

Dr. Richard A. Frost – Biography

Education and Teaching Positions

Dr. Richard A. Frost obtained an Honours degree in Physics from the University of London in 1971. He then went to Nigeria to teach Chemistry at a High School for two years, after which he completed a Master's degree in Medical Physics from the University of Aberdeen. He then went on to a Research Fellowship position at Strathclyde University where he became a faculty member and subsequently obtained a Doctoral degree in Computer Science. After spending nine years at Strathclyde university, Dr. Frost took up a position at Glasgow university where he was promoted to Senior Lecturer (equivalent to an Associate Professor in Canada).

Dr. Frost was appointed as a Full Professor and Director of the School of Computer Science at the University of Windsor in 1987. He held the position of Director, on and off, for 15 years. He is currently the Acting Director.

Whilst at Windsor, Dr. Frost has repeatedly won the Faculty of Science award for having the highest student teaching evaluation score in large Computer Science classes. He won the University of Windsor's highest teaching award, the Alumni award for distinguished contributions to teaching, in 2002, and the prestigious Ontario Provincial award for leadership in Faculty teaching in 2007.

Dr. Frost wrote the proposal for, and implemented, the thesis-based Master's program in Computer Science in 1989. Approximately 60 students are currently enrolled in this program. He also wrote and implemented the Doctoral program in 2001. This program currently has an enrolment of approximately 30 students.

Dr. Frost also wrote the proposals for government funding to purchase the first Web server on campus, the first Unix compute servers, and the first GigaBit Ethernet routers which form the backbone of the campus network. Dr. Frost also assisted Stephen Karamatos in introducing Lotus Notes to the campus community by first experimenting with it in Computer Science.

Dr. Frost served on the IBM Executive Advisory Board for the Toronto Labs. from 1989 to 2003, and was the Ontario Representative and Secretary to the Canadian Association of Computer Scientists from 1995 to 2003.

Research and Publications

Dr. Frost has authored two books. His graduate-level book on Knowledge Base Systems explains how formal logics, classical and non-classical, can be used to extend the capabilities of conventional database systems. The book has been

used as a textbook at many universities including Cambridge, and Queen's in Canada. It is still used as a textbook at the University of Manchester in the U.K. The book has been cited over 200 times in scholarly articles.

Dr. Frost has also written over 40 scholarly articles which have been published in journals and refereed conference proceedings. His paper on Binary-Relational data Structures, which was published in the British Computer Journal in 1982 raised awareness of the advantages of binary-relational databases and contributed to the development of “triple stores” which now form the basis of several commercial database systems sold in the U.K.

A paper which he co-authored with John Launchbury in 1989 is regarded as a seminal paper on the use of combinatory parsing in processing natural language. Dr. Frost was the first to use memoization to achieve polynomial time complexity in a purely-functional implementation of top-down parsing and published the results in SIGPLAN notices in 1994. He was also one of the first researchers to use the functional construct of a “monad” (from mathematical category theory) to facilitate the systematic memoization of parsers.

Dr. Frost's paper on the use of lazy functional programming languages in the realization of natural language interfaces was published in the premier journal in Computer Science – ACM Computing Surveys, and was in the top-10 downloads from the ACM site for January and February of 2007.

More recently, Dr. Frost, together with one of his doctoral students, Rahmatullah Hafiz, have solved a problem in parsing theory (a branch of theoretical Computer Science) which researchers have been trying to solve for over 40 years – how to accommodate arbitrary context-free grammars (including left-recursion and ambiguity) in polynomial time and space using a top-down parsing strategy. Dr. Frost's publications are referred to over 12 times in the definitive book on parsing “Parsing Techniques” written by Dick Grune in Amsterdam. The method for accommodating left-recursive grammars, which was developed by Frost and Hafiz has already found application in practice – it is referred to, and has been implemented by, the developers of the widely-used LEPL parser library which is written in the Python programming language.

Dr. Frost has received continuous funding from the Canadian Natural Engineering and Research Council (NSERC) for over 20 years.

The SpeechWeb Project

Dr. Frost is the inventor of the SpeechWeb architecture which facilitates the creation and deployment of hyperlinked speech application on the web. Dr. Frost was the first to demonstrate access to SpeechWeb applications at the IEEE WECWIS, PACLING and AAAI conferences in 1999. Since then, Dr.

Frost's SpeechWeb project has expanded to include speech access to Wikipedia and CNN News feeds, natural-language speech access to various databases, games with voice in and voice out, speech-accessible arithmetic calculators, and various other hyperlinked speech applications.