



# COLLEGE of ENGINEERING AND PHYSICAL SCIENCES

SCHOOL OF COMPUTER SCIENCE

## PhD Defence

**Wednesday August 30, 2023 at 12pm via Zoom [Remote]**

**James Fraser**

*Learning to Code: An Examination of Novice Programmer Profiles*

**Chair:** Dr. Stacey Scott

**Advisor:** Dr. Judi McCuaig

**Co-Advisor:** Dr. Dan Gillis

**Non-Advisory:** Dr. Shoshanah Jacobs [Integrative Biology]

**External Examiner:** Dr. Christopher Brooks [University of Michigan]

### Abstract:

Recently, online learning environments have played a mandatory and critical role at all levels of education. This abrupt technological shift has highlighted the importance of online education accessibility and resources. Historically, introductory computer science, specifically programming courses, has demonstrated high failure and drop-out rates in university and online studies.

This research examines novice (1st and 2nd-year university) programming students' effort levels during the semester. Our research developed the IFS (Immediate Feedback System), a voluntary and supplementary online platform in which students submit programming coursework snapshots. The educational platform monitors students' online actions, collects students' submissions, and provides assessment feedback. In addition, the IFS requests that students complete psychological surveys and self-assessments to communicate their assessment of course progress.

Our research conducted a multi-semester study investigating introductory programming courses. Student profiles were developed based on categorizing students' usage patterns and course outcomes. Our analysis examined student profiles from a session-level to the entire semester and the relationship between profiles and grade. Finally, we examine the transitions between student's usage profiles to examine how students develop throughout their preliminary programming classes.