



# COLLEGE of ENGINEERING AND PHYSICAL SCIENCES

SCHOOL OF COMPUTER SCIENCE

## MSc Defence

**Thursday April 27, 2023 at 10am via Zoom [Remote]**

**Nathan Laundry**

*Toward a Computational Thinking Paradigm*

**Chair:** Dr. Fei Song

**Advisor:** Dr. Judi McCuaig

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### **Abstract:**

Interest in Computational Thinking (CT) has steadily grown in the scientific community and in K-12 education since Jeanette Wing's 2006 article. Despite increased interest, the research area lacks canonical definitions for CT and its components. Various stakeholders in CT research hold different, yet equally valid, motivations for defining and measuring CT. The open problems: *what is CT? how do we measure it? and does it transfer beyond informatics contexts?* remain the most pressing questions for CT researchers.

This research proposes that many open research questions would be more tractable if CT researchers had a common paradigm from which to base their work. Contributing to the proposed paradigm, this thesis describes a CT meta framework that leverages CT literature as well as literature from cognitive science and concerning the cognitive processes of Human problem solving, and how to facilitate knowledge transfer across contexts.

The framework differentiates between three core CT perspectives present in the literature: Implicit Cognitive CT, Explicit Procedural CT, and Informatics Domain Specific CT. The motivations and definitions used by each CT perspective are outlined and incorporated into the CT framework. The thesis concludes with a case study that illustrates how the meta framework can be used to increase clarity (make definitions of CT and CT components as well as concepts of CT transfer explicit) when presenting experimental designs and findings to CT researchers who hold a variety of CT perspectives.