



PRESS RELEASE

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The Seventh International Meeting on Synthetic Biology (SB 7.0)

Singapore, 13 June 2017 – Imagine a world where extinct animals return to life. Or a world where movies and music can be stored in DNA.

These and other ideas could be future reality in a world that is seeing the transformational changes being brought about by synthetic biology.

Already, it is being used to change or challenge almost every facet of today's world from provisioning foods, fuels, medicines, and clothing, to enabling new modes of critical design, fashion and art.

It is also the focus of discussions at the National University of Singapore (NUS) this week, where NUS Synthetic Biology for Clinical and Technological Innovation (SynCTI) is co-organising the Seventh International Meeting on Synthetic Biology (SB 7.0) from 13 to 16 June 2017 at the NUS University Cultural Centre. The conference will bring together a global community of synthetic biology practitioners to share, learn and debate on the latest efforts in the rapidly advancing field, and to build synergistic global partnerships.

The conference lends support to Singapore's efforts to encourage interactions and co-development between industry and institutes of higher learning to augment manpower development for a new bio-based economy, as well as speed up translation of expertise for industry applications. About 900 participants from over 40 countries attended the conference, with more than 100 speakers presenting in 12 thematic sessions.

First launched in 2004, the Synthetic Biology Conference series is the world's foremost professional meeting in the field of synthetic biology. Previous conferences have taken place at MIT, University of California, Berkeley, Stanford University and Imperial College London.

"Biology is central to all of human existence and nature. While synthetic biology is already being used to advance many aspects of our life, to ensure that synthetic biology can benefit all people and the planet, I believe the international synthetic biology communities must work together. SB7.0 will provide a unique platform for a global community of synthetic biologists to gather and plan together for collective growth of our science, its beneficial applications, and responsible practices," said Associate Professor Matthew Chang from NUS Yong Loo Lin School of Medicine's Department of Biochemistry. He is also Director of SynCTI and the Singapore Consortium for Synthetic Biology (SINERGY).

Assoc Prof Drew Endy from Stanford University's Bioengineering Department and President of The BioBricks Foundation, one of the co-organisers of the conference, said synthetic biology had made significant technical progress since the first conference in 2004.

"Gene synthesis costs have been reduced 200-fold, all of Boolean logic has been realised across a diversity of organisms, and biosynthesis via 30 enzyme pathways is becoming routine."

"I am very excited to see the entire synthetic biology community gather under one roof in Singapore. The field has grown from strength to strength over the past 14 years, and now is the time to work together to chart our next decade's course," said John Cumbers, the founder of SynBioBeta, one of the co-organisers of the conference.

To excite the younger generation in this dynamic field of synthetic biology research, the Singapore Consortium for Synthetic Biology (SINERGY) has offered 300 SINERGY Fellowships to students, researchers and leaders in local tertiary institutions (junior colleges, polytechnics and universities) to attend the conference.

The Guest-of-Honour, Mr Desmond Lee, Minister, Prime Minister's Office, Second Minister for Home Affairs, and Second Minister for National Development, opened the conference on 13 June.

"I believe that SB7.0 will take Singapore's synthetic biology to another level by showcasing to the world our innovation and science, and enabling us to forge new cross-border friendships, facilitate international collaborations and build global partnerships. By working hand in hand with the international communities, Singapore can become a leading biological design hub where synthetic biology is seamlessly translated into impactful technologies that make a difference in all sections of civil society," said Assoc Prof Chang.

For more information on the conference, please visit <http://sb7.info/>

SB7.0 speakers and topics include:

➤ **Ryan Phelan: Reviving and restoring extinct or endangered species**

Ryan believes that the risk of losing nature is too high if humans do not intervene. She heads Revive & Restore, a non-profit organisation that brings together scientists and conservationists to look into rescuing endangered and extinct species, such as the Woolly mammoth and the Northern white rhinoceros. Her upcoming project in September 2017 will involve increasing coral resilience to warmer temperatures in Australia's Great Barrier Reef.

➤ **Emily Leproust: Archiving movies and music in DNA**

The amount of digital data worldwide is forecast to grow to over 16 zettabytes in 2017. While the demand for digital data continues to grow exponentially, the supply is becoming more and more limiting even accounting for future technology improvements. A large fraction of the data created is in archival form – where durability and density is paramount. Emily's company Twist Bioscience is leveraging its breakthrough DNA synthesis technology to store digital data on DNA. Currently a \$10 to \$15 billion market, DNA provides several benefits over current storage methods: **permanence** – DNA is stable for thousands of years; **density** – all the world's digital data could be stored in one shoebox of DNA; **low energy requirements** – current facilities require significant

energy to preserve data; **universal format** – DNA is composed of four bases, which will be true for all time. Twist Bioscience also has a non-exclusive collaboration with Microsoft and the University of Washington that has demonstrated the feasibility and benefits of DNA as storage media.

➤ **Christina Smolke: Using yeast to brew painkillers**

Christina discovered how to engineer yeast to produce opioids, mainstays of medicine that relieve chronic pain and pain after surgery. Her work is some of the most complex ever performed with yeast. Today, opium poppies – difficult, time-consuming and expensive to harvest – are the only source of medicinal opioids. The World Health Organization estimates that around 5.5 billion people have poor access to pain medications, partly because of the harvesting cost. Farming poppies also requires vast amounts of land, whose yields are susceptible to environmental factors such as climate and pests. At commercial scales, Christina's technology would take only a few days and could shrink production costs by at least tenfold. It would also use 500-fold less land and lower the supply risk. It might even offer a blueprint for producing other complex plant-based medicines, which comprise 40 per cent of prescription drugs. Opioid-churning yeast are among the latest advancements in the burgeoning field of synthetic biology.

