keep up to date with upcoming events by following the Facebook page www.facebook.com/VIBPostdocs.

POSTDOC DAY 2017: THE TRANSIENCE OF BEING A POSTDOC.

A great way to meet fellow postdocs and step outside your natural habitat is the community's main annual event: The VIB Postdoc Day. This year's 3rd edition, held on October 12, 2017 at Sportoase, Leuven, concentrated on career opportunities outside academia and featured sessions on industry, entrepreneurship, and communication and policy.

From the sessions and debate, PDC members Inge van Molle (VIB-VUB Center for Structural Biology) and Charlotte Scott (VIB-UGent Center for Inflammation Research) gathered some tips for postdocs aspiring to industrial careers:

- Don't hesitate to apply, even if you don't meet all of the criteria on the job application. Practical skills and a positive mindset are more important than years of industry experience.
- Follow courses to acquire new skills and show your dedication to personal development. The VIB training program offers courses on a wide variety of topics.
- Get to know the people on the inside, and try to gain insight into the company you're applying at.
- Although solid preparation is crucial, rest assured that, like with most things in life, you'll learn by doing: your fifth interview will be better than your first.

Overall, the day was well-received by the 124 attendees, a new record for the VIB Postdoc day. Petya Georgieva: "The PDC was very happy about both the number of registered attendees and the feedback we received. Looking ahead to 2018, we would be happy to hear any suggestions for the 4th Postdoc Day."

SCIENCE COMMUNICATION: FROM THE LAB INTO THE WORLD

At VIB, we strongly recognize the need to involve as many people as possible in science. To immerse them into our fascinating world, talking about our research simply and clearly is the best – if not the only – way. That's why we organize events like Biotech Day and Science on The Road. On that note, three of our scientists who go the extra mile to get their messages across to a more general public were recently rewarded for their efforts.

Evgenia Salta

EVGENIA SALTA: "IF YOU HAVE A CREATIVE IDEA, JUST GO FOR IT."

Evgenia Salta (VIB-KU Leuven Center for Brain & Disease Research) received one of this year's awards from the Royal Flemish Academy of Belgium for Science and the Arts, which honors scientists who put their hearts and souls into science communication. Her zebrafish neuroscience workshop shows children how model organisms are used for brain research.

Why is communicating to the public important?
Evgenia: "The general public will be the end recipients of our research outcomes: new ways to study and treat neurodegenerative disorders. It only makes sense to involve those end users in the scientific process as well. In the zebrafish workshop, we interact with little scientists-to-be, whose hunger for knowledge is endless. The interplay benefits us scientists as well: hearing them talk about grandparents with Alzheimer's disease adds a societal perspective to our sometimes nearsighted lab lives."

Do you have any tips for your fellow scientists?
Evgenia: "Don't underestimate children. Kids are extremely smart and many times their natural curiosity and lack of preconceptions make them better learners and scientific thinkers than us. Besides, they're a good benchmark for clear communication: if children cannot understand our language, we need to change it."

Bram Van Den Bergh

BRAM VAN DEN BERGH: "GRAB PEOPLE'S ATTENTION RATHER THAN GIVING THEM THE FULL MESSAGE."

Bram Van den Bergh (VIB-KU Leuven Center for Microbiology) was awarded the silver medal in this year's PhD Cup, a Flemish science slam between recently promoted PhDs. His research focuses on the evolution of bacteria and antibiotic tolerance.

Why do you tell people about your studies?
Bram: "I am, of course, fascinated by the subject of my research, and I – perhaps naively – believe that everyone would be. But more than that, increasing the interest of future generations in our work is essential to stimulating the knowledge economy. And, as much of our research is tax-funded, I feel we are obliged to give something back to the people who make our jobs possible."

What has the PhD Cup taught you?
Bram: "I was surprised by the number of reactions I got from various angles of society: people of all ages and industries were interested to discuss my work. Those interactions were not only very motivating, they also impacted my own views and helped me adjust my focus. Even further, I realized that although scientific publications may each contain many interesting details, the general public is best informed by communicating one impactful message at a time."

