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A journal to help you survive the valley of shit

The Optimist

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EDITORIAL

*Not long ago, we found ourselves at the pub the Optimist asking ourselves: why the hell did we ever decide to pursue a career in science? A few drinks in, we realized that we would not be doing relevant science if it was easy. Moreover, in any other job we would probably be bored. To be able to survive our PhD – in a healthy mental condition – we realized we had to change our mindset. We need to learn how to deal with failure, how to be patient and how to create a healthy work-life balance. In order to bring optimism back for ourselves and our fellow PhD students, we came up with the idea for this **interactive journal by PhD students for PhD students**. Our goal is to become healthy scientists that are hardworking but relaxed, ambitious but sharing, and confident but humble. We are convinced that the best way to achieve this is by sharing our struggles and by seeing the humor in it. But that is not enough. We believe the efficiency of science can be improved. The scientific method has proven very successful over the last decades. Nothing we write down here will change this. However, we would like to step away from the idea that the current way of doing science is the only way and encourage constructive discussions. Therefore, in every edition we will focus on a topic that merits some thought.*

The optimist team

Cover: Paula Longás

Striving towards Open Science

The utopic **Open Science.. what a dream!** We are currently in the mid of 2022, science is continuously expanding and demanding a high level of expertise and knowledge, yet we are still discussing how it should be available across the community. But, what does Open Science exactly mean and what can we do to improve it? Let's discover it together.

What is Open Science?

As PhD students we usually come across this situation multiple times – we have a scientific question to answer with an experiment that is not yet established in the lab. The first thing we usually do is consult Dr. Google to find publications that may include a similar experiment and then scroll to the Materials & Methods section to get the details about the procedure. Sounds easy! However, we often encounter several problems along the way. In some cases, the access is restricted (paywall), meaning we would have to pay to actually read the paper. This situation is prevalent even in privileged European countries, where universities purchase licenses of multiple publishers to allow access for all students and personnel. Most of us have heard about [SciHub](#) – a pirate website that gives people around the world access to

research papers without subscription, bypassing copyright claims of journals. So we try our luck there only to find that the experimental procedure is very poorly explained and lacks crucial information to reproduce it.

These hurdles are just an example of Open Science gone wrong. However, Open Science entails a lot more than Open Access (OA) publication and transparency as well as reproducibility of results. In total, there are 8 areas that are mentioned in the science policy of the EU regarding Open Science, including for example the call for FAIR (Findable, Accessible, Interoperable and Re-usable data) and open data sharing, alternative metrics to measure the quality and impact of research and to take open science into account when evaluating scientists for jobs or grants.



In this piece we will focus on a few examples of Open Science that many of you might be confronted with, mainly related to publishing, as it is a requirement for most PhDs to publish, but also on reporting guidelines and open data.

How do you report your experiments in a publication?

Let's start from the beginning with reporting of experimental work. Obviously, we keep track of the experiments we are doing in a way that other people in the lab could understand our protocols and redo our analysis (let's be honest - at least ideally). However, once we want to publish findings it can be extremely helpful for interested readers to get some more information to be

able to perform the experiments in their own lab setting. For many experimental approaches there are actually guidelines on which information should be recorded during the experimental phase and later reported when publishing a study. This is useful in two ways: it allows readers to better understand the details of the experimental work helping for interpretation of the results, but also allows researchers to use the procedure for their own scientific question. Many journals are already encouraging researchers to follow these guidelines and doing so can also be helpful to identify and keep track of crucial parameters. Moving to the results of experimental work, public sharing of data, and especially datasets, is extremely important. For instance, when we generate a big dataset, we may spend months or even years on

acquiring a big amount of data, when we then have to analyze it in order to answer our specific research question. This approach does not only take a lot of time, but usually also involves quite some money spent on experimental reagents/equipment (and do not forget that you are also paid while doing the experiments!). Eventually, you can (hopefully) get some exciting insights into the biology you were wondering about, find an answer to your research question, and publish a great paper. In most cases that's it and the dataset you acquired is backed-up in some archive, because maaaaaybe at some point someone else from the lab might use it. Once you leave the lab, knowledge about it fades and no one ever looks at it again. This is quite a shame, because even researchers from a different area might be extremely interested in the dataset to answer a completely different question you did not even think about. Would not be great if they could simply re-use your data? They would save themselves months/years and a substantial amount of money, which would lead to faster improvement of knowledge in their field of research. Someone may think this is quite unfair - you worked so much and then other researchers just picked some low-hanging fruits and published their paper a lot faster and with less work. Well,

Should it not be our aim as researchers to advance general knowledge as fast as possible?

yes, in a way this may sound unfair, but should it not be our aim as researchers to advance general knowledge as fast as possible? To understand how our body works and to be able to treat diseases better, safer or faster?

