



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

SIERRA ROSIANA

On Wednesday, August 26, 2020 at 9:30 a.m. (online)

Thesis Title: The role of fungal adhesins in mediating morphogenesis and virulence
in *Candida albicans*

Examination Committee:

Dr. Matthew Kimber, Dept. of Molecular and Cellular Biology (Exam Chair)

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

Dr. Cezar Khursigara, Dept. of Molecular and Cellular Biology

Dr. Jennifer Geddes-McAlister, Dept. of Molecular and Cellular Biology

Advisory Committee:

Dr. Rebecca Shapiro (Advisor)

Dr. Cezar Khursigara

Dr. George van der Merwe

Abstract: *Candida albicans* is a microbial fungus that exists as a commensal member of the human microbiome and an opportunistic pathogen. *C. albicans* is a polymorphic yeast that can switch between yeast and filamentous morphologies, and the governing mechanisms involve a complex genetic interaction network that remains to be fully explored. Preliminary research suggests cell surface adhesin proteins likely play a role in morphogenesis, but a complete analysis of the role and relationship between these adhesins has not been explored. Previous research from Dr. Shapiro's lab established a CRISPR platform for efficient generation of single- and double-gene deletions in *C. albicans*, which was applied to construct a library of 144 mutants, comprising 12 unique adhesin genes deleted singly, or in every possible combination of double deletions. My research aims to explore the role of adhesin proteins in *C. albicans* virulence. I performed a comprehensive screen of this library, using *Caenorhabditis elegans* as a simplified model host system which identified mutants critical for virulence and significant genetic interactions. This was followed up with in vitro biofilm and morphogenesis assays, which uncovered that some strains that were critical for virulence were also attenuated in these functions, but overall showed that the regulating of these three processes is complex and requires further investigation. The results of this project yield important new insight regarding the role of adhesins in mediating virulence of this critical fungal pathogen; and identifying these virulence regulators may ultimately lead to new targets for anti-virulence strategies.

Curriculum Vitae: Sierra completed her Bachelor of Science (Hons.) at the University of Guelph in the spring of 2018, and then began her MSc in the fall of 2018 in the lab of Dr. Rebecca Shapiro.

Publications: Sharma, J.; Rosiana, S.; Razzaq, I.; Shapiro, R.S. Linking Cellular Morphogenesis with Antifungal Treatment and Susceptibility in *Candida* Pathogens. *J. Fungi* **2019**, 5, 17.