



EMERGING TECHNOLOGY FOR URBAN FARMING

AUGUST 15-16, 2019

PROGRAM

Auditorium, Create Tower, Level 2
Utown at National University of Singapore
Singapore 138602



NATIONAL RESEARCH FOUNDATION
PRIME MINISTER'S OFFICE
SINGAPORE

CREATE
Campus for Research Excellence And Technological Enterprise



DiSTAP

Disruptive & Sustainable Technology
for Agricultural Precision

DiSTAP aims to revolutionize how food is produced to meet the demands of a growing population in an increasingly resource constrained world with a focus on:

- (1) development of tools, such as nanotechnology and microelectronic sensors that can measure the flow of nutrients and hormones within plants, that will allow scientists to study how plants adapt and develop;
- (2) using this knowledge and tools to select and develop plant varieties that are richer in nutrients and can grow in high density;
- (3) development of complementary technologies for producing nutrients and high-value food components at high volume; and
- (4) application of these technologies to improve urban farming.

DiSTAP's mission will facilitate Singapore's agricultural independence, ensures access to high-quality foods for the future, and will develop technology that can also be applied globally – making Singapore a leader in precision agriculture and urban farming.

AGENDA DAY 1 | AUGUST 15, 2019

08:30 – 09:00 **Registration**

09:00 – 09:30 **Welcome Remarks**

Prof. Michael Strano, *MIT*

Prof. Nam-Hai Chua, *TLL*

Opening Remarks

Dr. Khiaing Wee Lim (NRF), *Executive Director, CREATE*

09:30 – 10:45 Disruptive Technologies for Precision Agriculture

Session Chair: Prof. Kang Zhou, *NUS*

09:30 – 09:55 **Progress in Nanosensors and Nanocarriers for Plant Biotechnology**

Prof. Michael Strano, *Massachusetts Institute of Technology*

09:55 – 10:20 **Conformal Electrical Sensors for Plants**

Prof. Xiaodong Chen**, *School of Materials Science and Engineering, NTU*

10:20 – 10:45 **Optical Biomarkers of Plant Stress**

Prof. Rajeev Ram, *Massachusetts Institute of Technology*

10:45 – 11:15 **Coffee Break and Poster Session (Public)**

11:15 – 12:05 Technologies for Food Safety and Nutrient Uptake

Session Chair: Dr. Gajendra Pratap Singh, *DiSTAP*

11:15 – 11:40 **Plant-fungus interaction: Improvement of plant NUE (Nutrient Use Efficiency)**

Dr. Bongsoo Park, *Temasek Life Science Laboratory*

11:40 – 12:10 **Next Generation Technology for Food Safety**

Dr. Untzizu Elejalde** and Dr. Kevin Lim**, *WIL@NUS*

12:10 – 13:15 **Networking Lunch**

** Invited speakers



AGENDA DAY 1 | AUGUST 15, 2019

13:15 – 14:30 Volatile Organic Compounds (VOCs) in Urban Agriculture

Session Chair: Dr. Urano Daisuke, *Temasek Life Science Laboratory*

13:15 – 13:40 **Employing Plant Volatile Organic Compounds (VOCs) in Smart Agriculture Practices – prospects and challenges**
Dr. Rajani Sarojam, *Temasek Life Science Laboratory*

13:40 – 14:05 **Production of VOCs by using fermentation and enzymatic processes**
Prof. Kang Zhou, *NUS*

14:05 – 14:30 **Pathway and Protein Engineering for Terpenoid Production**
Prof. Kris Prather, *Massachusetts Institute of Technology*

14:30 – 14:45 **Coffee Break (End of public session)**

14:45 – 16:00 Nanosensing for Urban Agriculture

Session Chair: Dr. Min Hao Wong, *DiSTAP*

14:45 – 15:10 **Non-destructive and real-time analysis of shade avoidance syndrome in plants using Raman spectroscopy**
Dr. Incheol Jang, *Temasek Life Science Laboratory*