Open Science: what should we share?

Coming back to the ultimate measure of being successful in academia, let's have a closer look at Open Science when it comes to publishing our research. We are all very aware of the well known saying **"publish or perish"** in academia. For getting prestigious grants or climbing up the career ladder we are usually evaluated based on our list of publications. How often and how highly did we publish? We have to compete against others, so if we have an advantage - like a great dataset that took us months to obtain - why would we share it with others so they can get a paper faster and cheaper? Wouldn't we dig our own grave like this and enable

others to be more competitive? This is obviously a bit exaggerated, but ultimately the thought of many scientists and a reason why the EU included a call for alternative metrics in their policy. Maybe researchers would have more of an incentive to make their datasets openly available if they actually got credit for it when applying for their next grant or job. While we are at it – why not do that for making software available as well! If we have free softwares and datasets, what is left is the actual publication. Well, to be honest, usually a lot of hard work too, ups and downs, maybe tears and frustration in between. But ultimately, that is our goal! And when it comes to finally publishing our data, we are confronted with the choice of how to publish. In a subscription-based journal, a full OA journal, a hybrid journal? What is the difference between Green, Gold, and Diamond OA? Does the funding source actually have requirements for this?

The answer to the last question will often be “yes” because many European funders



are committed to “Plan S”, an initiative to promote a transition in publishing to immediate OA as fast as possible, without any embargos (more on that in a bit). This is for example the case for Horizon 2020 projects and FWO fellows, who are required to publish OA, although regulations are not as strict – yet.

Open Access: which type to choose?

Let's first have a look at the different types of OA publishing: Green OA usually means that either the author-accepted manuscript (so before final editing by the journal) or the original manuscript can be made publicly available after an embargo period that may last for 6 months or a year. It is therefore not immediately available to non-subscribers, but often also does not require payment of a so-called article processing fee (APC) that is supposed to level out the loss of income compared to a subscription-based model. The next step up the ladder is Gold OA, which does require payment of an APC, but also means that the research will immediately be available to everyone. Lastly, Diamond OA is usually only an option in full OA journals and, although the article will be immediately available,

no APC needs to be paid. These journals acquire their funding from other sources as they also do not obtain money from subscribers. While the OA system has evolved from the traditional subscription-based model for many different reasons, a frequently voiced one is the wish for more equality in access to research articles. In a subscription-based model, labs or institutions in low-income countries have a disadvantage as they cannot pay the often excessive prices asked for by journals – and therefore rely on pages such as SciHub. However, the OA model is actually increasing inequality as APCs are extremely high, especially in high IF journals, so low-income labs have a publication disadvantage and need to stick with conventional publication. In turn, this then leads to less citations of their research if fewer people will be able to read it, due to the paywall barrier and a disadvantage in competing for positions and grants. A vicious circle and surely not the intended outcome of OA publishing. Overall, Open Science should be something we should all strive for. We might be the next scientists being inspired by a published dataset and be able to use it for the good of advancing a whole field. As responsible researchers, we should all encourage transparency of how our

**Open Science
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work was carried out and there are great possibilities to publish new established protocols to be used by the scientific community and guidelines that should be followed to allow reproducibility. There is certainly room for improvement to implement rewards for advancing this kind of science but we should take the initiative to start doing as much as we can. At the same time, we have to be aware of how new developments that are surely well intended could actually backfire and not result in the desired outcome. There is certainly no easy solution to any of these problems, but it is also up to us young researchers to engage in conversations about these issues and think about which scientific world we would like to live in and what would make our – and therefore most scientists' – life easier.

