



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

KATHLEEN DELFOSSE

on Monday, March 19, 2018 at 1:30 p.m. in SSC 1511

Thesis Title: Investigations of the Effects of Subcellular Sugar Levels on Plastid Morphology

Examination Committee:

Dr. K. Yankulov, Dept. of Molecular and Cellular Biology (Exam Chair)

Dr. J. Mathur, Dept. of Molecular and Cellular Biology

Dr. T. Akhtar, Dept. of Molecular and Cellular Biology

Dr. M. Emes, Dept. of Molecular and Cellular Biology

Advisory Committee:

Dr. J. Mathur (Adv)

Dr. T. Akhtar

Dr. J. Wood

Abstract: Plastid extensions, known as stromules, are an enigmatic feature of all land plants observed to date but the mechanism by which they extend remains unknown. However, a number of conditions that are directly or indirectly related to sugar accumulation such as fungal infection, viral infestation, abiotic stress, and exogenous sucrose treatment result in their induction. Indeed a positive relationship was found between chloroplast morphology and modifications to the endogenous sugar levels of *Arabidopsis thaliana* achieved by various means. Since sugar feeds into the starch, fatty acid, and lipid biosynthesis pathways in plastids my study further investigated the role of starch and fatty acid biosynthesis pathways through the imaging of stromules in living plant cells. Changes in plastid morphology were also assessed in mutants with aberrant starch, fatty acid, or lipid synthesis, and following overexpression of proteins associated with sugar transport and the Oxidative Pentose Phosphate Pathway. The insights obtained from my investigations suggest a strong link between fatty acid metabolism and plastid pleomorphy.

Curriculum Vitae: Kate obtained her Bachelor of Science (Hons.) at the University of Guelph in April 2016 (Plant Science, Emphasis in Biotechnology). In May 2016, she began her M.Sc. in the lab of Dr. Jaideep Mathur.

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Awards: NSERC Canada Graduate Scholarship - Master's | May 2017-April 2018;
Graduate Entrance Excellence Scholarship | May 2016-April 2017

Publications: **Delfosse, K.**, Wozny, M. R., Anderson, C. J. J., Barton, K. A. and Mathur, J. (2017). Evolving views on plastid morphology. In *Concepts in Cell Biology- History and Evolution* (ed. Sahi, V. P., and Baluska, F.) Chapter 10, New York, Springer.

Delfosse, K., Wozny, M. R., Jaipargas, E. A., Barton, K. A., Anderson, C. J. J., and Mathur, J.(2016). Fluorescent protein aided insights on plastids and their extensions: A critical appraisal. *Frontiers in Plant Science*. 6:1253. doi: 10.3389/fpls.2015.01253

Griffiths, N., Jaipargas, E. A., Wozny, M. R., Barton, K. A., Mathur, N., **Delfosse, K.**, and Mathur, J. (2016). Photo-convertible fluorescent proteins as tools for fresh insights on sub-cellular interactions in plants. *Journal of Microscopy*.
doi: 10.1111/jmi.12383.