UNIVERSITY OF TORONTO
FACULTY OF ARTS & SCIENCE

FOR APPROVAL AND RECOMMENDATION

TO: Arts & Science Council

SPONSOR: Mary Pugh, Acting Vice-Dean, Undergraduate & International

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DATE: December 6, 2017 for December 13, 2017

AGENDA ITEM: 4

ITEM OF BUSINESS:
New Specialist Program in Data Science, Department of Computer Science

JURISDICTIONAL INFORMATION:
Section IV-7 of Arts & Science Council's Constitution gives Council authority to "recommend for approval to the appropriate body of Governing Council proposals for new academic programs".

GOVERNANCE PATH:

1. **Arts & Science Council [For approval and recommendation] – December 13, 2017**
2. Committee on Academic Policy and Programs [For approval and recommendation] – January 11, 2017
3. Quality Council [For information] – February 2018

HIGHLIGHTS:

This is a proposal for a new specialist program in Data Science jointly proposed by the Departments of Computer Science and Statistical Sciences, with the primary sponsor being Computer Science. Data Science is a discipline that is growing in prominence, meeting an ongoing need for training in statistical and computing sciences to handle large-scale data projects. The Data Scientist is a much-sought professional who will help curate, analyze, visualize and manage such datasets, and be able both to convey the demands of "Big Data" and appreciate its limits.

Data science is emerging at post-secondary institutions across Canada and the continent, but few institutions can leverage the depth and breadth of the two excellent departments here, where recent efforts to enrich the pedagogy of foundational course offerings shows the capability to manage such projects to ensure the best learning experience of students. The approach in this proposed program is to avoid a lean towards either Computer Science or Statistics within the program requirements, but taking a balanced approach which distinguishes this program from both Canadian and US offerings.

The student demand for this program is seen to reflect society's interest in such professional training, and students will be drawn from existing enrolment streams in both Computer Science and Statistical Sciences, where there is already very strong demand. Enrolment is projected to move to a steady state of around 35 students in a given year of study, with a total enrolment of 100–110 when there are full cohorts in 2nd, 3rd and 4th year (by the 2020–2021 academic cycle). Enrolment in the program will be limited as per Computer Science programs currently, with a focus both on exceptional standing in statistics and in computer science relative to their peers entering, respectively, either computer science or statistical science discretely. The program will be, like Computer Science programs, deregulated with respect to student fees – so students will pay higher fees starting in their second year.

The program requirements show a careful menu of course options from both Computer Science and Statistical Sciences, spread for an even course load across upper years, and will include three core joint courses in data science, for second, third, and fourth year of study. The learning outcomes will include both breadth of knowledge and depth through encouraging a specialized area of study within Data Science, a full understanding of methodologies, the practical and speculative applications of the knowledge, and an understanding of the limits of such knowledge. Students will also be trained to communicate the extracted and analyzed information, and to show ongoing capability as an independent professional.

This proposal has come about through rigorous consultation starting with a committee formed from faculty members in Statistical Sciences and Computer Science, along with data scientists working at U of T-affiliated institutions and in private industry. There was a survey of managers, executives and practitioners in the field to understand industry needs, and this proposal has been circulated to the Chairs represented on the Sciences Curriculum Committee, all potentially interested Arts & Science units, the Faculty of Applied Science and Engineering, and the Undergraduate Vice-Deans of UTM and UTSC.

The teaching of this program will fall to faculty in Statistical Sciences and Computer Sciences, with a program director coming from either department. Three new courses (the joint courses) are proposed and an application for pilot funding with respect to pedagogical innovation will be submitted to ATLAS. In addition, a joint Computer Science and Statistical Sciences tenure-stream assistant professor position is in active search, along with two teaching-stream assistant professor positions in Statistical Sciences. Currently, both departments have extensive faculty expertise in all aspects of Data Science, whether machine learning, data visualization, statistical computation, or communicating statistical ideas; there is also rich experience developing internship components which will allow for robust engagement by students in the Professional Experience Year (PEY) program.

MOTION:

THAT the proposed new Specialist Program in Data Science, as described in the attached proposal, be approved effective the 2018-19 academic year.