Special Programme in Science - led Undergraduate team wins gold in international competition in collaboration with SynCTI

The International Genetically Engineered Machine (iGEM) competition is the premier competition in synthetic biology. This competition challenges undergraduate students to tackle real world problems using synthetic biology techniques. The students eventually present their project at an international conference held in Boston, US.

In iGEM 2016, 5,600 participants and almost 300 teams across 42 countries took part in the conference and competition from 27-31 October 2016. This year, NUS sent a team of 11 undergraduate students from the Faculty of Science led by staff from the Special Programme in Science (SPS) to compete at the iGEM for the second time. This year's team collaborated with A/P Liou Yih-Cherng, SPS Director and PI in Department of Biological Sciences, A/P Matthew Wook Chang, PI and SynCTI Program Lead, as well as Prof Linda J Kenney, PI at Mechanobiology Institute (MBI).

Team NUS_Singapore made NUS history by winning a Gold Medal in the undergraduate track. The project was well-received by the judges and other iGEM participants and the team was also one of four nominees (out of 27 teams) for the best Diagnostic project. **A/P Chang** said 'I am proud of what our students achieved as a team at the iGEM competition, one of the world's most exciting events in synthetic biology. It was quite a joy to see our team with various backgrounds working in unison to come up with big, game-changing ideas for the project, turn the ideas into something tangible and achievable and realise the project together in a very tight timeline. I believe that this experience, ranging from striving for creativity to thinking big to presenting to the world, laid the lifelong foundation that the students can build upon to realise their dreams.'

Team NUS_Singapore engineered *E. coli* to diagnose and target cancer using non-invasive methods. This approach makes use of the Warburg effect, where high levels of lactate are produced near the tumour site. The bacteria were conferred with a lactate sensing ability, which allows for detection and targeting of the tumour.

Wong Chi Yan, the Team leader of Team NUS_Singapore and Honours Student in A/P Matthew Chang's lab said 'Having participated in iGEM 2015, I could apply the knowledge and experience gained to iGEM2016 and my final year project. This allowed us to develop and carry out a better project, which we successfully presented at the Giant Jamboree. It's been a wonderful experience discussing science with our collaborators and Jamboree participants which was topped off by an incredible result for NUS!'.

The iGEM offers an excellent opportunity to promote synthetic biology education by exposing students to an international research arena. Undergraduates practice teamwork and tackle real world problems, designing their project from scratch with synthetic biology principles. Students also have to ensure their project meets international standards and collaborate with other undergraduate teams from other universities. The iGEM also challenges students to think beyond the bench and consider safety, as well as the ethical and environmental impact of their project.

Looking ahead, NUS will be sending a team of undergraduates to compete in iGEM 2017 and continue to offer this unique educational opportunity to more students.

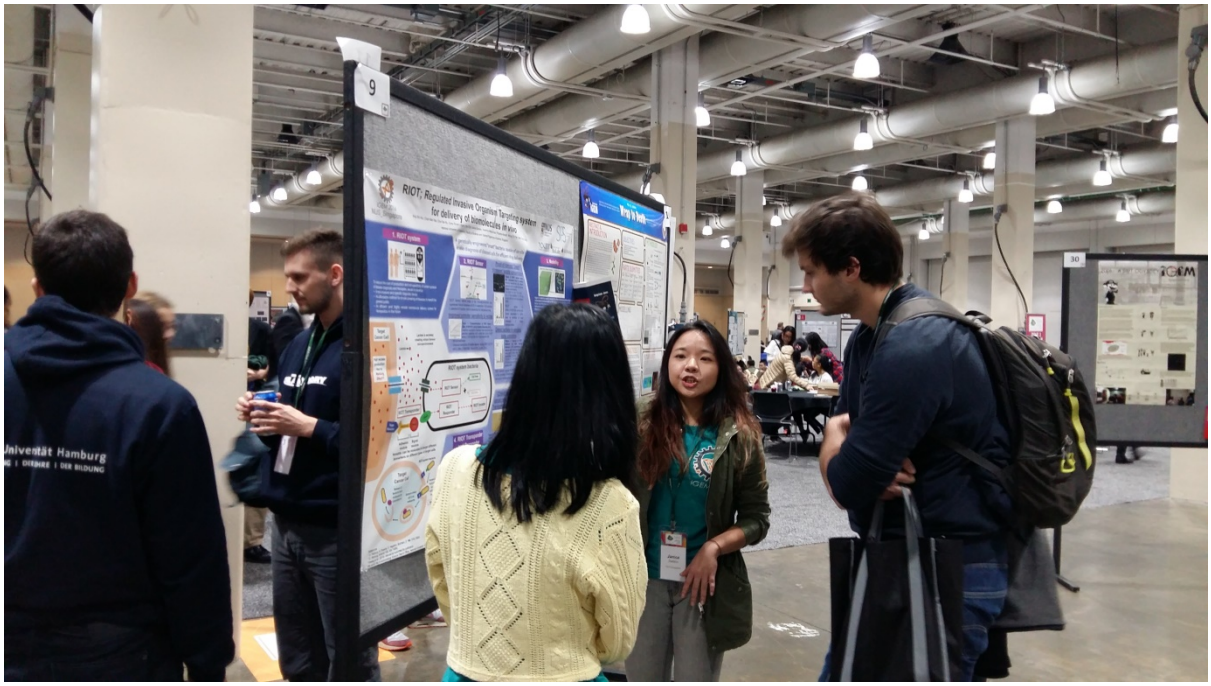

Figure 1. Team members Janice and Yan Ru presenting their poster to an interested conference participant at iGEM Competition.

Figure 2. Team members representing NUS at the iGEM conference.

Team NUS_Singapore comprised of Life Sciences' ANG Shi Hui, CHOI Yan Ru, Corey Bryen LINGAM, HAN Ziyin, Keshiniy MADIVANNAN, NGUYEN Hoang Diem Phuong, Priyanka KAMATH, WONG Chi Yan and YEAM Cheng Teng, Pharmacy's Janice DARIKHO and Physics' CHAN Man Yau, Joseph.

The team was led by Dr Robert LIEU Zi Zhao, Lecturer, SPS and Department of Biological Science; Prof LIOU Yih-Cherng, SPS Director; Prof Matthew Wook CHANG, Department of Biochemistry; Dr Adison WONG, Scientific Programme Manager, NUS SynCTI; and Ms TAN Yi Han, a former SPS student and Research Assistant, Department of Biochemistry; in collaboration with Mechanobiology Institute's Prof Linda J KENNEY and Dr Stuti Kaivalya DESAI.