Doris Vandeputte

DORIS VANDEPUTTE: "CLEAR COMMUNICATION AMPLIFIES SOCIETAL SUPPORT."

Doris Vandeputte (VIB-KU Leuven Center for Microbiology) was awarded the bronze medal in the PhD Cup with her research on intestinal bacteria and how their composition varies in healthy people.

How do you connect with the public?
Doris: "Although much of our research is of great societal importance, sufficient media attention is crucial to spark general curiosity. To get that attention, we have to communicate clearly and through different channels. That's why I regularly contribute to updates for the website and newsletter of the Flemish Gut Flora Project and talk about my scientific progress on my personal Twitter account."

What did you learn from your participation in the PhD Cup?
Doris: "I thought the way I presented my research was already quite straightforward, but I soon realized I had to try even harder. If people stare at you and nod but do not ask questions, they probably did not get it completely. Now, I try to get away from jargon, simplify my message even more, and I actually succeed in conveying the importance of my research. That's what it's all about: getting people to understand why we do what we do."

AWARDS & GRANTS

VIB scientists are recognized for their efforts, breakthroughs and contributions in a wide range of fields on a regular basis. Below you can find details about the awards and grants received by VIB researchers from foundations and institutes around the world in the last three months.

AWARDS

Sarah Weckhuysen (VIB-UAntwerp Center for Molecular Neurology) won the Epilepsia Clinical Science Prize of 2017 for her project titled 'Involvement of GATOR complex genes in familial local epilepsies and focal cortical dysplasia'. Sarah's original research underscores the importance of GATOR genes in epilepsy, potentially leading to new therapies for the disorder.

Sarah Weckhuysen

Dirk Inzé

Dirk Inzé (VIB-UGent Center for Plant Systems Biology) received the 2017 GCHERA World Agriculture Prize, a prestigious international award of USD 50,000 recognizing Dirk's outstanding lifetime achievements in agricultural and life sciences. The award was presented on 28 October 2017 at the 9th annual GCHERA World Conference at the Nanjing Agricultural University in China.

Peter Carmeliet (VIB-KU Leuven Center for Cancer Biology) was presented with the acclaimed Distinguished Career Award at the 18th Biennial Awards for Contributions to Hemostasis (BACH) on 10 July 2017. This award is given to accomplished researchers for their contributions to thrombotic and bleeding disorder research by the International Society on Thrombosis and Haemostasis (ISTH). He also received the 1999 Investigator Recognition Award from this nonprofit organization.

Peter Carmeliet

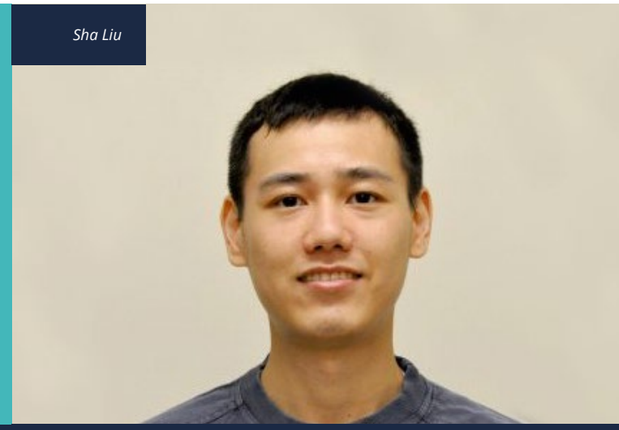
ALSO IN THE PICTURE

Tinneke Delvaeye (VIB-UGent Center for Inflammation Research) received a poster presentation prize for her project titled 'A role for Cx43 hemichannels in sepsis-induced renal vascular permeability' at the International Gap Junction Conference (IGJC) 2017 in Glasgow, Scotland.

