NGS Scholars’ Alliance Editorial

NGS Scholars’ Alliance is an official student group for NUS Graduate School for Integrative Sciences and Engineering. Established in 2005 to serve as a platform for exchange amongst all NGS scholars. This student body will also facilitate the personal development and leadership training of our scholars. NGSAA is also the key to developing, creating and fostering NGS community and identity.

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Inside this issue:

RISE Symposium 1
Induction Day 2
NGS bonding 3
After Hours… 4 – 8
Articles
- Perks & Challenges of Research Life
- Life outside of Lab
- Quick tips for scientific communication

“Do a PhD where you learn to learn”

-do quote from Prof Too Heng-Phon in his keynote speech for this year RISE symposium

From previous year’s iLOR (innovation, life, opportunities and research) to this year’s RISE, there is a shift in focus towards a discussion on translational research and research-based start-ups. In line with this theme, keynote speaker Professor Too Heng-Phon, founder of local start-up MiRXES, and various NGS alumnus and industrial speakers who are co-founders of start-up companies were invited to share their experiences in “bench-to-business” research.

The insider knowledge shared by these speakers was an eye-opener. It was no wonder that the NGS graduates responded actively during both the talks and focused discussion as they tried to understand the technicalities involved in translating research to business. Some quipped about business management in start-up initiatives from a group of budding scientists, while others wondered about the differences in interactions with various international collaborators. It was indeed a fruitful day spent with these innovators.
Continuing the tradition of past NGS symposia, the event provided a platform for the NGS graduates from various fields of study to present their research to their fellow PhD comrades – in the TED-talk styled way such that biologists could easily understand the engineers and vice versa. This year, we had 9 oral and 25 poster presenters showcasing their research. The event concluded on a happy note as the graduates gathered insightful information from the invited speakers and also took the opportunity to catch up with fellow NGS friends who came together from their various institutes.

A new batch of NGS students had arrived! Despite being a smaller intake, the 13 NGS students shared the same anxiety and excitement for embarking on their PhD journey as their peers. Tzu-Rung, a first year NGS student described her initial feelings as being anxious and excited during Induction Day. We can all remember what this felt like during our own Induction Day and it is a shared experience amongst us. The induction started with Executive Director of NGS, Professor Phillip Keith Moore delivering a welcome speech to the new students. Professor Ding Jeak Ling, Deputy Executive Director of NGS, shared her past experiences on the part and parcel of being a NGS PhD student and the matters close to our hearts.
Over lunch, the new students got to know their senior buddies better and the journey ahead started to seem less daunting. It is always comforting to know that there is someone—who has gone through the same process—there for you if you need any advice or help in the PhD journey. To facilitate the bonding between senior buddies and their juniors, we had some all-new ice breaking games that stimulated both our funny bones and our brains. The ice breaking games were perhaps one of the most memorable part of the event Eric Linardy, a new NGS student agreed, “I remember the games the most. It was very fun and I got to know most of my NGS peers then.”

The fun continued when the juniors and their senior buddies continued with more bonding opportunities, where they competed against each other in a mini bowling tournament. The new friendship made between the juniors and their buddies were strengthened, with clever jabs and seniors competing for the best and worst scores. It was a rare occasion for many PhD students who barely knew how to bowl, to come together and to have a good time. The night ended not only with laughter, but it was great to see both juniors and senior buddies learning more about each other and becoming much closer.

**NGS Bonding Sessions**

NGS scholars form a large community of students who come from all walks of life with diverse nationalities and backgrounds. Despite our differences, we often come together to share our research experiences and actively learn from each other. Apart from our indefatigable strive in our research, many of us also participate in social bonding events to make new friends and to catch up with old comrades. NGS organizes bonding events periodically within the academic year to promote interactions between students. For instance, there were two bonding events held last year (2015) – the Halloween party and Christmas party.

