NGS SCHOLARS' ALLIANCE (NGSSA) EDITORIAL TEAM

NGSSA NEWS

NUS Graduate School for Integrative Sciences and Engineering
National University of Singapore

May 2018 ✣ Issue 17

NGS 10TH SYMPOSIUM

The 10th NGS Annual Symposium OCEAN

By Liam Fisher, Priscilla Boon and Francesco Gelli

This year marks the 10th year of the NGS symposium. For the last decade, this annual event has served the NGS community in numerous ways. Not only is it a venue for many NGS students to showcase their research and obtain valuable feedback from their peers, there is also the opportunity to learn from the invited speakers. Whether these are professors on the cutting edge of research, or NGS alumni forging a path outside of academia, the NGS symposium is guaranteed to offer something of value for all attendees.

This year we had the honor of Prof Luke Lee to give us the keynote speech. He shared with us his source of inspiration for doing interdisciplinary research which comes from the first four lines of William Blake's poem Auguries of innocence:

"To see a World in a Grain of Sand

And a Heaven in a Wild Flower

Hold Infinity in the palm of your hand

And Eternity in an hour"

He demonstrated to us how each line in the poem spurred him to ask questions and to think about his research questions in a new way. For example, "to see a world in a grain of sand" motivated him to develop biologically inspired nanoprobes called nanocorals (the "sand") that could probe the movement of proteins in real

time at a single cell level (a "world"). Many such examples as well as his penchant for acronyms made for an engaging and motivating talk. We came away with lessons to look beyond our own disciplinary silos, to draw inspiration from all aspects of life and to have a little fun while doing research.

After the lunch break, students and presenters were welcomed by the panel session, this year featuring three NGS alumni sharing their successful stories. Since NGS students always have to cope with a large number of deadlines, experiments, writing, teaching and so on, it can happen that we don't think too much about what's next. This is the main reason why the panel session is one of our favourite moments in each year's symposium: we forget for a short time about our struggles and focus our thoughts on what may come next.

Despite the fact that NGS alumni are always extremely busy, every year's symposium always features a brand new panel of very successful

guests, sharing their stories about their life in academia or industry. This year we had three guests covering a very diverse range of careers from physics to data analytics. The panel discussion ranged from the dream of "letting machines speak for themselves" of Dr. Kiew Choon Meng to the career steps of Dr Tang Pak Kay, founder of XGATE, to the role of developer for seismic imaging of Dr. Lee Kean Loon. During the discussion, there was a remarkable moment when Dr Tang mentioned that during his business meetings he doesn't even introduce himself as a PhD graduate. To the surprise of the audience, he replied that the skills we acquire during the PhD have more meaning than letters on a name card. The real value is in the impact on our ability to critically reason.

After one last round of student presentations, the OCEAN symposium ended with the prize ceremony and group picture. The organizers took a sigh of relief and headed home for some rest. Soon we will be designing the next year's edition!

RESEARCH, PERSONALITY

The Elements of Style

by Liam Fisher

In the compulsory NGS modules, assessments often take the form of group presentations. After the third such module with the same cohort of students, patterns begin to emerge. This presentation has the introduction specialist, who always has colourful slides and a quirky hook, but saves the content for the rest of his team. The next group has the professional smoke machine. He can follow a script with elegant confidence, but you can call his bluff in the Q&A session. Of course, there are many others who never fail to simply stand up, recite their carefully-researched technical bulletin, and sit back down again.

The point is not that some people are better speakers than others, but that each person seems to approach the task with a certain style, and different combinations of these styles are needed for an effective presentation. Overwhelming depth might make the audience switch off, but a superficial elevator pitch will be equally ineffective if stretched to 20 minutes. In our student groups we typically have a diverse mix of presenters, so we don't see any problems. But what about in solo projects, where we can't rely on teammates to cover our weaknesses? What if this 'style' preference affects more than just the way of giving a talk?

The idea of 'cognitive styles' has been explored in different ways for many years. One well-known example of this is the hemispherical lateralization idea, commonly known as left-brain/right-brain theory. Under this paradigm, the left hemisphere of the brain is responsible for logical or analytical function, while creative or holistic activities are performed by the right hemisphere. A person can then be described as either left- or right-brained based on their

preference or aptitude for different kinds of tasks. The flamboyant orators of the classroom are presumably right-brained, while the matter-of-fact technicians would fall on the left side of the spectrum.

Another framework, 'Learning styles', refers to the idea that some people learn more effectively through different methods. One such theory distinguishes between visual, auditory, and kinetic learning styles. Even your personality can be similarly categorized into different boxes, by schemes such as the Myers-Briggs Type Indicator.

