

**Research Theme:** Plant Biology and Biotechnology

**MSc Research Project Title:** Rewiring Plant-pathogen Interactions for Novel Agrifood Technology

**Principal Investigator/Supervisor:** Associate Professor Yansong MIAO

**Co-supervisor/ Collaborator(s) (if any):**

### Project Description

#### a) Background:

Plants constantly receive different invasive molecules from the pathogenic microbe, which activate different layers of immune responses against pathogenic infection. Plant immune response includes the pathogen-associated molecular pattern (PAMP) triggered innate immunity (PTI) through recognition receptors (PRRs), and bacterial effector proteins triggered immunity. The interkingdom communications between pathogen and plants are diverse and sophisticated. They fight against each other and co-evolve during such constant plant-microbe interactions.

We have recently identified several novel mechanisms underlying plant-pathogen interactions. We are looking for a highly motivated master student to work on this emerging direction in host-pathogen communication using unconventional technologies. The master candidate will use advanced super-resolution living cell imaging, cutting-edge in vitro reconstitution, which integrates biochemistry, bioengineering, protein engineering, genetic engineering, to study the macromolecular assembly of several newly discovered key factors that regulate plant immunity. The student will also integrate bio-, chemical-, and genetic-engineering-based approaches to develop rationally designed plant defense technologies against pathogenic invasion for agriculture, food security, and sustainability.

In Miao lab, we provide solid scientific training for your future career and aim to nurture the next generation of scientists. As European Molecular Biology Organization (EMBO)-affiliated lab, Miao lab students have different high-quality scientific training opportunities, such as international conferences, workshops, exchanges.

For our recent work and publications, please see <https://personal.ntu.edu.sg/yansongm>  
For more details of ongoing and new projects, feel free to contact Dr. Miao at [yansongm@ntu.edu.sg](mailto:yansongm@ntu.edu.sg).

#### b) Proposed work:

Our top-notch biotechnologies in the lab and long-term collaborations with material science, chemistry, structural biology, and modeling groups will ensure a comprehensive understanding of biomolecular phase separation and cellular aging.

#### c) Preferred skills:

Enthusiasm for science; Excellent oral and written communication skills; Good collaboration skills.

**Supervisor contact:**

**If you have questions regarding this project, please email the Principal Investigator:**

[yansongm@ntu.edu.sg](mailto:yansongm@ntu.edu.sg)

**SBS contact and how to apply:**

Associate Chair-Biological Sciences (Graduate Studies) : [AC-SBS-GS@ntu.edu.sg](mailto:AC-SBS-GS@ntu.edu.sg)

Please apply at the following:

**Application portal:**

<https://venus.wis.ntu.edu.sg/GOAL/OnlineApplicationModule/frmOnlineApplication.ASPX>