On 4th November 2015, we held our first ever Halloween party to bring students together and to offer them a respite from their research work for a little while. To create the Halloween ambience, the NGS cluster was meticulously decorated with bats, pumpkins and anything remotely horrifying. A total of 39 students turned up for the event and some were well-dressed for the occasion. A murderous-looking mad scientist, a wicked witch, and even an “undead” with a knife across her skull were spotted! Immersing in the theme of the event was exhilarating. We enjoyed good food and simple interactive games during the short event. At the end, we awarded prizes to the winning team at the games and also to the two participants dressed in the Best Halloween Costume.
The Christmas party was held on 18 December 2015 and it was a huge success as a total of 31 students turned up for the event. The event was also held at the NGS lobby and the students gathered together for a cozy chit-chat session before the sumptuous dinner arrived. Apart from the delicious feast, the best part about Christmas party was no doubt, the Christmas Presents! A gift exchange session was conducted and the unexpected gifts certainly brought a smile to the faces of every student.

For many students, the bonding sessions were timely respite from the hectic pace of research work. Hence, NGSSA and the students involved would like to thank NGS for their continued support of these social events for students. We look forward to more bonding sessions and wish great success for all future events!

After Hours...
~a section for light-hearted articles that are close to a research student’s heart~

Perks and Challenges of Research Life

We all enter graduate school with different reasons and goals to achieve. Regardless, all graduate students started with a similar zest for the challenges that would come. However, as we progress further into graduate school, the initial enthusiasm felt could gradually be dampened en route to achieving the doctorate degree. A survey done by University of California, Berkeley on science and engineering PhD students found that between 42%-48% of them felt depressed with “minimal career optimism and academic engagement”. What could the graduate students be facing in the academic environment that could have intimidated them?

- **Is it the long working hours?** – The need to withstand experiments that stretch throughout the night, days or even weeks. Additionally, having to painstakingly collect data, to plan upcoming experiments and to constantly keep up with literature articles published in one’s field of study.

- **Is it the uncertainty associated with research?** – Religiously memorizing facts through well-organised textbook and slides from lecturers no longer suffice. You realise that facts change everyday, paradigms shift in the blink of an eye, people constantly debate about the basic functions of supposedly well-established proteins, and you just don’t know the outcome of an experiment until you go on to do the experiment yourself.

- **How about the deadlines to look out for?** – Similar to your friends working in non-academic fields, you have to attend meetings and make sure you update your supervisors about your research progress regularly. Moreover, you have to keep a look-out for the important milestones one after another, such as TAC meetings, the PhD Qualifying Exam and final PhD Thesis Defense.

- **Is it the need to communicate with different people?** – While the common misconception of researchers is that we constantly bury our heads under test-tubes or stay immobilised in front of computers to do coding, that is often not the case. We have to communicate with people of various persona and background, not just within
our own work environment but also outside the laboratory, such as during a conference. While there are definitely lab mates whom you can laugh your lungs out with, there are also bound be people whom you can come into conflict with and have to manage appropriately. There is simply too many balances to achieve whilst still juggling with the 304954309 samples to analyse and 3904239 more experiments to perform.

And that’s just a non-exhaustive list of “banes” that you could associate with doing research. It could be all these priorities of a graduate student that slowly erodes our enthusiasm for research, and that could have raised the alarm for the university which had conducted the abovementioned survey. However, while we could be sighing our hearts out during gatherings with fellow PhD comrades, take a step back and ask yourself again – what is the reason that made you sign up for a PhD programme initially?

Is it the pure interest for the field of study that you are in? Is it because you were always curious since a young age? Is it that inspirational character who encouraged you to go into that field of study that you are currently pursuing? You are where you are now because of your aspiration and you had the opportunity to fulfil that dream of yours. The truth is, no matter where you end up at, you are bound to face the same types of “banes” and stressors to overcome. Okay, perhaps the working hours of typical 9-5 office jobs and other general occupations are more regular. Nonetheless, there are still deadlines to meet and different characters to deal with, innocuous or not.

