NGSSA BONDING EVENTS
The obligatory coverage of the freshest induction day and all the related fun

RESEARCH, REFLECT I
Private information and ethical dilemmas for researchers in Machine Learning

CHIT CHAT WITH THE DEANERY
A conversation with Dr. Joan Lee, dedicated to your mental well-being

RESEARCH, REFLECT II
A few thoughts on scientific misconduct

PROMO TIME!
The 10th NGS annual symposium will be held this coming March!
NGSSA BONDING EVENTS

I went to all the Newbie Welcome Events back in July

by Liam Fisher

On the 27th of July, the NGS cycle began once more with the induction day for the new intake of graduate students. I headed down to CeLS as a member of the contingent of seniors, in attendance to facilitate the ‘buddy system’ for helping the new students adjust to NGS life. Each year the organizers plan an icebreaker game to introduce the two groups, and this year was no different, with four teams competing against each other in a kind of telephone/charades hybrid. Overall, I have to say that the performance was Golden Raspberry Award–winning. Science nerds are not renowned for their charisma and this task really pushed us to the limit. Bacteria multiplying in a dish would have provided a more compelling display. Chemistry students were present but actual chemistry was not. I could go on. Fortunately, all things must come to an end. Unfortunately, so did the subsequent lunch break. I headed back to the lab, taking comfort in the knowledge that all of us will at least be more successful as scientists than as thespians.

Only a week or so after this introductory session, the NGS social team had organized another event. This time we were going to be battling in the other preferred arena of science nerds: sports. The plan was to meet with our buddies at 6pm to go bowling. However, upon arriving at the MRT I checked my messages to see that my buddy had cancelled at the last minute. This seemed to be a common theme among the seniors in attendance. Naturally, this could only be a sign that NGS students are highly dedicated to their work and we were all very impressed. What I was not impressed by was the 6pm crowd at the bus stop. When you take the shuttle from Engineering to PGP at 11 PM every day you start to forget what rush hours look like. After three buses passed us by we eventually made it to Clementi West Bowl without any drama.

With the bowling underway, I quickly positioned myself as a top scorer, challenged only by a mystery rival from the other lane. I wish that statement was artistic embellishment, but there are many NGS students spread all over the NUS campus and it’s difficult to get to know them all! An excellent reason to attend the NGS events. After a narrow loss in round 1, I fought back in the second game to beat him (and everybody else), with a high score of 177. If only my simulations produced such promising results. The biggest loser of the evening was not even related to the bowling, as one of our
colleagues still had to go back to their lab at about midnight, to prepare some cells for the following day. With the high level of commitment demanded by research, the events that NGS organizes to relax and socialize are certainly welcome.

CHIT CHAT WITH THE DEANERY

When the going gets tough, sometimes the tough doesn’t seem to get going

by Priscilla Boon

Have you ever felt like everyone has their act together but your work is not going as well as you would like? Maybe you’ve been feeling that there is a cloud that just wouldn’t go away or leave you alone. As someone who sometimes struggles with feelings of anxiety and inadequacy, I know that those moments can be challenging and the state of my mental health comes into question. Mental health is not the absence of a mental illness. The World Health Organization defines mental health as “a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community.” A recent study conducted on PhD students in Flanders, Belgium found that one in three students were at risk of a common psychiatric disorder. Given such a high risk, I had a chat with Dr Joan Lee on some of the issues NGS students face especially when it comes to mental health and what we can do about it.

What are some of the common issues NGS students face?

Depression is the most common issue. We have also seen students with anxiety issues. The main reason why students experience depression or anxiety is the lack of progress in their research, or a possible lack of lab support. If students come to us early, we can help support them in a timely manner.
How do you know when a student is struggling? Do they come to you voluntarily or ...?

Yes, we have students who come to us voluntarily; he or she knows that help is needed. We also refer to TAC reports and progress reports. If required, we will invite the student in for an advisory/counseling session to see how we can help them as well as we can. Sometimes the supervisors will let us know if their students are suddenly “Missing in Action” (MIA). We encourage the students to be honest about how they are coping with everything in the candidature and to contact us if things have not been going well for some time. We keep whatever is discussed at our sessions confidential.

As a student how do we know whether something is wrong or whether we can cope with it? At what point do we need to seek help?

