Inspiring Singapore's Defence Future

DSTA scholars **Ang Zhi Yuan**, **Jansen Jarret Sta Maria** and **Bryan Phee** have embarked on a career that is not only engaging and fulfilling, but also one that is of utmost importance to Singapore's defence and security.
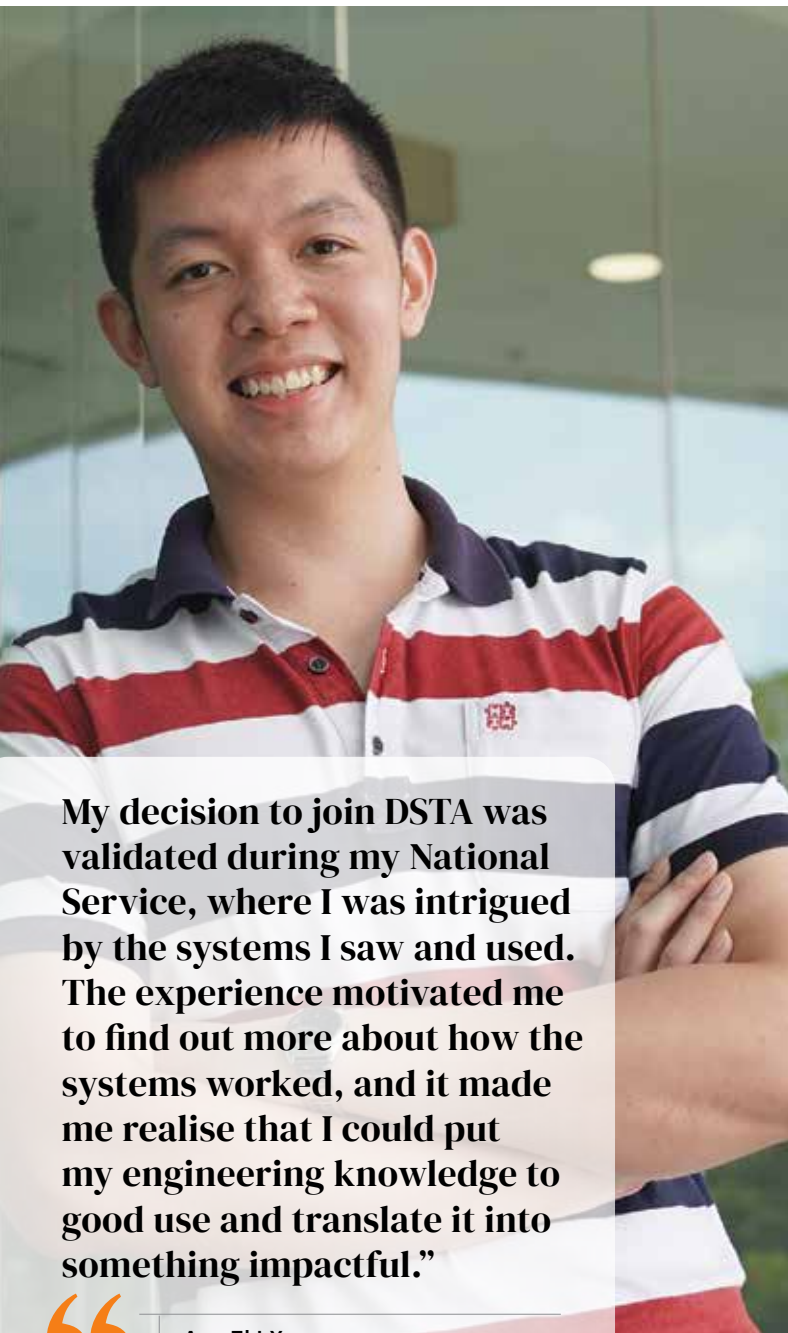
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Those with a desire to pursue a career in engineering and technology are destined to reach new heights. The ability to leverage knowledge to innovate and create is more relevant than ever, especially in today's technology-driven world.

