

Department of Molecular and Cellular Biology  
**Graduate Seminar MCB\*6500**  
Friday, Feb. 16, 2018 in SSC 1511 @ 12:45 p.m.

*presented by:*

## **Cecily Costain**

*(Advisor: M. Emes)*

### **“The role of starch in the physiology, development, and reproduction of oilseed species”**

Starch is an agronomically important carbon storage polymer synthesized by most land plants as a means to store sugar as an osmotically inactive glucan for subsequent use as a substrate for metabolism and growth (Eveland and Jackson, 2012). It is used in a number of industries due to its wide range of physical properties, and is an indispensable source of energy feeding the world's human and livestock populations (Makhmoudova *et al.*, 2014). The proposed research aims to investigate the role of starch in the physiology, development, and reproduction of oilseed species, using the model species *Arabidopsis thaliana*. Recently, starch branching enzyme isoforms SBEI and SBEIIb cloned from maize endosperm were constitutively expressed in a starchless, *sbe*-null *A. thaliana* line. Transformants exhibited an increase in biomass and number of siliques per plant, which resulted in a four-fold increase in oilseed production (Liu *et al.*, 2016). Understanding the biological processes underpinning these changes could have a significant impact on improving yield in agronomically important oilseed crops under cultivation in Ontario and across Canada.

#### **References**

1. Eveland, A.L., and Jackson, D.P. (2012). Sugars, signalling, and plant development. *Journal of Experimental Botany* 63, 3367–3377.
2. Makhmoudova *et al.*, (2014) Identification of Multiple Phosphorylation Sites on Maize Endosperm Starch Branching Enzyme IIb, a Key Enzyme in Amylopectin Biosynthesis. *Journal of Biological Chemistry* 289, 9233–9246.
3. Liu, F., Zhao, Q., Mano, N., Ahmed, Z., Nitschke, F., Cai, Y., Chapman, K.D., Steup, M., Tetlow, I.J., and Emes, M.J. (2016). Modification of starch metabolism in transgenic *Arabidopsis thaliana* increases plant biomass and triples oilseed production. *Plant Biotechnology Journal* 14, 976–985