During the PhD, students have to contend with challenges at every turn. If you can still see a general plan to your research, and you are able to find solutions to the problems that you are facing and can identify who you can go to for advice then I think you are still alright and in control. But if you are totally lost, you don’t have any plan and you don’t know who you can reach out to for help in terms of emotional support as well as technical advice about your project then I think you should urgently seek help. Also, if you are perpetually stressed, are constantly falling ill and suffer from chronic headaches, insomnia, ulcers etc., please approach UHC CPS (Counselling and Psychological Services) and NGS and connect with your supervisor. So, it is when you feel the total loss of control and physical ailments start to bother you over a period of time, then you should reach out to your family, circle of friends, supervisor, NGS and CPS for help.

Our generation has been called many things – narcissistic, lazy, self-centered, rude and disloyal – the “strawberry” generation as it were (because we bruise easily) and so sometimes we may fear retaliation from our supervisors if we are seen as struggling, how can NGS help students like that?

I don’t think laziness is a characteristic of NGS students, most NGS students are pretty driven. But some students do struggle with taking hard knocks/failure well. We try our best to support these students and help them to be aware that a PhD is not for the faint hearted and you need a lot of resilience. And your strawberry has to become something ... maybe like a durian! We try to help them see that they have the inner strength and they just need to harness it. Don't give up, basically. Of course, we let them know that they are not alone and that we understand.
We've been through it to different extents and we really do empathize. We want them eventually to overcome those obstacles and achieve what they are here for, which is the PhD.

Most students do not inform their supervisors that they are in trouble. If required, we will seek the supervisor's perspective and advise the student on the steps to take to improve the situation. We play an advisory role in NGS. We recognize that most students keep their difficulties to themselves. If they don't come to us then we are unable to help them.

**What are some the things we can do to have good mental health?**

Self-help is the first thing. We all need proper rest, proper nutrition and regular exercise. Many students make drastic changes to their lifestyle when they start the PhD. Have enough “me” time to engage in activities that you enjoy. If you stop all these, then you might feel that you are sacrificing so much from your past life so that you can do this PhD. Self-help also means that you make time to connect and build relationships with those around you. Neglecting these will add up over time and lead to poor mental health. If you need help you can also go to UHC CPS for free consultations where you can talk about your problems, unload and get some strategies or new ways of looking at things. They complement what we do. We try to help students on the academic side and if they go to UHC CPS it is a completion of the whole therapy. It helps you to a greater extent than just going to either on its own.

So, I am personally comforted to know that we do not journey alone, that many have gone before us and have not only survived but they have thrived, and that we do have help whenever we need it. We should be more aware of our mental state and give it the care it deserves so that we may achieve our fullest potential. I thank Dr Lee for her time and her genuine concern for us students.

**If you would like to talk to someone, please contact:**

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UHC Counselling and Psychology Services:
Phone: +65 6516 2376
Email: cps@nus.edu.sg

Lifeline (life-threatening psychological emergencies, 24 hours):
Phone: +65 6516 7777
In one episode of the television series South Park, a young clever student develops a technology called “emoji analysis”, which is able to predict who is the author of anonymous emails or texts. This technology identifies each individual by his own unique emoji style. When the technology is announced on the news, the whole planet falls into turmoil, hinting that almost every citizen is terrorized by the idea of public disclosure of their anonymous online content. Besides being funny, the South Park episode offers us opportunity to reflect on the following question:

*How much attention should we pay to the safeguard of our personal information?*

We commonly share personal information on the internet and social media profiles. Most sites allow us to choose what information is accessible, meaning relationship status and age are commonly kept private, whilst email addresses, names or profile pictures are often made public. But what if this seemingly harmless public data, can be used to predict other information that could indeed harm us? For example, most Facebook users have a public display picture of themselves. Can this kind of disclosure of our face be harmful or used for evil goals? Seems improbable no? Well with computers and machine learning, this may not be the case.

Machine Learning (ML) is a sub-discipline of Artificial Intelligence (AI) in which computers are trained to imitate, or even outperform humans. For the purpose of this article, you can think of machine learning as a black box system (with lot of complex math inside) as in Fig 1. Like a newborn baby who never saw the world, a ML black box starts unable to make any reasonable predictions: it is just a bunch of math equations and random numbers. However, as it observes more and more data, it slowly starts to make meaningful predictions and with enough data it can even outperform humans.

Does it sound like science fiction? Absolutely not, we interact with these kinds of machine learning models every day, whenever we browse recommended videos on YouTube, whenever we use any translation software or even when our smartphone’s keyboard suggests the next word to be typed. YouTube or Amazon use this type of technology to help select personalized recommendations of videos or products for us. Inspired by that episode of South Park, we can ask ourselves: does this kind of intelligent system represent a threat to our privacy? Can ML predict private information about us, given our public information?

