



Research Theme: Biophysics, Biochemistry

MSc Research Project Title: Enzymatic reaction mechanisms within biomolecular condensates

Principal Investigator/Supervisor: Tianjin Yang

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

Project Description

a) Background:

Phase separation is now recognized as a common mechanism underlying the regulation of enzyme activity in cells possibly by concentrating enzymes and substrates together and enhancing turnover or conversely, sequestering enzymes and substrates and reducing turnover. Understanding this regulatory function is vital for uncovering how cells control metabolic reactions. Microfluidic tools, combined with single-molecule spectroscopy, will allow us to study enzyme-substrate interactions and activity in condensates under non-equilibrium conditions. By experimentally tuning the driving force for condensate formation, we can correlate enzyme kinetics, substrate affinity, and enzyme activation with the physical properties of the condensate, offering insights into enzyme regulation within condensates.

b) Proposed work:

The student will reconstitute biomolecular condensate in-vitro with different physical properties, and measure enzyme kinetics within the condensate using microfluidic systems and multiple imaging technologies including single molecule spectroscopy.

c) Preferred skills:

Biochemistry, Fundamental fluorescence knowledge, Good collaboration and communication skills, Data analysis skills are advantageous, particularly with MATLAB, Mathematica, or similar platforms.

Supervisor contact:

If you have questions regarding this project, please email the Principal Investigator:
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SBS contact and how to apply:

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

Please apply at the following:

Application portal:

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