**Course Code:** MMG 1350H

**Course Title:** Fungal Drug Resistance, Development & Disease

**Course Coordinator:** Leah E. Cowen, PhD

**Course Location:** MaRS Centre West Tower, 661 University Ave, Room 1622

**Course Time:** TBD - typically Tuesdays, 10:30am-12:30pm (January – February)

**Overview:**

Fungi are the cause of scores of life-threatening diseases, are the earth’s preeminent degraders of organic matter, include the best-characterized eukaryotic model systems, and are proving to be invaluable to science and manufacturing. This course will focus on recent advances in fungal pathogenesis, with an emphasis on understanding the unusual sexual mechanisms of pathogenic fungi as well as the molecular mechanisms by which they cause disease and evolve resistance to antifungal drugs. Papers selected for discussion will span genomics, signaling, cell identity, interspecies interactions, evolution, and models of pathogenesis. Introductory lectures will set the stage for class discussion of selected papers. Student grades will be based on participation in discussions, a written NSERC-style grant application, and referee reports on two grant proposals submitted by their peers.

**Course Objectives:**

* Provide an introduction to the diversity of microbial pathogens in the fungal kingdom.
* Define key concepts in fungal sex and cell identity, and their relationship to pathogenesis.
* Survey central mechanisms of environmental sensing and morphogenesis in fungal pathogens.
* Introduce antifungal drugs and resistance mechanisms.
* Examine virulence traits in fungal pathogens and how virulence is assayed in models of disease.
* Explore principles of host response to fungal infection.

**Marking Scheme:**

* 40% for participation in the discussion (this includes both presenting specific figures and general contribution to discussion).
* 40% for a grant proposal.
* 20% for referee reports on two grant proposals submitted by your colleagues.

If you anticipate missing a class you must let the instructor know in advance, given the weight on participation and the fact that there are only six classes. Providing that you had a legitimate reason for missing the class, you will provided with an assignment based on the reading for that week that you can use to make up for the lost class.

The basic outline for what will be covered in the six weeks is below. Assigned reading will be sent out the week in advance. In addition to the research articles, a review article will be distributed that is meant to provide a bit of context for the lecture for those students with less background and will not be a specific point of discussion.

Week 1: Microbial Pathogens in the Fungal Kingdom

Week 2: Fungal Sex and Cell Identity

Week 3: Environmental Sensing and Morphogenesis)

Week 4: Antifungal Drugs and Resistance Mechanisms

Week 5: Virulence and Models of Disease

Week 6: Host Responses to Fungal Infection