|  |
| --- |
| **Research Theme: Cell Biology, Computational Biology** |
| **MSc Research Project Title: Evaluating organelle network dynamics during the cellular response to lysosome damage** |
| **Principal Investigator/Supervisor: Claudio Bussi** |
| **Co-supervisor/ Collaborator(s) (if any):** |
| **Project Description**  **a) Background: Lysosomes are the degradative endpoints of material delivered by endocytosis and autophagy and are therefore particularly prone to damage. Membrane permeabilization or full rupture of lysosomal or late endosomal compartments is highly deleterious because it threatens cellular homeostasis and can elicit cell death and inflammatory signaling. Cells have developed a complex response to endo-lysosomal damage that largely consists of three branches. Initially, a number of repair pathways are activated to restore the integrity of the lysosomal membrane. If repair fails or if damage is too extensive, lysosomes are isolated and degraded by a form of selective autophagy termed lysophagy. Meanwhile, an mTORC1-governed signaling cascade drives biogenesis and regeneration of new lysosomal components to reestablish the full lysosomal capacity of the cell. This damage response is vital to counteract the effects of various conditions, including neurodegeneration and infection, and can constitute a critical vulnerability in cancer cells.**  **b) Proposed work: We will use high-resolution live-cell imaging to evaluate how different organelles respond and interact when lysosomal damage is triggered. By focusing on single-organelle tracking, we aim to uncover novel factors that either promote lysosomal function or contribute to its membrane rupture and dysfunction.**  **c) Preferred skills: tissue culture knowledge, confocal imaging expertise and computation work on data analysis would be a big plus, but not indispensable** |
| **Supervisor contact:**  **If you have questions regarding this project, please email the Principal Investigator:** |
| **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> |