



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

JESSICA NELSON

On Monday, May 6th, 2024 at 10:30 a.m. (online)

Thesis Title: **The Disruption of the GID Complex Pathway Impacts Nutrient-Sensitive Gene Expression in *Saccharomyces cerevisiae***

Examination Committee:

Dr. Melanie Alpaugh, Dept. of Molecular and Cellular Biology (Exam Chair)

Dr. George van der Merwe, Dept. of Molecular and Cellular Biology

Dr. Rebecca Shapiro, Dept. of Molecular and Cellular Biology

Dr. Ian Tetlow, Dept. of Molecular and Cellular Biology

Advisory Committee:

Dr. George van der Merwe (Advisor)

Dr. Rebecca Shapiro

Dr. Wei Zhang

Abstract: The yeast *Saccharomyces cerevisiae* plays an integral role in brewing, baking, and winemaking. When grown in abundant glucose, the yeast undergoes a phenomenon known as glucose repression, a form of carbon regulation that favours aerobic fermentation and employs transcriptional inhibition and targeted protein degradation to repress the catabolism of alternate carbon sources, like ethanol, through respiration and gluconeogenesis. Some primary mechanisms involved in glucose repression require the E2 ubiquitin conjugating enzyme, Ubc8, and the glucose-induced degradation deficient complex (GIDc), an E3 ubiquitin ligase. These proteins perform the ubiquitination of gluconeogenic enzymes like fructose-1,6-bisphosphatase, encoded by *FBP1*, for targeted degradation in abundant glucose. Here, qRT-PCR and cell viability assays demonstrate that a compromised GIDc pathway, through deletion of its catalytic subunit genes, *GID2* and *GID9*, and/or *UBC8*, impacts carbon-regulated gene expression in yeast cell viability in response to changing nutrient conditions.

Curriculum Vitae: Jessica completed her B.Sc. (Hons.) with a Major in Microbiology and a Minor in Biotechnology in Spring 2020 at the University of Guelph. She then began her M. Sc in Molecular and Cellular Biology in Fall 2020 under the supervision of Dr. George van der Merwe.