These examples all have one thing in common, however. The scientific validity of each of them has been called into question. While it is true that there is some hemispherical lateralization of brain activity, such as speech function [1], the idea that the left and right sides are separately responsible for logic and creativity has been debunked. Similarly, 'Learning Styles' were also criticised in a 2009 review [2], where a panel of experts found that there was insufficient empirical evidence to support the idea that they even exist at all. The Myers-Briggs indicator has also been doubted [3], with detractors claiming that it uses vague terminology, is too reliant on honest self-reporting, and attempts to categorize individuals by dichotomizing their traits, even though most people tend to fall somewhere 'in the middle'.

Despite these shaky foundations, theories of individual style endure. The concepts of the Myers-Briggs indicator resonate so strongly with some people that they include their own test result in the personal profiles of online dating apps. (I have personally observed this, in the course of my, uh, research). Fellow NGS student Francesco Gelli told me about his favourite theory of personal style: people are either more 'front-end', being extroverted and customer focused, or 'back-end', meaning they prefer working on technical challenges behind the scenes. I tried to learn more about this theory but searching for these terms only yields references to web development. I therefore congratulate Francesco for pioneering his own theory of 'computational' psychology.

Regardless, it is clear that many people intuitively feel they can categorize themselves and others based on 'style' (my own classroom observations included) even though the scientific consensus is that such systems do not work. I do think it is true that people have different strengths, weaknesses, and preferences, and that there is value in the introspection needed to determine such things. However, I also think that people may be too eager to identify with fixed labels. Once somebody has formed a firm belief in the type of person that they are, they may resist opportunities to grow or improve, subconsciously or otherwise. Giving these labels to other people can be equally harmful, as people may be judged or be denied opportunities based on these preconceptions.

In science and in life we can often face setbacks or adversity, where we might feel that we just aren't the right person to solve the problems we encounter. Recognising that anybody has the potential to be successful at any endeavour is probably the most productive mindset in these situations, and it may be closer to the truth than many people realise.

References:

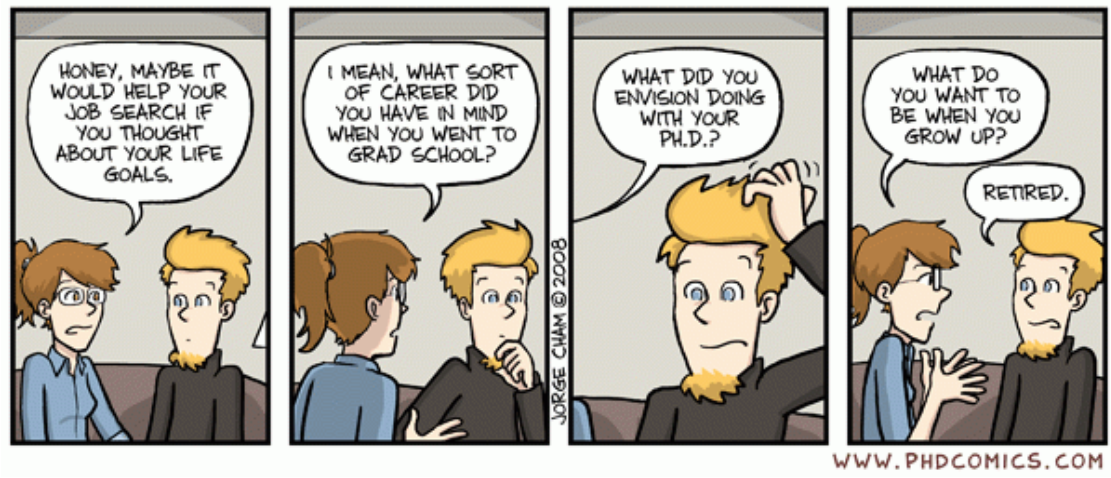
[1] A.W. Toga & P.M. Thompson. (2003). Mapping brain asymmetry. *Nature reviews neuroscience* 4, 37-48

[2] H. Pashler, M. McDaniel, D. Rohrer & R. Bjork. (2009). Learning styles; concepts and evidence. *Psychological science in the public interest*. 9(3), 105-119.

[3] D.J. Pittenger. (1993). Measuring the MBTI… and coming up short. *Journal of career planning and employment*. 54(1), 48-52

Professors, Managers and Businessmen

by Francesco Gelli



I always like listening to people's life stories, especially successful ones. One of these is from the founder of a company that offers yoga classes and products to women. I am not particularly interested in her company, partially because I have never tried yoga and partially because I am not a woman, but I was impressed when she mentioned she obtained a PhD before founding her company, in a totally unrelated area. I think the reason why that story got stuck in my head is because it felt peculiar to receive advice on PhD life from a founder of a yoga company.