➤ **Randal Kirk: Visionary leader in biotechnology**

Randal was listed as one of 25 geniuses shaping the future in 2016 (by Wired magazine). His company Intrexon is behind creating apples that resist browning, producing salmon that grow twice as fast without swimming upriver to spawn, fighting Zika mosquitoes through unleashing genetically modified male mosquitoes to pass off a gene that kills their offspring, and the cloning of pets and animals dear to their owners.

➤ **Reshma Shetty: Engineered yeasts impacting various industries**

Engineered yeasts are growing products in fermentation vessels around the world, impacting industries as wide ranging as fragrance, fashion, and pharmaceuticals. Biology is the most advanced manufacturing technology on the planet, able to sustainably self-assemble and self-repair. With advances in synthetic biology, the industry is being biologised, with products grown from renewable materials. As a PhD student at MIT and co-founder of Ginkgo Bioworks, Reshma has been at the forefront of synthetic biology for nearly 15 years, building the tools and systems that are making it easier to engineer biology. Ginkgo's foundries are today enabling new economies of scale in biological engineering, opening up new opportunities across many industries, from consumer products to manufacturing, agriculture, and medicine.

➤ **Tom Knight: How the synthetic biology industry can move forward**

Tom will be leading the panel titled "Art, Critical Design, Critique, Our world." The panel will explore how artists and designers have been involved in exploring the applications and implications of synthetic biology. As a leader in the field of synthetic biology for decades, Tom's vision for what the field can accomplish, how, and – importantly – why has been incredibly influential. The role of art, design, and critique in shaping these visions of the field has been crucial to developing thoughtful, responsible, and responsive technologies and stories about our shared future.

➤ **John Cumbers: How bio-entrepreneurs are disrupting trillion-dollar industries**

John believes that the last 50 years have been dominated by microprocessors and information, but the next 50 will be dominated by living systems engineered to function as biological machines. His upcoming book, *What's Your Bio Strategy?* talks about how synthetic biology is transforming and disrupting trillion-dollar industries and changing the rules of business.

More information on the speakers can be found in <http://sb7.info/> under 'Speakers'.

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About National University of Singapore (NUS)

A leading global university centred in Asia, the National University of Singapore (NUS) is Singapore's flagship university, which offers a global approach to education and research, with a focus on Asian perspectives and expertise.

NUS has 17 faculties and schools across three campuses. Its transformative education includes a broad-based curriculum underscored by multi-disciplinary courses and cross-faculty enrichment. Over 38,000 students from 100 countries enrich the community with their diverse social and cultural perspectives.

NUS takes an integrated and multi-disciplinary approach to research, working with partners from industry, government and academia, to address crucial and complex issues relevant to Asia and the world. Researchers in NUS' Schools and Faculties, 30 university-level research institutes and centres, and Research Centres of Excellence cover a wide range of themes including: energy, environmental and urban sustainability; treatment and prevention of diseases common among Asians; active ageing; advanced materials; risk management and resilience of financial systems. The University's latest research focus is to use data sciences, optimisation research and cyber-security to support Singapore's Smart Nation initiative.

For more information on NUS, please visit www.nus.edu.sg.

About NUS Yong Loo Lin School of Medicine

Established in 1905, the NUS Yong Loo Lin School of Medicine is the first institution of higher learning in Singapore and the genesis of the National University of Singapore.

The School offers one of the finest undergraduate medical programmes in the Asia Pacific region and commands international recognition and respect. The Times Higher Education World University Rankings 2016 by subject and Quacquarelli Symonds (QS) World University Rankings by Subject 2016 list NUS Medicine as Asia's leading medical school.

It admits 300 students to the MBBS degree programme annually and its principal missions are to educate and train the next generation of healthcare professionals, and foster research that will help to advance the practice of medicine.

The 18 NUS Medicine departments in the basic sciences and clinical specialties work closely with the Centre for Medical Education, the Centre for Biomedical Ethics, the Centre for Healthcare Simulation as well as the restructured public hospitals to ensure that teaching and research are aligned and relevant to Singapore's healthcare needs. The School is a founding institutional member of the National University Health System.

For more information about NUS Medicine, please visit <http://nusmedicine.nus.edu.sg>.

About the BioBricks Foundation

The BioBricks Foundation (BBF) is a public benefit organization working to ensure that the engineering of biology is conducted in an open and ethical manner to benefit all people and the planet. BBF works at many levels, including community building, creating platforms for sharing information and materials, facilitating open technical standards, and developing property rights frameworks which spur innovation.

Learn more online via www.biobricks.org.

About SynBioBeta

SynBioBeta (SBB) is the leading community of entrepreneurs, investors, policy-makers and enthusiasts devoted to the responsible growth of the synthetic biology field. SynBioBeta hosts international synthetic biology conferences and events that bring the entire community together several times each year, giving anyone the opportunity to meet with the bright minds building and shaping the bioeconomy. SynBioBeta also offers a highly specialized weekly industry e-digest, news blog and educational courses, in addition to providing companies in the industry with opportunities for advertising, exhibition and sponsorships for promotion.

Learn more online via www.synbiobeta.com.