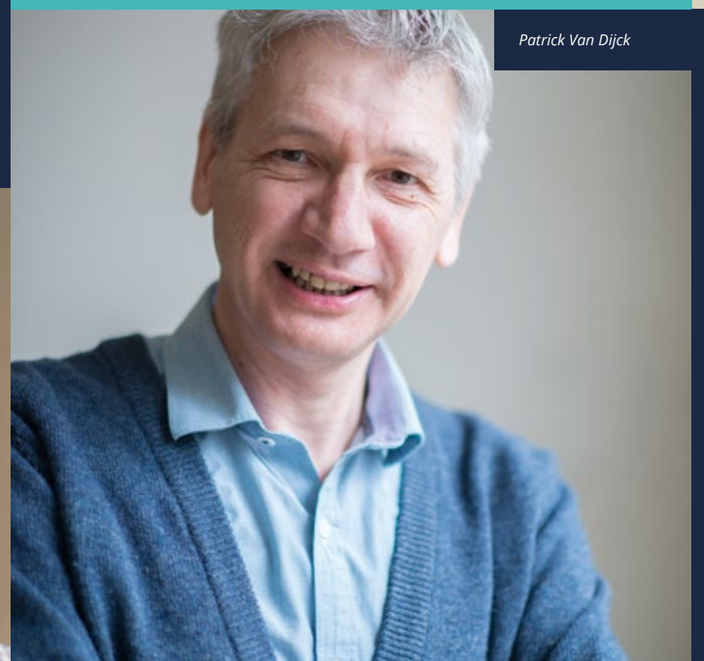
Yuechen Bai (VIB-UGent Center for Plant Systems Biology) won the poster presentation prize at TERPNET 2017, the 13th International Meeting on Biosynthesis, Function and Synthetic Biology of Isoprenoids.

GRANTS

Sha Liu (VIB-KU Leuven Center for Brain & Disease Research) has received an ERC Starting Grant for his project titled 'The role of sleep in synaptic plasticity'. His Laboratory of Sleep and Synaptic Plasticity studies the basic mechanisms underlying sleep and its function within the brain.

