FOR APPROVAL

TO: Arts & Science Council

SPONSOR: Dwayne Benjamin, Vice-Dean, Graduate Education

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DATE: March 13, 2019 for March 20, 2019

AGENDA ITEM: 3

ITEM OF BUSINESS:
Major Modification – Approval of New Concentration in Applied Mathematics within the Master of Science in Applied Computing (MScAC)

JURISDICTIONAL INFORMATION:
The Arts & Science Council has delegated authority to approve modifications to existing degree programs that are defined in the University of Toronto Quality Assurance Process (UTQAP) as major modifications, such as new program requirement options within an existing graduate program.

GOVERNANCE PATH:
1. Graduate Curriculum Committee – March 7, 2019 (for approval)
2. Arts & Science Council – March 20, 2019 (final approval)
3. Office of the Vice-Provost, Academic Programs (for information), in turn reported to the Committee on Academic Policy & Programs (for information) – May 8, 2019

The Office of the Vice-Provost, Academic Programs will also report this major modification to the Ontario Universities Council on Quality Assurance in the summer of 2019.

HIGHLIGHTS:
This is a proposal for a new concentration in Applied Mathematics, within the Master of Science in Applied Computing. The proposed concentration is offered jointly by the Department of Mathematics and the Department of Computer Science, and would be effective September 1, 2019.

This concentration will train students in the algorithms and mathematical models needed to manage complex data, preparing them for a wide range of industrial and scientific opportunities. It results from the increasing importance of the interface between computational and mathematical sciences. The techniques developed by applied mathematicians have proven to be invaluable for work in scientific computation, artificial intelligence, computer science, medical imaging, data compression and inference, quantum computing, and many other fields.
The proposed concentration is unique to U of T and is without peer in Canada due to the strength of expertise in the Department of Computer Science and the Department of Mathematics, and the numerous potential collaborators across campus and within the GTA. There is demonstrated need and demand for mathematical training within the MScAC, as well as growing demand for qualified, mathematically trained personnel in the industrial and scientific sectors. Large-scale, highly complex data has become a ubiquitous feature of practitioners in modern quantitative disciplines. Designing, interpreting and utilizing the sophisticated algorithms and mathematical models needed to manage complex data is a skill necessary to keep pace with the increasing opportunities for employment in many sectors; particularly in bioinformatics, advanced financial modelling, medical imaging, operational optimization, quantum computation, and large scale numerical scientific computing.

It is anticipated that this concentration will see a steady state intake of 10 students annually within five years. The concentration program requirements follow the structure of the existing MScAC program. Students in this concentration will take 1.0 FCE in mathematics courses, 1.0 FCE in computer science courses, and 1.0 FCE in technical communications and entrepreneurship courses, and will complete an eight-month (two session) industrial internship. Students may choose a supervisor from the Department of Mathematics or the Department of Computer Science, or may be jointly supervised by faculty from each department. The proposed concentration will be offered through the existing faculty complement, although complement growth in the areas of mathematical and computational sciences is predicted.

This proposal has been developed in consultation with the Office of the Vice-Provost, Academic Programs.

**MOTION:**

a) THAT the proposed new concentration in Applied Mathematics within the Master of Science in Applied Computing, described in the attached proposal dated March 5, 2019, be approved effective for the academic year 2019-20.