Written by Julika Neumann
Edited by Paula Longás, Simone Marcigaglia, & Miriam Seiti

Doing a PhD in the stone age

For this edition of our PI interview, we interviewed Prof. Dr. Eleonora Ferraris to tell us about her PhD experience. Prof. Ferraris is an associate professor in the Mechanical Engineering Department, Manufacturing Processes and Systems (MaPS) division, KU Leuven. She is professionally active in the field of additive manufacturing since 2013, with research and teaching responsibility at campus De Nayer, Faculty of Engineering Technology, as head of the research group Advanced Manufacturing Laboratory (AML). She obtained her Master Degree in Industrial Engineering from Politecnico di Milano (Italy) in 2002, and she received her PhD Degree in Material Engineering from the University Tor Vergata of Rome (Italy) in 2006. In 2008, she was granted with a Marie Curie Post-Doctoral fellowship, hosted by the KU Leuven. She has expertise in manufacturing technologies, material testing and system design. Since 2013, her research focus is on nozzle based additive manufacturing, including filament extrusion and aerosol jet printing for smart applications and regenerative medicine.



How did you come across your PhD project at the time?

I did not start with the goal of doing a doctorate program or even staying in the academy, actually I was more tending towards industry, but then the path took a different direction. At the beginning of my master thesis on micro-precision manufacturing and machining, I got very fascinated about the topic which led me to start research activities under a PhD program in the same field at the University of Rome "Tor Vergata" (Italy) in the period 2002-2005. Particularly, my doctoral studies were focused on design, manufacturing, and reliability of complex

micro/meso scale devices, including Microelectromechanical systems (MEMS), hybrid systems based on parallel kinematics, and 3D components.

How would you describe the experiences that you had during your PhD time?

Scientifically speaking, my PhD gave me the fundamentals to become a versatile scientist, especially in terms of technical expertise, management skills, problem solving, literature searching, publications, and public networking. The relationship with my promoter was mostly formal. I realised many technical and professional aspects all by myself. Also, because at that time there was no the tendency to follow technical and professional courses, or to be formally introduced to concepts such as research integrity, data management, publication strategy, project writing, etc. From a personal view, my student life-work balance was much better than the current one, as professor: I travelled across many countries and cultures, I got married, and I had the chance to explore various hobbies, such as Kung-fu, art painting, and equitation. During the following years in academia, I changed my scientific field from micromachining

PhD gives the fundamentals to be a versatile scientist

to additive manufacturing, but still there were many analogies of physical principles and process methodology. For example, in my PhD I worked on ceramic processing and now my research group is dealing with ceramic 3D printing. Moreover, electro-erosion discharge machining, which seems to have nothing in common with 3D printing, gave me the all bases of process methodology, which is not dependent on the manufacturing process.

What if you had to go back? Would you still choose your PhD?

Yes, but I would have attempted a more prestigious university and I would not have done it in Italy, probably in an Anglo-Saxon country. The salary in Italy for instance is not proportionate to the value and amount of work. In hindsight, I would have approached the academic future in a different way: I would give more attention to university rankings and the impact factor of the research team. I would have also faced many things with a different sensitivity, sometimes a little more diplomatic / observer, sometimes a little

more aggressive. On the other side, I am proud of what I have reached, since I built an interesting career, being a foreigner female researcher, a wife, and a mother.

Learn how
to recognise
opportunities

How do you see yourself in 10 years?

I see myself as full professor who has not only a research group, but higher responsibilities, and a clear path for future generations after my retirement. I see my research group more and more oriented towards 3D printing applications in the electromechanical and biomedical field. The most important social aspect of 3D printing is that it has brought the “noble cause” of manufacturing back in the heart of the society. The field of 3D printing is indeed becoming more and more preponderant, in everyone's life.

Do you have any PhD tips for us?

Realize whether you want to stay in the academy or move to industry as soon as possible. And, enjoy your PhD, take advantage of all the possibilities for cultural aspects, travelling, build your network of contacts, both professional and personal. The main lesson that I am also teaching to my students is understanding when you have an opportunity and how to catch it.

For example, a very bad turning point in my carrier development, was about an application as a professorship I submitted to a Swiss university; I absolutely believed it was my chance, however they took eventually another candidate. In the end, this event turned out to be the best choice because three months later KU Leuven opened a new professorship position, and I was the right person at the right time. Overall, I always suggest to follow your instinct and do never give up if you will find difficulties during your journey.

What do you think about Open Science?

Open science is a complex and sensitive topic, and it should be leaned. From one side, institutions pay to give researchers database access, but researchers have still to pay publication fees in most of the cases to have their work fully open and keep copyright. I personally think that the future is open access. Organizations and publishers will eventually reach an agreement to create a transparent system which is equal for all magazines. I hope that in the future the reviewing process will also receive the right recognition.

Is there life after a PhD?

