THE GIS SPEAKER SERIES

Engineering and SCRaMbLEing a synthetic yeast genome

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2 pm

GIS Seminar Room,
L2 Genome, Biopolis,
Singapore 138672

About The Speaker

Patrick Cai is Professor in Synthetic Genomics and a world-leading expert in synthetic chromosomes, with a highly interdisciplinary research group. In 2017, Prof Cai's team published 7 research articles in the journal of Science and featured on its cover. He is the international coordinator for the (Sc2.0) Consortium, which is composed of over 10 top universities from four continents aiming to synthesize the world's first synthetic eukaryotic genome. Prof Cai founded Edinburgh Genome Foundry, which is the largest automated DNA synthesis and assembly facility in academia today. He regularly provides advice and consultancies to the Cabinet office, the Foreign Office and the Prime Minister's Council for Science and Technologies. Prof Cai holds prestigious visiting professorships with MIT (US), MRC LMB at Cambridge (UK), Hong Kong University and Chinese Academy of Sciences (China). In 2022, Prof Cai was awarded a 5-year EPSRC fellowship to work on biosecurity and biosafety mechanisms for synthetic genomes. In 2023, he was awarded an ERC Consolidator Award to engineer non-coding RNAs using a synthetic genomics approach.

About The Seminar

Over the last 9 years, my lab has been building synthetic yeast chromosomes from scratch. These synthetic yeast cells are engineered to allow genome-wide directed evolution with a system call SCRaMbLE (Synthetic Chromosome Recombination and Modification by LoxP-Mediated Evolution). SCRaMbLE allows the synthetic cells to process the information (e.g. environmental stress) differently from their wildtype counterparts, and also enables them to re-configure the genomes to cope with the environments. Finally, I will also discuss the progress of making a minimal yeast genome with genome SCRaMbLEing.