And for those who believe in a higher calling, the opportunity to further Singapore's technological edge in defence science and technology so that we can continue to protect the ones we love is something not to be missed.

For that, there's the DSTA Scholarship, a springboard for your career with either the Defence Science and Technology Agency (DSTA), DSO National Laboratories (DSO), or the Centre for Strategic Infocomm Technologies (CSIT). The DSTA Scholarship nurtures and grows talent with the passion and desire to contribute to Singapore's evolving national security needs.

Zhi Yuan, Jansen and Bryan are DSTA Scholarship recipients who are currently working towards that common goal with DSTA, DSO and CSIT respectively. Find out more about their experiences and gain insights into their work as part of Singapore's defence ecosystem.

All of you are obviously passionate about technology. What made you accept the DSTA Scholarship over the others you may have been considering?

Zhi Yuan: With my interest in the defence sector, I shortlisted scholarships that would enable me to pursue a prestigious engineering degree and jumpstart my career in the defence industry. I was drawn to the DSTA Scholarship as it would provide me with opportunities to learn from experienced engineers, and expand my technical knowledge by exposing me to a myriad of multidisciplinary domains.

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Jansen: I enjoyed my three-month internship at DSO, especially the friendly work environment which was, and continues to be, something important to me as someone new to the field. My mentors would frequently check in with me to see how I'm doing, and ensure that the work I was doing was both meaningful and aligned with my professional goals.

I value the opportunity to learn from the best so when I received an email about the DSTA Scholarship, I applied and subsequently accepted the offer.

Bryan: I attended a DSO open house event and was impressed by the various exhibits and enthusiasm of the people. Subsequently, I interned with DSO, which introduced me to the work of the Defence Technology Community (DTC, which comprises DSTA, DSO and CSIT). This positive experience coupled with my mentors' passion for the work inspired me to apply for and accept the DSTA Scholarship.

After completing my studies, I knew my interest was in cybersecurity and machine learning. Following discussions with my seniors and peers, I decided on CSIT because its technical focus in cybersecurity and work with advanced digital technology would allow me to hone my technical expertise and further deepen my skills and knowledge in cybersecurity and machine learning. I have since embarked on a meaningful career contributing to our nation's security.

How did the DSTA Scholarship support you while you were studying?

Zhi Yuan: The DSTA Scholarship provides many opportunities for growth. For instance, I went for an exchange semester at Lund University in Sweden, where I got to widen my perspectives and pick up new knowledge. Under the DSTA Scholarship's Global Internship Programme, we are offered the chance to intern at industry leaders from around the world such as Thales, Boeing, Rolls-Royce, Nokia and Samsung.

I interned at SAS Institute Singapore during one of my summer breaks, where I experimented with their artificial intelligence (AI) and machine learning framework to conduct object detection and classification on various data sets. The internship really gave me a leg up in working with industry experts early on in my career!

Jansen: The scholarship office would check in with us regularly to ensure that we were coping well and had the latest information on internship opportunities. I also had the chance to intern at DSO three times, or five, if you include my two post-A-levels internships, where I got to expand my learning journey across different domains from AI development, cryptography and also theorem proving.

Bryan: The DSTA Scholarship gave me the opportunity to study at top universities and learn from leading professors from around the world. My overseas experience helped me to deepen my understanding of the work in the industry before returning to contribute to the DTC.

Zhi Yuan, tell us more about your role.

Zhi Yuan: As an engineer in DSTA's C3 Development Programme Centre, I develop software for a new command, control and communications (C3) system to help keep our waters safe. The C3 system uses video analytics to detect, track and classify vessels visually, which it then aggregates with other information sources and presents the overall situation picture as a single cohesive picture. This system is also able to flag out suspicious vessels for further investigations. This helps to reduce the cognitive load on the operators monitoring our waters, allowing them to work more efficiently and effectively.

We read that you also mentor young developers.

