

Gold for NUS iGEM Team 2018!

An Eco-friendly Biomanufacturing Platform That Transforms Waste to Natural Dyes

In late October, the NUS iGEM team (NUSGEM 2018) participated in the Giant Jamboree of the International Genetically Engineered Machine (iGEM) competition in Boston, USA. The competition is in the area of Synthetic Biology. The team competed against more than 300 teams from all around the world, including teams from renowned universities such as Harvard, MIT, Oxford and Imperial College London. **The team has not only clinched a Gold Medal, but was also nominated for three special awards, emerging top in their rightful tracks - Best Manufacturing Project, Best Hardware, and the Safety and Security Award.** They were even specially commended for their efforts in ensuring safety in their project during the awards ceremony. This is the best accomplishment NUS has ever achieved in this prestigious competition, excellent job team, you have done us proud!

This year, the team of 13 students hailing from diverse academic backgrounds encompassing biomedical, material, chemical, mechanical engineering and engineering science, life sciences, architecture and medicine, had one ambitious goal: to alleviate the water pollution problem caused by chemically synthesised dyes via an eco-friendly biomanufacturing platform.



The NUS iGEM 2018 Team is a multidisciplinary group of students

The team was quick to identify a pressing need to address this problem given that the textile and dye production industry is the second most pollutive industry in the world according to the World Bank. They looked to nature for the solution, and recognised the advantages of using natural dyes as the alternative to chemically synthesised dyes. At the same time, the team understood the limitations of traditional plant dye extraction which render natural dyes an unsustainable solution. Hence, they sought to produce natural dyes using bacteria to increase the viability of natural dyes. Eventually, the team developed a novel, eco-friendly and multicomponent biomanufacturing platform that takes in waste as a feedstock to produce dyes. Their innovative platform made use of intelligent machine control to optimise the production process of natural dyes. The entire project brainstorming and

execution period was supported and guided by esteemed mentors, as well as various stakeholders who the team had actively sought out.

All through the journey, the team made a conscious effort to engage with the public to educate pre-university and university students about synthetic biology and the pertinent issues surrounding its applications. Among the several talks and group discussions that were organized, NUSGEM is most proud of its flagship event - *Life Hacks!* - during which the awareness of synthetic biology was raised in the form of games and interactive discussions. Members of the team were also given opportunities to connect and collaborate with teams from all around the world, such as France, Canada and Hong Kong, forging meaningful and exciting friendships along the way.



Group photo taken at Life Hacks!, the flagship outreach event organised by the team



The team finally meeting friends from other teams in Boston after months of correspondence in their collaborations!

Nine months of hard work culminated in a showcase at the Giant Jamboree on the 25th of October, during which the presenters captivated their audience with a dramatic introduction to the problem addressed and their exciting solution. Their outstanding presentation and project were acknowledged and praised by impressed expert judges and many fellow iGEM teams.



The team presenting their project to a panel of distinguished judges at the Giant Jamboree

To conclude this article, Nanda Wang, the student leader of this year's team, shared some of her insights about her experience joining iGEM:

"iGEM is a transformative experience. I'm not going to lie - it is tough, but I learnt so much from all the talented people around me, be it my professors, my teammates, or iGEMers from all over the world. It is an excellent platform to get yourself immersed in the world of Synthetic Biology and research in general. I would still choose iGEM if I were to choose again."

--- Nanda Wang, Year 4 Biomedical Engineering

Her insights echo most of other iGEMers'. It is not surprising to note that the decision to join a competition as intensive as iGEM is a challenge to oneself, a test that pushes one to understand his or her tolerance to adversity. It is a competition that requires grit and perseverance, and absolute determination to succeed. If you are up for this challenge and are interested to be part of the NUS iGEM Team 2019, please contact A/Prof Poh Chueh Loo at poh.chuehloo@nus.edu.sg.

This year team was led by A/Prof Poh Chueh Loo from NUS BME and a PI at SynCTI together with other PIs from FOE and SynCTI (Assistant Prof Jimmy Peng, A/Prof Yew Wen Shan and A/Prof Matthew Chang). The team would like to specially thank their instructors (Zhang Jingyun, Lim Yan Ping, Saravanan Prabhu Nadarajan, Yeoh Jingwui and David Chee) from SynCTI and their sponsors – NUS FOE, SynCTI, and the companies for their great support!



Proud members of NUSGEM 2018

To find out more about their exciting project, visit http://2018.igem.org/Team:NUS_Singapore-A.