UNIVERSITY of GUELPH

COLLEGE of BIOLOGICAL SCIENCE

DEPARTMENT OF MOLECULAR AND CELLULAR BIOLOGY

Announcement:

All interested members of the university community are invited to attend the Final Oral Examination for the degree of ***Master of Science*** *of*

PUJA PUSPA GHOSH

On Monday, April 15th, 2024 at 1:30 p.m. (SSC 2315)

Thesis Title: **Investigating the Role of Endoplasmic Reticulum (ER) in Plastid Division**

Examination Committee:

Dr. Jasmin Lalonde, Dept. of Molecular and Cellular Biology (Exam Chair)
Dr. Joseph Colasanti, Dept. of Molecular and Cellular Biology
Dr. Jaideep Mathur, Dept. of Molecular and Cellular Biology
Dr. Tariq Akhtar, Dept. of Molecular and Cellular Biology

Advisory Committee:

Dr. Jaideep Mathur (Advisor)
Dr. Ian Tetlow
Dr. Joseph Colasanti

Abstract: Plastids, postulated endosymbiotic organelles, generally multiply by binary division across the mid-plane of a pre-existing plastid, yielding two daughter plastids of equal size. A crucial player in this process is a cytosolic dynamin-related protein 5B (DRP5B) or Accumulation and Replication of Chloroplast 5 (ARC5), which constricts and severs the plastid membrane. While ARC5 localizes to the plastid division site through its interaction with plastid envelope membrane proteins, the precise mechanism of its recruitment to this site remains unknown. Moreover, daughter plastid separation following membrane fission is poorly understood. Despite the significant influence of the endoplasmic reticulum (ER) in plastid morphology and dynamics, previous studies did not consider its potential role in plastid division. To investigate the role of ER in plastid division, this study employs time-lapse imaging of stable transgenics of *Arabidopsis thaliana* expressing ER and ARC5-targeted fluorescent proteins. The findings of this study strongly suggest the involvement of ER in facilitating ARC5's recruitment to the plastid division site and the separation of daughter plastids, expanding the current understanding of the plastid division mechanism.

Curriculum Vitae: Puja completed her B.Sc. in Botany at the University of Dhaka in March 2018 and her M.Sc. in Botany in November 2019. She then began her M.Sc in Molecular and Cellular Biology in Winter 2022 under the supervision of Dr. Jaideep Mathur.

Publications: Mathur, J. & Ghosh, P.P. (2024). Using ER-Targeted Photoconvertible Fluorescent Proteins in Living Plant Cells. In: Kriechbaumer, V. (Ed) *The Plant Endoplasmic Reticulum. Methods in Molecular Biology*, vol 2772. Humana, New York, NY. https://doi.org/10.1007/978-1-0716-3710-4_22

Hall, M. R., Kunjumon, T. K., Ghosh, P. P., Currie, L., & Mathur, J. (Accepted). Organelle Interactions in Plant Cells. In: M. Kloc, J. Z. Kubiak, & M. Halasa (Eds.), *Intercellular and Interorganellar Transfer and Communication in Biology and Medicine*, Springer Nature.