Zhi Yuan: That's right. I am part of a group of experienced developers that hosts periodic coding workshops, where we tutor junior developers who have just joined DSTA. I teach them about unit testing, data structure and algorithms, and good software practices, among others. This helps them write good, clean code that can be integrated into our codebases quickly, which they can then incorporate into their project work. Getting to share the knowledge I've learnt from my seniors really injects positivity into my work routine!

The importance of knowledge sharing is emphasised heavily in DSTA as our work calls for a multidisciplinary approach, and we are encouraged to collaborate across teams to tap one another's technical expertise. This has resulted in a culture that is very healthy, dynamic, and one that promotes teamwork.

"[At DSO], we have a strong culture of mentorship. In defence R&D, the nature of our work is either too sensitive to share outside of DSO or the information we require is not readily available online. So, I'm glad that my senior colleagues are always ready to impart their uniquely DSO lessons, insights and wisdom to us, the juniors!"

Jansen Jarret Sta Maria

Jansen, tell us about your work as an AI Engineer.

Jansen: I'm currently in the Information Division at DSO where I specialise in using AI to do certain tasks with Natural Language Processing and Computer Vision. While most of the work that I do is classified, one of my research goal is to improve the robustness of our image detection models.

Beyond the friendly work environment that drew you to the organisation, what is the work culture like at DSO?

Jansen: We also have a strong mentoring culture in DSO. In the field of defence R&D, the nature of our work is either too sensitive to share outside of DSO or the information we require are not readily available online. So, I'm glad that my senior colleagues are always ready to impart their uniquely DSO lessons, insights and wisdom to us, the juniors!

Bryan, what's your main responsibility at CSIT?

Bryan: My work deals with mobile security for the Android platform. Specifically, my team conducts research on the underlying Android architecture and the latest security developments to understand how these components could potentially be susceptible to attacks. We develop novel solutions to deal with these threats to ensure that the systems remain safe and secure.

Has there been a breakthrough so far in your research?

Bryan: As part of my work on security vulnerabilities on the Android platform, my team developed an automated framework for vulnerability research. I continuously probed a vulnerability that was previously overlooked and it turned out to be more severe than expected. My findings contributed to a solution to enhance the security of the devices that we use for sensitive communications, thus avoiding any potential serious consequences that could compromise communications security.

Lastly, if someone is on the fence on whether to take up the DSTA Scholarship, what would you say to them?

Zhi Yuan: If you have an interest in technology and defence, join DSTA to get the best of both worlds! Not only will you get to pursue your interests, you will also get to collaborate and exchange ideas with industry experts to improve yourself.

Jansen: If you are looking for a place to grow your career in defence R&D and solve important problems for the nation, DSO is the place to be! Whether you prefer to specialise in your domain, or excel in the management route, your supervisor will work closely with you to help you reach your goals.

You'll also get to level up your mindset and skill set with a wide spectrum of training courses in and out of DSO. This will not only support you in your current role but also prepare you for your future roles.

Bryan: If you are interested in digital technology and want to develop alongside passionate digital professionals, CSIT is likely to be the agency for you. At CSIT, our comprehensive training and development program coupled with technical mentorship will ensure that you are well equipped to deal with challenging problems while safeguarding Singapore's security.

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Bryan Phee

SCHOLARSHIP INFORMATION

PROFILE

Ang Zhi Yuan
develops software for C3 systems in his role as Senior Engineer, C3 Development Programme Centre, at DSTA. He holds a Bachelor in Engineering (Computer Engineering) as well as a Master in Computing from NUS.

Jansen Jarret Sta Maria
develops AI to solve problems in his role as AI Engineer at DSO. He holds a Bachelor's and Master's degree in Mathematics from the University of Oxford.

Bryan Phee
conducts technical research and develops solutions to secure mobile devices. He holds a Bachelor of Engineering in Engineering Science from NUS and a Master of Science in Electrical & Computer Engineering from Carnegie Mellon University.