TEMS

TLL External Monthly Seminar

TEMASEK LIFESCIENCES LABORATORY

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*Scan for address

9 April 2024 (Tuesday), 3pm
The Auditorium (Level 1)

Hosted by: Dr Ji Liang Hui

Reprogramming microbial cell factory for CO2 fixation, drugs and edible fats

Prof Peng Xu
Guangdong-Technion Israel Institute of Technology, China



Prof. Peng Xu is an Associate Professor of Chemical Engineering at Guangdong Technion-Israel Institute of Technology. He received his BS and MS degrees from Jiangnan University and completed his Ph.D. at RPI. He has held postdoctoral and assistant professor positions at MIT and University of Maryland. Prof. Xu has received awards such as the "Biotechnology & Bioengineering DIC Wang Award" and the "Biochemical Engineering Journal Young Investigator Award".

Biological process is among the most intricate and complex mystery on Earth. Biochemical engineering aims to utilize the design logic of life processes and apply chemical engineering principles to address environmental, energy, food and healthcare challenges. From mRNA vaccines to biofuels and alternative proteins, all involve the applications of chemical and biological engineering. Synthetic biology allows us to manipulate both the metabolic and informational flows within cells using genetic tools, and reprogram biological functions in living cells with spatial and temporal precision. This lecture will update our progress to engineer a yeast cell factory for various applications, including the use of genetically-tunable nanoparticles for photocatalytic CO2 fixation; the AI-assisted engineering and design of protein secretion tags to improve protein secretion; and the construction of efficient nutraceutical cell factory to produce natural products and anti-depression drug gastrodin; and the biomanufacturing of edible fats from an oleaginous yeast cell factory. Overall, our approach will contribute to fostering harmonious coexistence between humans and nature, and promoting sustainable development.

Recent Publications:

1. Gu Y, Jiang Y, Li C, et al, Xu P*and Huang H. (2024) High titer production of gastrodin enabled by systematically refactoring yeast genome with an antisense-transcriptional regulation toolkit. Metabolic Engineering. 82, 250-261
2. Lv Y, Gu Y, Xu J, Zhou J and Xu P*. (2020) Coupling metabolic addiction with negative autoregulation to improve strain stability and pathway yield. Metabolic Engineering. 61, 79-88.
3. Xu P, Qiao K, Ahn WK and Stephanopoulos G*. (2016) Engineering Yarrowia lipolytica as a platform for synthesis of drop-in transportation fuels and oleochemicals. Proceedings of the National Academy of Sciences, U.S.A., 113(39): 10848–53.