



Announcement:

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

ASHLEY PEI YI CHENG

on Wednesday, June 27, 2018 at 1:30 p.m. in SSC 1511

Thesis Title: Evaluating the impact of replication fork pausing on epigenetic conversions in *Saccharomyces cerevisiae*: A novel approach and first analysis

Examination Committee:

Dr. J. Vessey, Dept. of Molecular and Cellular Biology (Exam Chair)
Dr. R. Lu, Dept. of Molecular and Cellular Biology
Dr. G. van der Merwe, Dept. of Molecular and Cellular Biology
Dr. J. Colasanti, Dept. of Molecular and Cellular Biology

Advisory Committee:

Dr. J. K. Yankulov (Adv)
Dr. R. Lu
Dr. G. van der Merwe

Abstract: The subtelomeric regions of *Saccharomyces cerevisiae* undergo infrequent conversions in the expression state of a gene. The switch in gene expression is thought to be a consequence of a loss in epigenetic information encoded by post-translational modifications on histone proteins. Previous assays used to study epigenetic conversions involved the use of the counter selection drug, 5-FOA, but recent evidence has shown that 5-FOA can lead to unreliable conclusions. Using a new approach involving cellular fluorescence, I developed an assay that circumvents the need for 5-FOA. With flow cytometry I analyzed the effects of a replication fork pause site on the frequency of epigenetic conversions. The results were cross-validated with microscopy and with the previous assay. However, the data was inconclusive. It is plausible that the design of the reporter protein may be responsible for skewing the results. I have included recommendations for further optimization. Furthermore, I discovered that a combination of serine to alanine point mutations to CDC7 and CDC28 phosphorylation sites, S94A-S238A and S238A-S515A, on Chromatin Assembly Factor I (CAF-I) can significantly alter the morphology of the cell. This morphology is consistent with arrest in the G1 phase of the cell cycle; therefore, this novel observation demonstrates that the deregulation of histone chaperone CAF-1 can cause deregulation of the cell cycle.

Curriculum Vitae: Ashley obtained her Bachelor of Science (Hons.) at the University of Guelph in April 2016. She began her M.Sc. in the lab of Dr. J. Krassimir Yankulov in May of the same year.

Publication: Rowlands, H., Dhavarasa, P., Cheng, A., and Yankulov, K. (July 2017) Forks on the Run: Can the Stalling of DNA Replication Promote Epigenetic Changes? *Front. Genet.* Vol. 8, pp. 1-15.