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Professor Danielle Fowler,
Chair,
Department of Information Systems and Decision Science,
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Dear Prof. Fowler,

I am writing to apply for a faculty position in Information System and Decision Sciences at UB's . I have extensive theoretical as well as practical experience in many areas of electrical engineering, applied mathematics as well as theoretical physics, and many of the techniques are directly relevant to the investigation of decision problems involving uncertainty. I believe the breadth and depth of my expertise would enable me to provide a fresh and exciting interdisciplinary perspective to teaching and research carried out in the department.

I have a Ph.D. in theoretical particle physics from Boston University. I also have a Master's degree in Electrical engineering from the University of Ottawa. I have several publications in leading journals in theoretical physics and electrical engineering, apart from numerous peer-reviewed conference publications, as detailed in the resume. My work on particle theory (sole author), on alternatives to the standard model Higgs boson, has been published in Physical Review as well as Physics Letters B. Furthermore, I have pioneered the application of quantum field theory methods (that had been developed in particle theory) to stochastic filtering theory. The work has been published in leading physics and engineering journals. It is noted that this is a fundamental new approach to continuous-time stochastic filtering, and is applicable to many areas of applied mathematics, including continuous-time time-series analysis which is directly relevant to finance and decision science.

I have also led the development of a patented antenna design that led to the addition of a fundamental new capability (detection and tracking of slow-moving objects from an airborne or space-borne radar). This required a fairly detailed understanding of adaptive signal processing as well as antenna theory and simulation tools. My strong theoretical physics and mathematics background helped bridge the gap and led to the ensuing success. The technology has been adopted by the Canadian air force, and has been licensed to a leading international radar vendor in the world. I have also applied computational linguistics methods to extract intent from radar measurements in an automated manner. Some of my current research is on partially observed Markov decision processes (investigation of dynamic programming and related methods as well as optimal control) and application to radar control. Finally, I have applied deep Riemannian

geometry techniques to the practical problem of estimating covariance matrices from limited data, a result of considerable practical importance.

I have significant practical and theoretical/mathematics background to teach many current courses in the MBA and Ph.D. program, as well as propose innovative courses that will further expand the skills of the students. Specifically, my internationally recognized expertise in adaptive signal processing, Bayesian state estimation techniques, stochastic filtering theory, and theoretical and applied control theory will enable me to teach the following courses currently offered in the Ph.D. program:

- **Bayesian Inference and Decision**;
- **Dynamic Programming and Optimal Control**;
- **Convex Optimization**.
- **Probability and Statistics**;
- **Decision Models**;
- **Business Computer Applications**;
- **Statistical Forecasting**
- **Strategic Modeling**;
- **Information Management**.

I would also be interested in proposing novel courses that would be interesting, useful as well as relevant. They include:

Advanced Time Series Analysis: Filtering and Smoothing

Machine Learning Techniques: Concepts and Business Application

Artificial Intelligence: Applications in the Contemporary Business World

I also believe all these courses, unique in content and perspectives, will further enhance the excellent reputation of the school.

I also plan to augment the lectures and discussions with interactive demos (created using, Mathematica/Matlab/Sage), that will help the students in assimilating the material.

Sincerely,

Dr. Bhashyam Balaji