Besides that experience of mine, NGS students are not unfamiliar with this kind of story, since the annual symposium regularly features guests alumni who have started their own business, and not always in fields strictly related to their PhD topic. In addition to these anecdotes, there is plenty of data on cases of former students who join careers in the industry, for example R&D or data scientist positions.

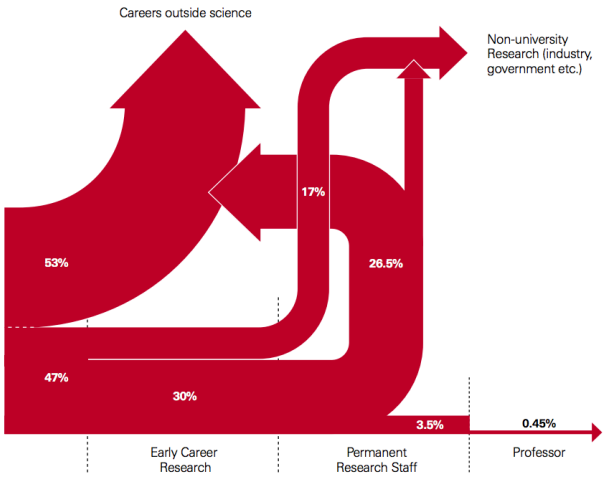
The figure below shows some percentages about life after PhD from a 2010 report by The Royal Society [1]. According to this source, only 0.45% of PhD alumni become a professor. 53% of graduates initially pursue a career outside science.

These stories and numbers lead to the following questions:

1. Given how PhD programmes are designed, can non-academic careers be seen as natural continuations of PhD studies or are they indeed very sharp deviations?
2. Are skills learned during the PhD beneficial for this kind of career?
3. Should PhD programmes take this data into account and provide a more rounded and general curricula?

My thoughts on these questions are supported by discussions with two NGS alumni: Dr Li Guangda, CTO and Co-Founder of Visenze and Dr Wang Yuhui, data scientist at Grab.

Answering the first question requires a comparison of aspects of academic vs non-academic careers and the reasons for deciding to undergo PhD studies. "They are totally two different worlds" says Dr Li. "Everything is different, including challenges, approaches and metrics. During PhD we need to conduct novel and outstanding research, while in business you focus on your customer instead and try to be always one step ahead of your competitor." So,



is it a sharp turn? Well, not exactly, according to Dr Wang. “Different yes, but not really a sharp turn, since what I'm doing in the company is not that different from my PhD research area. Besides, becoming a Professor or a researcher is not the only reason for starting a PhD. Other reasons can be joining an environment where you can find resources and network to work on your personal problem of interest. For example, companies may have large private data collections”. From this discussion it seems that we cannot find a yes or no answer to this question, since life in the industry or business can be totally different from the life of academia, but at the same time industry may be related to the same research areas and also offer a more natural environment for a research direction to grow.

The answer to the second question is much easier and will probably cause the student readers to rejoice: Yes, PhD programmes enrich their scholars with fundamental skills for industry and business as well. “Even if a PhD doesn’t teach anything about business, it certainly provides you with critical thinking skills which you can’t live without. Thinking of what competitors do already and how you can provide a better service to your customer is not that different from doing a literature review for a research paper” says Dr Li. Dr Wang adds another point: “If I didn’t take a PhD, I think I wouldn’t have mastered the ability of designing solutions for difficult long-term problems. In the company we face many challenges that cannot be solved in one or two days, these big problems don’t easily scare former PhD students, who spent years working on a single, challenging problem”. Not bad news for NGS students, it sounds like having a free business masterclass after graduation!

Finally, I wanted to discuss if PhD programmes should take these future careers into account and introduce new activities or classes in their curricula. “I don’t really think this is necessary” says Dr Li. “In the first place, learning how to do business is something you mostly learn by doing, and secondly not all PhD students may be interested in learning about markets and investments”. Dr Wang shares a similar view: “I wouldn’t suggest major changes, since most universities already have business-oriented events and programmes. However, business and industry education won’t be harmful if offered in a non-compulsory or optional way, since knowing how business work can definitely help you do more significant and impactful research”. I am personally quite happy about these answers as well, so that if NGS introduces a NGS+ PhD programme with business elements in the future, I know I didn’t miss out on much!

In conclusion, it seems that a PhD may have a more natural orientation to academia, since both take place directly in the laboratory and involve all aspects of research life. However, just as not all students need to become teachers, PhD graduates are not limited to a life in the environment that made them. Hence I would like to wish to my NGS fellows and aspiring PhD holders a great career whether inside or outside academia.

