



BIOLOGY COLLOQUIUM

Friday, 1 Nov 2019 | 4pm | DBS Conference Room 1

Hosted by A/P Wu Min

Organelle Biogenesis and Function in Plants



By Liwen Jiang

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Professor JIANG Liwen is a Professor in the School of Life Sciences and Director of Centre for Cell & Developmental Biology at the Chinese University of Hong Kong. Professor Jiang's research has been focused on understanding the molecular mechanisms of protein trafficking and organelle biogenesis in the plant secretory and endocytic pathways as well as their applications in plant biotechnology.

Organelle biogenesis and function is an important topic in plant cell biology. The plant endomembrane system contains several functionally distinct organelles including the endoplasmic reticulum (ER), the Golgi apparatus, trans-Golgi network (TGN) or early endosome, prevacuolar compartment (PVC) or multivesicular body (MVB), and vacuole. Over the past years, we have used a combination of cellular, molecular, genetic and 3D TEM approaches to study protein trafficking, organelle biogenesis and function in the plant endomembrane system, with novel findings: 1) We demonstrated a unique mechanism of COPII-mediated ER protein export; 2) We showed multiple functional roles of FREE1 (a plant-unique ESCRT component) in mediating MVB biogenesis and MVB-autophagosome fusion as well as autophagosome formation in plants; 3) We developed a new strategy to screen for suppressor of free1 (sof) and identified a novel mechanism through demonstrating a *BRo1-domain protein As FREE1 suppressor (BRAf)* to negatively regulate MVB biogenesis and MVB-mediated protein sorting in plants; and 4) Using 3D whole-cell tomography analysis, we recently developed a new model of vacuole biogenesis in Arabidopsis root cells. Here, I will first summarize our major findings and present progress from on-going research in these areas.