My opinion? Since you are already pursuing what you initially aspired to do, hold on to that conviction of yours and overcome whatever challenges you face. You are here to develop yourself personally, you are here because you love biology, physics, engineering or even research itself, and you are here because you believe this is where you will be the most satisfied in life. Moreover, it’s not just “banes” that you see in research, there are “boons” as well.

- For those who love their field of study, you are in fact basking in the things you love everyday and you are given the opportunity (and library access) to read deeply into the subject matter.
- Many graduated seniors would have said that the journey is arduous, but would also agree that it was a great journey of personal development. Although challenging, this is where it would be most rewarding as well, whether you decide to embark on the academic route post-PhD or not.
- You get to experience interacting with people of different personalities, interests, cultures and background and that itself is already a good learning journey.

In fact, most of the banes that you might have associated with research can be transformed into a boon, eventually. Such is a matter of perspectives. Ultimately, we are all here for that innate reason to enter graduate school, whatever it could be. Being able to fulfil that reason is good enough reason for you to stay. Stick by the decision, find back the zest you initially possessed and face whatever challenges that comes, bravely.

**Living Life Outside of Lab**

There is no mistaking a graduate study for a leisure journey. Embarking on a graduate life can be unnerving and challenging. The challenges include struggling with the sudden flood of knowledge, keeping up with the tedious and demanding research work and most importantly, dealing with the uncertainty of our future. To deal with the stressful research or studies, one must seek balance between “work and play” in their graduate life. As the saying goes – “All work and no play makes Jack a dull boy (or Jane a dull girl!)”. Therefore, participating in recreational or social activities outside of the laboratory can be essential to help the students to cope with the ever present pressure.

Planning a short respite from mundane laboratory routine now and then can help students destress and recharge for the next task. Most importantly, these social or recreational activities can also help to enrich our graduate life. Many of my fellow Ph.D. friends have at least one hobby outside of the lab, ranging from Chinese orchestra, dancing, photography to doing sports such as running marathons. After conducting a poll on NGS students, 84% (20 out of 25 students) of the respondents (Fig. 1) expressed that they do take part in social or recreational activities outside of graduate studies. Of course, there are always some of us who wondered:
“Where do we find time for such activities?” It is indeed true that graduate studies are always depicted as a rat race to produce data, analyse results and to publish novel articles in top-tier journals. The answer! You have to make time for it, plan for it and put it down into your ever-so-packed schedule. Time management is perhaps one of the most basic and important (probably the hardest) skills to pick up along the Ph.D. journey. Committing valuable time to these leisure activities is the first step forward.

Does it really help in my scientific and academic career? The answer could be a yes or a no. Many successful scientists have hobbies outside of their research work. A commonly quoted example is Albert Einstein, who played the violin when he was not working on developing the theory of relativity. A study by Root-Bernstein et al. (2008) tried to establish the link between the pursuit of the arts and scientific success. The primary results suggest that elite scientists, compared to general scientists, are more likely to have a hobby relating to arts and crafts. Furthermore, some hobbies such as painting or drawing, singing and art sculpting seem to be correlated to the scientist’s impact factor scores. But some may argue such associations are not causal and have nothing to do with their ability to excel in academia. Having a hobby, or not could be non-consequential to your scientific progress. However, the main idea is that learning to juggle the time between your research, studies and leisure time is possibly the key to academic success.

Moving away from the scientific literature, my personal opinion is that getting involved in social or recreational activities with friends is a good way to get a mental break from work-related stresses. Most importantly, inter-personal interactions promote positive thinking and broaden your views from the “tunnel-vision” of science or engineering work. From the aforementioned NGS survey, 56% of the students agreed that social or recreational activities are very important and it is a must-have for graduate life. To quote some of them, these activities helped them to “recharge creatively”, “stay focused”, “release stress” and even to “keep a sane mind”. Be it sports, arts or volunteering activities; as long as it helps to motivate and encourage you to keep on track in graduate studies, it is worthwhile to invest time and effort into such activities. To highlight, the most popular activity among students is simply just staying home and relax (nothing to do with hobbies or recreational activities!). A well-deserved break is important to reset your body to take on new challenges. We hope that after that break, NGS students will be more motivated to pursue a new hobby. After all, there are so much more to explore, learn and experience outside of lab. To put it simply, maybe it is time for you to take up a hobby today, if you didn’t have one before!
Quick tips for scientific communication