Let’s examine two recent examples. A study published in Journal of Personality and Social Psychology by a group from Stanford University showed a dangerous application of machine learning: predicting the sexual orientation of an individual from a facial image (Fig 2) [1]. In this study, the authors discovered that computers trained with thousands of images from a dating app can outperform humans in this task.

The reason to be scared for these results is obvious. Most people would happily share a public picture of their face but not many would indicate their sexual orientation as in some contexts or cultures, homosexuality is a reason for discrimination or can even considered a crime. Unsurprisingly, the authors of the paper
received serious criticism for conducting such a study [2]. Readers are encouraged to check out the “I hope somebody will kill you” section in the author’s note of [3], to have an idea of how far some of the reactions go.

Another recent case is the face recognition app FindFace, which is able to match a face of a person with profile pictures from social networks to predict the identity of a person [4]. If the reader watched the Japanese show Death Note, he or she may remember a demon offering a man this ability in exchange of half of his lifespan. Thanks to machine learning, nowadays you don’t need to find a demon and trade your soul, you can just download the app and you will have access to this devilish power with 70% accuracy!

From these privacy violations arises an ethical problem for researchers in machine learning: is it acceptable to publish results that may educate criminals to harm individuals? It is a double-edge word scenario: is it acceptable to publish something that can be used for evil purposes, even for a greater benefit? In the case of machine learning, the technology and data are already out there and often easy to collect and use. The cat might already be out of the bag. Therefore, it is important that we are being educated on this sort of privacy threats, so that we can plan more responsibly on what information to disclose.

In conclusion, machine learning technologies are a potential threat to people’s privacy: public data can be used to accurately predict private information. However, this shouldn’t be a deterrent to conducting research on machine learning applications, as such studies play a very important role in educating the public to privacy risks.

References:
[3] Author’s note: https://docs.google.com/document/d/11oGZ1Ke3wK9E3BtOfFfUQuaSMR8AO2WfWH3aVke6U
NGS students may come from different faculties and backgrounds, but we still have a lot in common. Chief amongst these similarities is their familiarity with research ethics cases, thanks to the stimulating course hosted by Prof Tang. While our artificial scenarios were interesting and complex, some of us may have wondered about how commonly such situations occur in real life, or how serious they can be. To consider these questions, we look at some recent cases, both involving NUS and external institutions.

On the 19th of September 2011, the popular blog RetractionWatch noted that there seemed to be a pattern developing regarding the manipulation of published scientific figures [1]. One paper in *Science* had been corrected after a reader “noticed that something was wrong” with a figure, and another in *Nature Immunology* was retracted after figures were found to have “irregularities”. The corresponding author for both papers was Professor Alirio Melendez. At the time, Melendez was working at the University of Liverpool, but had previously held positions at the University of Glasgow, and at NUS, where he produced a significant amount of the work in question.

These initial findings prompted a critical investigation of Melendez’s publications. He was suspended from his position at Liverpool pending the results of inquiries at both his current and previous universities, which were reported to be verifying the legitimacy of as many as 70 papers [2]. Amidst this increased scrutiny more problems were uncovered in articles authored by Melendez, the most common complaint continuing to be the duplication of identical figures across different studies.

Before these university investigations concluded, Melendez had resigned from his position at Liverpool. As more retractions began to accumulate, both the University of Glasgow and NUS finished their investigations. NUS declared that fabrication, falsification, or plagiarism was found in 21 papers, but would not reveal specific details of their findings or even what those papers were [3]. A statement from Glasgow was even more vague, with a *Times Higher Education* article noting that “it was the university's policy not to comment on individual cases”, although “relevant journals would be contacted where retractions or corrections were deemed necessary” [4].

A copy of the NUS report was evidently made available to Melendez, who has created a webpage dedicated to refuting each of the claims made by NUS against his publications [5]. The most common defense is that his role was to design the experiments or act in an advisory capacity only, so while the papers do contain fabrication or plagiarism he is therefore not directly responsible. While this excuse may deflect some of the culpability for the problematic figures, it begs the question as to whether Melendez should have been recognized as an author on these publications in the first place, if he consistently had such little oversight over the work his lab was producing.

On the current version of the RetractionWatch leaderboard Melendez has the dubious honor of being listed in 28th place, with 17 retractions. (Jan Hendrik Schön, whose exploits were discussed in the GS5002 lectures, is all the way up in 9th with 36 compromised publications). His own website describes him as a “freelance scientific consultant” [6], and since the conclusion of the NUS investigation he does not seem to have had a professional affiliation with
any university. With the limited amount of information available, further commentary on the extent of Melendez’s involvement is limited to speculation, but the case serves as a reminder that NUS is certainly not immune to accusations of scientific misconduct.