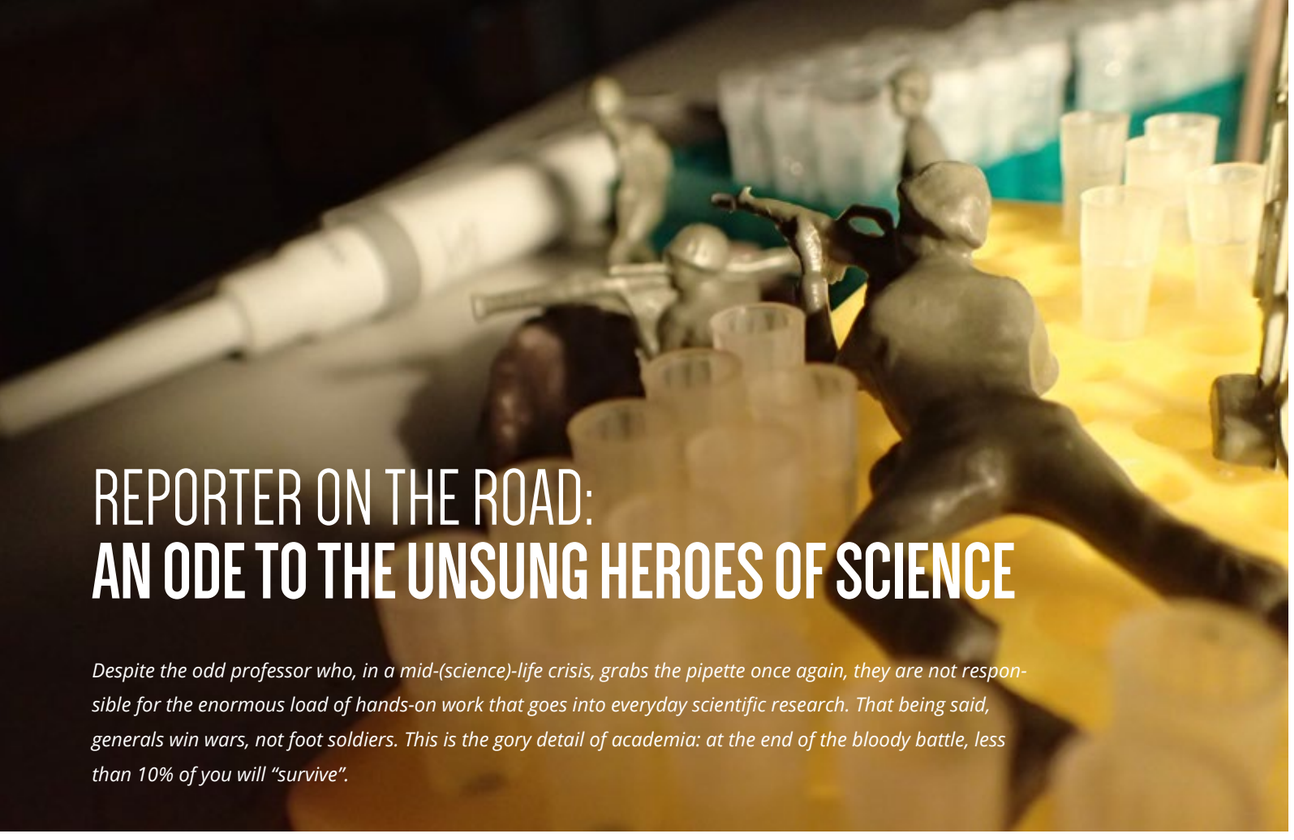


Sha Liu



Patrick Van Dijck

The **Patrick Van Dijck** Lab (VIB-KU Leuven Center for Microbiology) has secured 4 full years of select pay funding from the United States National Institute of Allergy and Infectious Diseases, beginning in 2018 at the University of Maryland in Baltimore. Approximately USD 360,000 will be provided each year to support the project titled 'C. albicans and S. aureus catheter infections: clinical implications and therapy'.



REPORTER ON THE ROAD:
AN ODE TO THE UNSUNG HEROES OF SCIENCE

Despite the odd professor who, in a mid-(science)-life crisis, grabs the pipette once again, they are not responsible for the enormous load of hands-on work that goes into everyday scientific research. That being said, generals win wars, not foot soldiers. This is the gory detail of academia: at the end of the bloody battle, less than 10% of you will "survive".

A BATTLE DOESN'T WIN A WAR

Remember that first day of your PhD work? You had your master's degree in your pocket, found a cool lab, and you were certain you'd change the world by doing awesome research? It's unlikely that you had this rosy outlook, but I guess the following years were a bit of a reality check for most of you. At least, they were for me. You learn a few of the practical things about science. First of all, working hard does not equal scientific output. Sometimes you need an extra pinch of luck. An idea may look great on paper, but this does not mean the experiments will pan out in the end. And if you eventually achieved those amazing results, you were faced with your first peer-review experience. As the PhD student Winston from the lab next door once said: "Peer-review is the worst form of evaluating scientific accuracy, except for all those other forms." It is the cornerstone of science and we desperately need it, but I think most of us can agree that the system is far from perfect. You pull yourself through months of revisions, and when you finally have your paper, you can defend. First battle won… but one battle does not win a war.

BECOMING A GENERAL

A number of you will be sick and tired of it. Tired of bench work, the pressure to publish, or the world of academia. But a lot of you, despite a few battle scars, choose not to give up. You decide to pursue the ultimate goal of a foot soldier: climbing the ranks and earning your stripes. You want to get out of the mud of the battlefield and onto that horse. You want to become a general! Are you talented? Yes? Then academia tells you that you can do it.

But is that really true? By now, you are a postdoc and you should be able to count. Let's do the math. In most cases, a general has to retire before a new general can be raised. But my general trained 6 other soldiers, and is far from retirement. So what do I do now?

The longer the war takes, the more likely your fellow officers will not survive. All you can do is to keep on battling. You keep fighting your general's war until it has been won. You started out as one of one hundred, but by now, you're more likely one of ten.