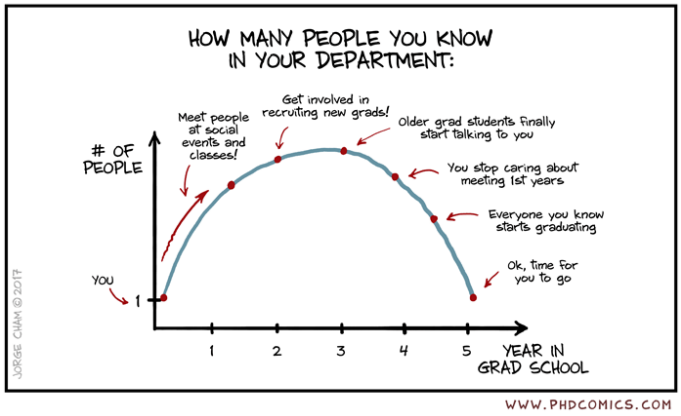
References:

[1] The Scientific Century, securing our future prosperity. The Royal Society, 2010, https://royalsociety.org/~/media/royal_society_content/policy/publications/2010/4294970126.pdf

NGSSA: Behind the Scenes

by Priscilla Boon

One of the benefits of NGS is its interdisciplinary nature. This means that you are able to take all kinds of courses and reside in almost any school or institute in Singapore. However, a side effect is that students are geographically and academically distant from one another. I joined the NGS Scholar's Alliance (NGSSA for short) in my second year when I realized that apart from the compulsory NGS modules there wasn't any other opportunity to interact with other NGS students. Pursuing a



PhD in general can sometimes be an isolating experience but there is a comfort in knowing that someone out there is encountering similar experiences and going through the same thing as you. Therefore come and join the NGSSA and be in touch with other NGS students!

But, what does the NGSSA do? In order to understand that, let me first introduce its three sections: social welfare, communications and peer mentorship, each one with different tasks and responsibilities. The social welfare committee is tasked with organizing events to get NGS students to mix and mingle. The communications committee is in charge of the NGS newsletter (Hello!) as well as the NGS Facebook page and blog. The peer mentorship committee is primarily responsible for the pairing of senior students with juniors in the "buddy" program. In addition to the responsibilities of their respective sections, all NGSSA members are involved with the planning and execution of the NGS symposium. Everything from getting sponsors, organizing speakers and marketing the event is planned by the NGSSA, with the help of the NGS main office of course. I asked three NGSSA members Simon, Su Bin and Yvonne about their thoughts and experiences in being involved thus far.

How and why did you get involved with the Scholars Alliance?

Simon: Irene recruited me during my second year, because of my previous experience in organising a conference by the School of Medicine. Initially, I was a bit reluctant to join NGSSA because my PQE was approaching. In the end, I decided to give it a shot because the team is quite flexible, and I can opt for the busier roles only after my PQE.

Yvonne: Irene approached me! When I received the invitation to attend NGSSA, I thought "why not?" Joining NGSSA is a great opportunity for me to interact and work along with my fellow NGS peers in activities other than academics.

Su Bin: I first joined NGSSA when I was first appointed as a 'co-head' of the 9th Annual NGS Symposium, last year. It was a nice experience for me and I had great opportunities interacting with many talented people in NGS. It was personally fulfilling to start something I initially deemed as 'small' eventually grow into the real university-wide event. Having been involved in NGS Symposium with no previous 'events 'experience, I've realised my own limitations at times. But along the way I learned many great lessons which can be applied in not just organizing events but also in getting through hard times. For this, I am still grateful I had the

chance to join NGSSA this year again; many thanks to Irene.

Why should other people join NGSSA?

Simon: I guess the model answer would be to contribute back to the NGS community, pick up some soft skills that can't be learned in the lab or from modules, and a leadership role will look good on your CV. The real answers are you can have time/excuses to be away from your jail (oops…. I meant lab), and plan activities that YOU are interested in (and let NGS pay for it). If you are concerned about the level of commitment, we are all busy PhD students, so we seldom call for meetings (my team only had 2 meeting during our term) and we try to settle everything via emails/WhatsApp.

Yvonne: It is a great opportunity to be exposed to the experience of organizing a symposium right from the start. The seniors are also very patient and friendly, and are willing to show us the ropes. I also made a lot of friends in the process of interacting and working alongside so many people.

Su Bin: I find NGSSA serves an excellent networking 'platform' to, literally, get to KNOW EACH OTHER. There may be students who find these sessions as a time away from their lab and thus research output, but who knows, this may be another excellent opportunity to find a potential collaborator and produce great science :)

These are sentiments I share as well, and despite the extra activity involved, it is indeed quite enjoyable and a great opportunity to meet people I would normally have never crossed paths with. It is a wonderful chance to contribute back to NGS and to feel a sense of satisfaction when the events planned reach their purpose of bringing together the NGS community. So if you are interested in joining the Scholars alliance please email ngscic@nus.edu.sg and it will be a decision you will not regret.

NGSSA Editorial Team. May, 2018