In more recent news, Chinese laws are being designed to make drug approval both faster and tougher [7]. The consequences of misconduct under Chinese legislation can be extremely serious, as researchers can face jail sentences or even the death penalty. In 2007, the former head of the Chinese FDA-equivalent was executed for approving medicines in exchange for bribes, after some of these drugs were fatal for patients. Under a new interpretation of China’s criminal code, similar sentences could in theory be applied to researchers who falsify data in drug trials.

So why has there been such a sudden shift? In 2015, the China food and Drug Administration (CFDA) required the applicants of 1622 registrations to perform self-examination of clinical trial data [8]. Surprisingly, 1193 voluntarily withdrew their application, hinting that the process of drug approval was not transparent enough. A separate survey estimated that 40% of biomedical papers in China involve misconduct [9].

Despite general agreement that research misconduct is a real problem, opinions differ on the most effective way of addressing it. Some researchers suggest “meaningful penalties” as a solution for countering misconduct, combined with mandatory training, conscientious mentoring and protection for whistleblowers [10]. On the other hand, Prof Martin Reinhart from Humboldt University of Berlin has stated that “law-and-order policies have devastating effects” [11]. He argues that punitive measures should be replaced with preventive tactics, such as “setting up university commissions for good scientific practice, and introducing regulations for responsible research.”

In conclusion, research misconduct is not confined to the realm of the hypothetical. Fraud and scandal are constantly happening in the scientific world and the consequences are often serious. So how can we prevent this? Are more severe controls the way to go? There are no simple answers. But, since all NGS scholars have received comprehensive education in this subject, we can start by being an example for the next generation of scientists!

References

[7] https://www.nature.com/articles/n-12286656
10th Annual NGS Symposium

NUS Graduate School for Integrative Sciences and Engineering (NGS) Symposium is a cherished tradition of the NGS community which has served as a key event for NGS graduate students to showcase their research and learn from invited speakers. This coming year, our theme (OCEAN) focuses on three key aspects: 1) Fostering collaboration within the school’s community, 2) Creating awareness for career planning, 3) Providing a platform for networking within the community.

📅 1st March 2018 (Thursday)
_CLOCK 9.00 a.m. - 5.00 p.m.
📍 Ngee Ann Kongsi Auditorium, Level 2
Education Resource Center, U-Town
📝 Registration dateline: 1st Jan 2018

Participate and stand a chance to win gifts and vouchers!

Current Student

Prospective Student

Contact us for more information:
ngssa.nus@gmail.com
The 10th NGS SYMPOSIUM — OCEAN

NUS Graduate School for Integrative Sciences and Engineering (NGS) Symposium is a cherished tradition of the NGS community which has served as a key event for NGS graduate students to showcase their research and learn from invited speakers. This coming year, the NGSSA committee presents a new theme for the 10th NGS symposium – OCEAN: Opportunities for Collaboration, Employment And Networking. From this symposium, we hoped to foster collaboration within the NGS community through idea sharing in the format of oral and poster presentation. In addition, we aimed to create awareness in future career planning for our graduate students by conducting career talks and inviting representatives from various companies to the symposium. Lastly we strive to provide a platform for networking within the NGS community as well as an opportunity for prospective students to network with current NGS students to have a better understanding of NGS.

To start off with the event, we have invited Professor Luke Pyungse Lee as our keynote speaker. Professor Lee is a Tan Chin Tuan Centennial Professor, Founding Director of the Biomedical Institute for Global Health Research & Technology (BIGHEART), and Associate President (International Research and Innovation) at National University of Singapore. He is also a Fellow of the Royal Society of Chemistry and the American Institute of Medical and Biological Engineering. With over 350 peer-reviewed publications and over 60 international patents filed, Professor Lee is a world-renowned pioneer in nanobiophotonics, plasmonic resonant energy transfer (PRET), optofluidics, rapid photonic PCR, microfluidics for quantitative life sciences, and integrated molecular diagnostics systems (iMDx).

The symposium will be held at Ngee Ann Kongsi Auditorium (Level 2, Education Resource Center, University Town, NUS) on 1st March 2018 from 9.00 am to 5.00 pm.

Register as a participant or sign up as an oral or poster presenter and stand a chance to win attractive gifts and Capitaland vouchers!

About NGS Scholars’ Alliance

An official student group of the NUS Graduate School for Integrative Sciences and Engineering (NGS).

Established in 2005 to serve as a platform for exchange, personal development, and leadership training for NGS scholars, as well as the key to fostering the NGS community and identity.