THE STRUGGLE FOR FUNDING

Wartime metaphors aside, this analogy is not that far from the truth. To those of us dreaming of one day becoming professors, it feels like a battle. We soon began to realize that the odds are stacked against us, and frankly, it is frightening. How can you make sure that you are one of the last (wo)men standing? I experienced first-hand that hard work and good ideas do not guarantee impact factors, and that eventually I will need those to get a position. Even if you achieve that position, you are still confronted with the current funding climate: each year, it is getting increasingly difficult for young group leaders to secure money to actually do research. It is clear that this situation is becoming unsustainable, and we face the threat of losing out on a lot of good research.

REDEFINING SUCCESS IN SCIENCE

On the other hand, we have the ones that "did not survive". But did they? Too often, we put forward the idea that everyone in academia needs to aspire to professorship. When I hear about my friends' paychecks, free weekends and the cool things they do working in industry, I am not sure if this is justified. We strive to push our scientific discoveries outside of the realm of dusty academics and attract the attention of industry. At that point, shouldn't we want our best people out there ensuring that our science is translated into benefits to society?

I am not the first one to bring this up, nor do I have a simple solution to the problem. But I do know that we have to address this issue, and we can only do this by keeping the conversation alive. First of all, we as scientists need to be vocal about the value of our work to remind governments that cutting science funding – or simply failing to increase science budgets – in our tech economy can be disastrous. If the number of scientists is increasing, why isn't the budget following suit? Second, we as students, postdocs and professors need to be honest with ourselves and to each other. "What are my realistic options as a young postdoc? If I will go into the private sector anyway, is a postdoc valuable for my career?" Universities and doctoral schools should play key roles in providing correct information on these subjects to prevent a further pile-up of PhDs and postdocs. Lastly, something we can only change ourselves: our mindset about academia versus industry. While there are obvious differences, at the end of the day, we all want to make the world a better place through science. Exchanging academia for industry should not be considered a failure. We should celebrate the bright people that make that leap and power the companies that fuel our economy. Without them, our work would gather dust on lab benches.

A FANFARE FOR THE FOOT SOLDIER

A university may claim that their scientists stand on the shoulders of giants. This is true in a way, we all build on singular breakthroughs born of exceptional minds that advanced a field in a dramatic way. Yet, I would argue that this perspective completely ignores the contributions of the 'foot soldiers' that were there the entire time, constantly pushing the boundary of science. Their blood, sweat and tears created an environment where science could thrive. Without them, there would be no opportunity for breakthroughs. They are the real unsung heroes of science.

Further reading:

1. Taylor, J.Q., *et al.* Avoiding a lost generation of scientists. eLife 5(2016).
2. Daniels, R.J. A generation at risk: young investigators and the future of the biomedical workforce. PNAS 112, 313-318 (2015).

Steven Boeynaems is a VIB alumnus who worked at the Kevin Verstrepen Lab and the Ludo Van Den Bosch Lab. Recently he traded Belgium for the Californian sun. At Stanford University he keeps pursuing his passion for science and science communication.

A GLANCE AT BIOTECH DAY 2017 IN GHENT

Maksim Marissen (EOS)
"Compliments to the organization: getting 4,350 people excited about biotechnology is a remarkable achievement!"

Joël De Ceulaer (Knack journalist – moderator of the biotech talk):
"As always, it was my pleasure to participate in Biotech Day. I learned a lot."

Oscar Van Hecke (9 years old):
"I had a blast. When I grow up, I want to study biotechnology."

Lena Van Dender (11 years old):
"The day was inspiring and fun, and I definitely want to return next year!"

Kris Gevaert (VIB-UGent Center for Medical Biotechnology):
"I had a great day, and my family and friends felt the same way!"

Emilie Du Bois (14 years old):
"I really enjoyed the fact that there were experiments specifically for kids."