In this section, we interview former PhD students about the value of their PhD and which career moves they made later on.



What did you enjoy the most during your PhD?

Despite the challenges, I enjoyed many things during my PhD. First and foremost was the project. Did you know that more than 80% of human embryos are genetically mosaics even before implanting in the uterus? No wonder

I loved to be
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comfort zone

We introduce to you Elia Fernández Gallardo, a previous PhD student under the supervision of Prof. Thierry Voet in the Laboratory of Reproductive Genomics. She is currently a scientist in preimplantation genetic testing at the center of medical genetics and reproductive medicine in UZ Brussels.

humans are reproductively so inefficient, right? In my project we used cutting-edge single-cell multi-omics technologies to try to understand causes and consequences of this phenomenon and, to me, that was fascinating. Secondly, the privileged professional environment. At the group of Prof. Thierry Voet I could learn the newest technologies in the field, I could participate in many scientific collaborations and courses and could present at multiple international conferences. I loved to be pushed out of my comfort zone. And last but not least, my colleagues. I feel so grateful to have met so many wonderful people from Belgium and

My work means meaningful for everyday

all over the world, from whom I have learned so much, with whom I have shared great moments, and on whom I could always count during hard times. We built strong friendships along the way.

Why did you decide to leave academia and go for your current job? Which steps did you have to take to achieve this?

One of my motivations to pursue a career in biomedical sciences is to have an impact in society and be able to help patients in the clinic. During my time in academia, I found that research is eventually altruistic, but on a daily basis it didn't feel like it. Besides, the sense of focus and control is difficult to maintain due to the constant input of new things.

The excess of unfinished tasks with an unforeseeable end was a struggle for me. Also, I never had the ambition to become a professor. Currently, I work as scientist in preimplantation genetic testing at the center of medical genetics and reproductive medicine in UZ Brussels. There I am able to apply my background in embryology and genetics to help couples achieve a pregnancy of a child that is free of a genetic disease or a chromosomal abnormality. It was a natural fit for my CV and interests, and it feels meaningful every day. The work is organized by a well-established routine within the team, combined with some room to improve and implement new methodologies to the diagnostics, which is a good balance for me. To find that job, I got lucky. At that time, I hadn't started the job-hunting process but a colleague found about the vacancy and shared it with me. It only took two interviews within three weeks to

get in! The bad side: I started before being able to defend, and I still have to combine the full-time job with writing my thesis.

What are your main tasks and which skills that you learned during your PhD proved to be useful?

Me and my colleagues decide, design, interpret and follow-up the genetic tests that are applied to the couples that request preimplantation genetic testing according to their indication, while our team of highly skilled lab technicians perform the lab work. Once the data of embryo biopsies is available, we decide which ones are genetically transferable. For example, families with a child affected by sickle cell anemia can have embryos selected that are free of the disease and can be a future compatible bone marrow donor for their sick child. We use haplotyping sometimes combined with direct mutation testing for monogenic disorders or low coverage NGS for large chromosomal abnormalities such as unbalanced translocation carriers. We also make use of Oxford Nanopore Technologies in combination with breakpoint PCR for small deletions or complex rearrangements. We have to report yearly on quality and performance

and we are always in constant communication with embryologists, counselors, gynecologists and clinical geneticists. My PhD has provided the knowledge about all the technologies applied as well as the biology, allowing me to quickly adapt to the new job and help in troubleshooting. It also helped me improve my resilience to challenges, flexibility to changes, critical thinking and work management. Importantly, my PhD research kept me present within the professional network of reproductive genetics.

What would you give as advice to PhD students?

PhD is a journey for growth, where many things are learned on your own. This can be painful and disappointing sometimes. Having a network of colleagues will definitely help you along the way. So, be pro-active, communicate, share your thoughts opinions and concerns, ask for help, be grateful and help create a good team atmosphere. Also, find a good balance between productivity and rest. You have probably realized that a PhD is not a 9 to 5 job, and there are always high expectations. Organize well your tasks for the day/week and



keep your objectives focused despite the unforeseen circumstances that appear. Also, create a good system of traceability for your experiments that anyone can understand: lab book, databases, eppendorfs, plates.... Most importantly never skip lunch or hours of sleep, that won't improve the outcome of your project. **As Dory in 'Finding Nemo' would say: keep swimming!**



HEY IT'S OKAY TO...

Science is serious business, but we may share similar frustrations



...leave the lab around 4PM to go back home and watch Netflix!