15:10 – 15:35 **In planta sensing of 1-naphthalene acetic acid using CoPhMoRe nano-sensors**
Dr. Mervin Ang, *SMART*

15:35 – 16:00 **Transcriptomics based approach to elucidate the effect of SWNT infiltration to living plants**
Dr. Niha Dhar, *Temasek Life Science Laboratory*

16:00 **Day 1 Closing Remarks (Announcement for PI Dinner)**



08:30 – 09:00 **Registration**

09:00 – 09:20 **Welcome and Introduction to Day 2**

Prof. Michael Strano, *Massachusetts Institute of Technology*

Opening Remarks

Ms Melin Lim (SFA)

*Senior Director, Research Planning & Systems Integration
Division and Urban Food Solutions Division*

09:20 – 11:00 **Food Security**

Session Chair: Dr. Min Hao Wong, *DiSTAP*

09:20 – 09:45 **Disruptive technologies to assure food security**

Prof. Paul Teng**

Dean and Managing Director, NIEI

09:45 – 10:10 **Nanomaterials and Nanosystems for Food Applications**

Prof. Jackie Y. Ying**

*A*STAR Senior Fellow & Director NanoBio Lab*

10:10 – 10:35 **Silk-based technologies to enhance global food security**

Prof. Benedetto Marelli, *Massachusetts Institute of Technology*

10:35 – 11:00 **In planta Auxin sensing**

Prof Mary Chan, *NTU*

** Invited speakers

11:00 – 11:15 **Coffee Break**

11:15 – 12:00 **From Lab to Table – Challenges and Opportunities**

Panel Discussion

Moderator: Dr. Azlinda Bte Anwar

Panelists: Bjorn Low, *MD and Founder, EdibleGarden City Singapore*
Dr. Deepak Raghothaman, *APAC Lead, Ferrero Asia Pacific*
Dr. Howard Califano, *Director, SMART Innovation Center*
Dr. Gajendra Pratap Singh, *Scientific Director, DiSTAP*



AGENDA DAY 2 | AUGUST 16, 2019

12:00 – 13:00 **Networking Lunch (End of public session)**

13:00 – 14:15 **DiSTAP Research Highlights**

Session Chair: Dr. Mervin Ang

13:00 – 13:15 **Production of VOCs for urban farming via GTS-based pathway engineering**

Dr. Xiaoqiang Ma, *SMART*

13:15 – 13:30 **Early diagnosis of plant nutrient deficient response by Raman spectroscopy**

Dr. Chung Hao Huang, *Temasek Life Science Laboratory*

13:30 – 13:45 **Imaging spectrometry for plant monitoring**

Dr. Maciej Baranski, *SMART*

13:45 – 14:00 **Verification of DiSTAP tools with treating PAMP in Arabidopsis**

Dr. Pil Joong, *Temasek Life Science Laboratory*

14:00 – 14:15 **Generation of Low Arsenic and Low Cadmium Rice through Genome Editing and Gene Overexpression**

Dr. Gui Yuejing, *Temasek Life Science Laboratory*

14:15 – 14:30 **High temperature affecting flowering in lettuce**

Dr. Kulaporn Boonyaves, *Temasek Life Science Laboratory*

14:30 – 14:45 **Analytical proxies and sensors for understanding heavy metal environmental impact in agricultural practices**

Dr. Gonzalo Carrasco, *Tropical Marine Science Institute, NUS*

14:45 – 16:00 **Coffee and Poster Session (Internal)**

16:00 **Close**



Singapore-MIT Alliance for Research and Technology

The Singapore-MIT Alliance for Research and Technology (SMART) is a major research enterprise established by the Massachusetts Institute of Technology (MIT) in partnership with the National Research Foundation of Singapore (NRF) in 2007.

SMART is the first entity in the Campus for Research Excellence and Technological Enterprise (CREATE) developed by NRF.

SMART is MIT's first, and to-date only, research centre outside the United States. It is also MIT's largest international research programme.

MIT faculty members have laboratories at SMART, mentor postdoctoral associates and graduate students, and collaborate with researchers from universities, research institutes and industries in Singapore and Asia.





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