

DEPARTMENTS of STATISTICAL SCIENCES and MATHEMATICS  
University of Toronto

**JOB POSTING – POSTDOCTORAL FELLOW**

**Area of Research: Mathematical Logic and Mathematical Statistics**

**Description of duties:** Conduct collaborative research outlined in an awarded NFRFE-2018 *New Frontier in Research* proposal, titled “Rebuilding the Foundations of Bayesian Statistics on Nonstandard Analysis”.

Our proposal aims to rebuild the mathematical foundations of Bayesian statistics using tools from mathematical logic and nonstandard analysis that were unavailable at the time Bayesian analysis was formalized. Our goal is to tackle one of the grand challenges in mathematical statistics: fully characterize the relationship between Bayesian and frequentist inference, the two dominant approaches to statistical inference. In recent work, replacing the standard model of countably additive probability theory with a nonstandard model allowed us to settle a longstanding open problem of deriving a Bayesian characterization of frequentist extended admissibility. We believe that rapid progress on the grand challenge can be achieved by committing additional resources to this unconventional approach.

The candidate may also be asked to teach a small course related to the research, although the primary duty is research.

The Principal Investigator is Daniel M. Roy (Statistics/CS; Toronto). The following researchers are co-applicants on the funded project and will be involved in research and informal advising: William Weiss (Math; Toronto), Robert Anderson (Math, Econ; Berkeley), Nancy Reid (Statistics; Toronto), and Kenny Easwaran (Philosophy; Texas A&M). Collaborators include Aaron Smith (Probability; U. Ottawa) and Haosui Duanmu (Econ; Berkeley).

**Salary: \$45,000 to \$65,000 CAD per year, based on experience; negotiable.**

**Required qualifications:**

Candidates should have obtained or expect to obtain a Ph.D. (or equivalent) in statistics, mathematics, or a related field by September 2019. Candidates should have a strong background in at least one of mathematical logic, probability theory, or mathematical/theoretical statistics and should have demonstrated promise in research as evidenced by peer-reviewed research.

**Application instructions**

All individuals interested in this position must arrange for the following items to be submitted by the closing date:

1. Cover letter, arguing for one's suitability for the project, in particular, by demonstrating excellence in research related in at least one of *mathematical statistics*, *probability*, or *mathematical logic* and demonstrating adequate mathematical training in order to ramp up to carrying out research at the intersection of mathematical statistics and mathematical logic;
2. Curriculum vitae;
3. Best two (2) papers (in PDF format); applicants should provide descriptions of their role in any joint work, along with contact details for coauthors;
4. At least two (2) references, but no more than three (3), ideally one at arm's length (i.e., not an advisor, coauthor, or member of the same institution). Letters should speak to the applicant's research.

**Closing date:** October 15, 2019

**Supervisor:** Daniel M. Roy

**Expected start date:** November 1, 2019 or as soon as possible thereafter

**Term:** One (1) year from start date, with the possibility of extension, depending on approval of supervisor based on performance and funding. Note that funding for the project runs for two years.

**FTE:**

The normal hours of work are 40 hours per week for a full-time postdoctoral fellow recognizing that the needs of the employee's research and training and the needs of the supervisor's research program may require flexibility in the performance of the employee's duties and hours of work.

*Employment as a Postdoctoral Fellow at the University of Toronto is covered by the terms of the CUPE 3902 Unit 5 Collective Agreement.*

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*The University of Toronto is strongly committed to diversity within its community and especially welcomes applications from racialized persons / persons of colour, women, Indigenous / Aboriginal People of North America, persons with disabilities, LGBTQ persons, and others who may contribute to the further diversification of ideas.*