NEW VIB GROUP LEADER COMMITTEE

Presenting the new members of the VIB Group Leader Committee from 2017 until 2019, with Chair Rose Goodchild (VIB-KU Leuven Center for Brain & Disease Research):

- **Claude Libert**
  (VIB-UGent Center for Inflammation Research)
- **Bert De Rybel**
  (VIB-UGent Center for Plant Systems Biology)
- **Gabriele Bergers**
  (VIB-KU Leuven Center for Cancer Biology)
- **Jeroen Raes**
  (VIB-KU Leuven Center for Microbiology)
- **Rouslan Efremov**
  (VIB-VUB Center for Structural Biology)
- **Stuart Maudsley**
  (VIB-UAntwerp Center for Molecular Neurology)
- **Sven Eyckerman**
  (VIB-UGent Center for Medical Biotechnology)
- **Alexander Botzki**
  (VIB Bioinformatics Core)
- **Alan Urban**
  (NERF, VIB-imec-KU Leuven)

Find out more about this new Group Leader Committee in an interview featured in the next VIBtimes.

"The GLC is hoping to help VIB maintain its leading position in world science – including facilitating principle investigator collaborations across the institute and examining the recruiting programs that bring diverse top talent into our community."

Rose Goodchild

THE VIB CONFERENCE SERIES IN NUMBERS

500
TOP SPEAKERS

3,500
PARTICIPATING RESEARCHERS

50
COUNTRIES REPRESENTED

60%
OF PARTICIPATING SCIENTISTS WERE INTERNATIONAL IN 2017 (VS. 40% IN 2015)

SPONSORED BY
100+
BIOTECH COMPANIES

3 MILLION
ONLINE IMPRESSIONS IN 2016

27,000
CLICK-THROUGHS TO THE VIB CONFERENCE SERIES WEBSITE

3 YEARS OF SUPER SCIENCE: THE VIB CONFERENCE SERIES IN FACTS & FIGURES

Full steam ahead for the last three years, the VIB conference series hosts numerous hot spots for collaboration, discovery, and much more. Since its kick-off back in 2014, VIB conferences have only added to the prestige of the VIB brand, both locally and internationally. Now at the conclusion of another successful year full of fascinating topics and fruitful collaborations, it's high time to put the numbers – and the events' numerous fans, partners, sponsors and attendees – in the spotlight.

BRINGING PEOPLE AND TECHNOLOGIES TOGETHER

The primary goal of the series is visibility – in terms of new and established scientists as well as technologies. For example, Ruedi Aebersold (ETH Zurich), a speaker at 'Next-Generation Antibodies and Protein Analysis' in 2015, appreciated VIB uniting two very different research communities. "This program brought together scientists studying the proteome using mass spectrometry and those studying affinity reagent-based approaches – they rarely get to meet at conferences. Some very lively discussions ensued!"

Following hot on the heels of that goal is the opportunity for VIB and guest scientists to present their research and strike up groundbreaking collaborations, and not just between top researchers. PhD student Catherine Creppe (GIGA, Belgium) attended the 2016 event titled 'The Brain Mosaic: cellular heterogeneity in the CNS', saying: "I had the amazing opportunity to meet experts in my field and get detailed advice regarding my project."

MORE THAN SIMPLY SCIENCE

In addition to the presence of leading names in a variety of fields, VIB conferences also bring camaraderie and a spirit of welcome. "'At the Forefront of Plant Research' was a fully immersive experience, and a rare occasion to find top-level research in an unbelievably friendly environment," Maurizio Trovato (University of Rome) said of his 2017 attendance. "The social aspects were great," enthused an anonymous attendee of 'ER Stress, Autophagy & Immune System', held in 2017. "The speaker lineup was impressive. I really enjoyed it and would definitely come again."

BETTER EVERY YEAR, SAY SCIENTISTS

The last few years have seen participation – especially among international researchers – on the rise, with 2017 events particularly well-attended. "That was an awesome meeting," asserted Detlef Weigel (MPI, Germany) after speaking at 'At the Forefront of Plant Research' in Ghent this year. "Great speakers, great program, great venue, great city. I'm very impressed by its popularity – many recent events have struggled to attract many more than 100 participants. Well done."

