



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

SHARALL PALMER, on Monday, September 11, 2017 at 1:30 p.m. in SSC 2315
(Advisor: Dr. S. Graether)

Thesis Title: The role of residue position and charge in the cryoprotective behaviour of the *Vitis riparia* K₂ and YSK₂ dehydrins

Examination Committee:

Dr. J. Yankulov, Dept. of Molecular and Cellular Biology (Chair)
Dr. S. Graether, Dept. of Molecular and Cellular Biology
Dr. I. Tetlow, Dept. of Molecular and Cellular Biology
Dr. D. Josephy, Dept. of Molecular and Cellular Biology

Abstract: Dehydrins are group II Late Embryogenesis Abundant proteins that accumulate in plants during seed development and in response to abiotic stresses. The biological function of dehydrins remain elusive, as they are multi-functional *in vitro*. The contribution of sequence and charge to the cryoprotective behaviour of dehydrins was analyzed using synthetic variants of the *Vitis riparia* YSK₂ and K₂ proteins: ScYSK₂, a scrambled version of YSK₂; and AntiK₂, a charge-reversed version of K₂. Circular dichroism (CD) spectroscopy analysis revealed that dehydrin-induced changes in the structure of YFH1 was dependent on sequence and independent of residue charge. An LDH cryoprotection assay showed that the efficiency of YSK₂ was unrelated to its sequence, whereas the efficiency of K₂ depended on its residue charge type. CD spectroscopy analysis also suggested that the mechanism of protein stabilization by dehydrins may be more like glycerol than polyethylene glycol. Identifying functionally important residues in dehydrins would provide insight into the potential mechanism(s) of their protective behaviour.

Curriculum Vitae: Sharall obtained her B.Sc. from Brock University in 2013 and began her M.Sc. in the lab of Dr. Steffen Graether in the fall of 2015.