Communicate as a scientist

Communicating science to others can be daunting. Distilling complex concepts riddled with intricate details into bite-sized, easily understandable ideas is a challenge. While we spend our days knee-deep in our research, we seldom realize that as scientists, be it a novel concept in biology or a latest breakthrough, it is fundamental for us to convey our ideas effectively across to our audience. The aim is to let others understand the ideas behind our research and to gain new information that can be useful to them. Here are some things to keep in mind no matter if you are writing a scientific paper or planning a talk to cater to a wider audience.

Define the purpose of your writing and stay focused

Why are you writing this report? What is the purpose of the presentation? Knowing the purpose behind communicating your research is the first step of effective communication. The purpose of your writing or talk changes your focus on the information presented and the emphasis is placed on certain ideas more than others. In the setting of a progress report, the emphasis could be placed on the methods and interpretation of the results of an on-going project, whereas a presentation to potential collaborators would emphasize on the future directions of the project and provide a "big picture" perspective.

The same approach of focusing on the big picture is especially useful when the purpose is to introduce your research to an audience, made out of non-specialists outside of your field. Instead of focusing on the details, which can disorientate your audience, the general conclusion or finding of your research can be emphasized.

Know your audience and prepare for them

Put yourself in your audience's shoes. Understanding the perspective of your audience will help you decide what should be left in and out of the presentation or writing. Who is your likely audience? Are your audience mainly experts in the field or the general public or a heterogeneous mix of both? These questions guide your preparation and delivery of the information, from the amount of assumed background knowledge to the use of technical terms and the level of detail needed. You can treat your likely audience as your primary audience, whom you can tailor your presentation or paper to. Be ready to define terms and concepts used in the writing or presentation in the introduction if they are mainly non-specialists. Specialists on the other hand would want more details, depth in the interpretation of results to be convinced by your article or talk. Especially in articles, your audience can be undefined, whom you can consider to be the secondary audience. They can be a heterogeneous mix of specialists and non-specialists. Scitable by Nature Education suggests to place information everyone needs to know first in a summary, followed by detailed information for the readers who want to know the intricate details.
Write to include everyone in the audience

Effective scientific communication should make sense to a broader audience with a scientific background, even if they are not experts of the field. Overly technical articles and talks can feel foreign and exclude people from understanding the broader context. The use of technical jargon without context and explanation hinders the audience from understanding the information that you want to convey.

Despite having an audience of scientists, the level of specialisation will likely vary between the audience members. Ever so often, we might assume that the audience would have the same prior understanding of the field as we do—as if we were writing or speaking to ourselves—and fail to realize that it is hardly the truth. We can be close to, if not the experts of our field unlike our audience. We should never assume that the audience is already familiar with the concepts presented, but instead always provide context and sufficient background to include the audience in a dialogue of our ideas and research.

Paint a picture for the audience

It is difficult to visualize abstract ideas. In a presentation or a talk, we can use images and animations to show what we mean to our audience, but that is challenging simply in words. Being unable to visualize an idea makes it difficult to understand the idea as well. The answer? Paint a picture with words. The use of analogies helps the audience to visualize what you mean in words. My favourite example is the using of an analogy to explain the properties of DNA and the central dogma of molecular biology. DNA is similar to a library of recipes stored in books and holds the information on how to make parts of a cell. A version of the book is copied (RNA) and used as a recipe to make the components in a cell (proteins). This example helps budding biologists remember the central dogma and at the same time, paints a vivid picture which will aid understanding. Aim to present your ideas in a vivid way to be remembered by your audience, to leave them thinking, while walking away from the presentation.