...explain your research for the 1000th time to your family and they still don't understand anything

... miss the coronatimes where you could work from home in your pyjamas

...feeling to escape for a short trip with friends

...do not have enough time to properly reply to emails

...not getting along with your colleagues sometimes



Pesto Flower

You and your family or friends are watching on Netflix the latest episode of your favourite series, and... let's say you want to surprise them with your cooking abilities! This pesto flower recipe is great, because it is really easy to prepare and at the same time the final result looks really great and will surely be an eye-catcher. Extra advantage: you can also very easily turn it into a nice finger food dessert by substituting the pesto, for instance with cinnamon! See the tips on the bottom of the recipe.

E n j o y

Ingredients

- 600 g all-purpose flour (wheat)
- 300 ml lukewarm water
- 1 block of fresh yeast (dry yeast can also be used, use 2 packages or approx. 14 g then)
- ½ tsp sugar
- 2 tsp salt
- 50 ml oil (best with neutral taste, e.g. sunflower)
- 2 glasses of pesto (red or green or one of each)
- 1 egg (optional)

Preparation

1. Crumble the fresh yeast into small pieces and mix with a part of the lukewarm water.
2. Mix the flour, remaining water, sugar, yeast/water mixture, salt and oil and knead until you get a nice dough.
3. Cover the dough with a cloth and let it rest for at least 30 mins, ideally in a warm spot.
4. Shortly knead the dough again and split it into four equal parts.
5. Roll out the first piece of dough into a round shape with a diameter of about 26-28 cm. You can use a plate as indication and to get a nice form that you can also use to later roll the doughs into an equally sized circle.
6. Spread approx. 1/3 of the pesto on the dough and cover it with

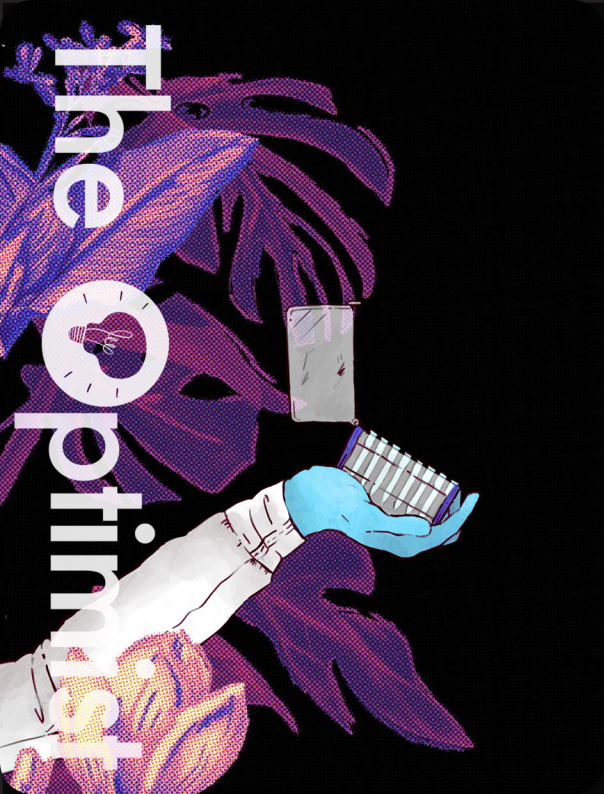


a second piece of the rolled out dough. Continue alternating between pesto and dough until you place the fourth dough circle on top of the pile.

7. Take a small glass and put it into the middle of the circle. Then start cutting the dough into four equal parts, sparing the middle that is covered by the glass. Cut each quarter into four equally sized parts, so that you end up with a total of 16 pieces. You can now remove the glass.
8. Pick up two pieces and carefully twist them three times toward the outsides, so into opposite directions. If you want some nice "flower petals", slightly pinch together the ends.
9. Continue with all other strands, forming 8 big strands in the process.
10. It is optional to cover the flower with a cloth and let it rise again for another 20 mins, while heating up the oven to 190 °C.
11. If you want to achieve a nice golden brown colour of your flower in the end, mix the egg and slightly brush it before baking it for about 25 mins.

Tips: This flower is very versatile and you can exchange the filling by anything that comes to your mind, some chocolate spread, a butter-cinnamon-sugar mixture, poppy seed filling, jam (shouldn't be too liquid) – your limitation is your imagination!

Tasty right? Enjoy it!



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Thank you

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