FUTURE PERSPECTIVES

Over the past years, the VIB Conferences Series have definitely earned a quality label. But we are aware that there are always things to improve, for instance a better gender balanced speaker line-up. This remains a continuous point of attention for the organizers and they see to it that for every conference they invite as many female as male speakers. The gender issue is on the agenda and will be addressed to improve future conference programs.

The 2018 conference program is already available (www.vibconferences.be) and the first lines for 2019 are plotted. Looking forward to a series of inspiring meetings!

VIBES IN BIOSCIENCES 2017: SCIENCE, FUN, AND HEAPS OF NETWORKING

'Rocco Stirparo, Harmonie Etienne, Ludger Goeminne, Marleen Vanstraelen, Yessica Wouters, Evi De Keuckelaere, Marlies Vanden Bempt, Jaana van Gastel, Aleksandra Lewandowska, Jessica Vetters, Jolien Bridelance, Maria Tossounian, Iryna Voytyuk, Yannick Vervoort, Nandita Bodra and Halina Novak.

"I was amazed by the versatile, interesting and motivating topics tackled at the VIBes in Biosciences conference. The impressive presentations resembled TED talks, and the workshops made me realize that I am not alone in my problems. Events like these, where everyone gets to share knowledge and experiences, are essential for the PhD community." – One of the many positive responses from our anonymous survey.

On September 27-29, over 150 Belgian and international PhD students gathered in Ghent for VIBes in Biosciences, a VIB-funded symposium organized by a team of enthusiastic VIB PhD students.

On the first afternoon of the symposium, several workshops by training agencies True Colours, Summersault, Braingain and The Floor is Yours helped the students improve their time management, presentation and networking skills, preparing them for life after graduation.

What followed in the next two days was an inspiring showcase of science at its best: renowned researchers, such as Ruedi Aebersold, Jeff Lichtman, Carl-Henrik Heldin and Christine Winterbourne, shed their light on topics ranging from plant science to human behavior, and everything in between. Bart De Strooper (VIB-KU Leuven Center for Brain & Disease Research) and Savvas Savvides (VIB-UGent Center for Inflammation Research) proudly presented the breakthrough research at VIB, while numerous other international scientists demonstrated their efforts in big data management, innovative imaging techniques, proteomics and intricate molecular mechanisms.

WORK HARD, PLAY HARD

Wrapping up the first day of workshops, Cedric Dumont, full time Red Bull Athlete, drew some surprising parallels between extreme sports and science. Driven by his own experience travelling the world in search of new adventures and challenging projects, he encouraged all the participants to live in the moment and push their limits. After all, he claims, greatness begins beyond your comfort zone.

Mixed with the science, there was play time: during a brewery visit, conference dinner and party, the students chatted with each other and with the international speakers, building a network for their future lives as scientists. Iryna Voytyuk (VIB-KU Leuven Center for Brain & Disease Research), co-organizer of VIBes, went home with a light and warm heart: "The symposium was an unforgettable and rewarding experience. I hope VIBes in Biosciences can continue to connect and inspire young, talented scientists in the years to come."

MARK YOUR CALENDAR

Genome Engineering and Synthetic Biology
January 25-26, 2018 - Bruges

Applied Bioinformatics in Life Sciences (2nd edition)
March 8-9, 2018 - Leuven

Piano concert (Fight Against Cancer)
April 21, 2018 - Leuven

Medical Biotechnology
May 24-25, 2018 - Ghent

CTLS2018@VIB
July 1-4, 2018 - Ghent

Structural Dynamics in Cellular Communication (2nd edition)
September 20-21, 2018 - Brussels

CELL-NERF Neuroengineering Conference
September 30 - October 2, 2018 - Leuven

Metabolism in Cancer & Stromal Cells (2nd edition)
November 26-27, 2018 - Leuven

Biotech Day
October 21, 2018 - Antwerp

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