

# Undergraduate Student Research Award (USRA) { Summer 2023

Dr. Eugenia Ternovska  
School of Computing Science

**Note:** both domestic and international students are eligible to apply.

## **Reasoning about Non-Deterministic Computations**

During this internship, the undergraduate USRA researcher will join the Computational Logic team and gain hands-on experience with research in the area. The student will be supervised by Dr. Eugenia Ternovska, and work with a graduate student as part of an international team of researchers. The research team is studying the connections between logic and computation. Logic-based formalisms have been used to approach the most intriguing open problems of computer science, from the birth of Computer Science at the beginning of the 20th century. The main question that drives our research is: *How does non-determinism influence the complexity of computation?* We work with a formal framework where non-deterministic computational processes or programs are described algebraically. This framework has a proof system, that is, a set of rules of inference that allow one to derive true statements about computational processes from other true statements.

**The USRA student will investigate** the properties of this proof system by developing an implementation and running multiple examples. The student will then experiment with the implemented proof system to understand how to construct derivation strategies more effectively. The project

## Desired qualifications:

- Interest in Theoretical Foundations of Computer Science and Logic;
- Interest in efficient algorithm design;
- Interest in how computational processes can be represented formally in logic;
- Programming experience;
- Interest in implementing a proof system and designing inference strategies for efficient performance;
- Have taken (and excelled in) some Computer Science Fundamentals and Theory courses (for example, in courses such as MACM 101, CMPT 307, 308, 405, 409, 411, 477, etc.).

## Contact

Applications (resume and transcript) should be emailed directly to Dr. Eugenia Ternovska by January 30, 2023.

If you're interested in applying, or simply want more information, please get in touch by sending an email to Dr. Eugenia Ternovska, [ter@sfu.ca](mailto:ter@sfu.ca).