

UofA Prof wins Fessenden Medal

Dr. Norman C. Beaulieu, Professor and iCORE Research Chair in Broadband Wireless Communications at the University of Alberta has been awarded the 2010 Reginald Aubrey Fessenden Silver Medal “for outstanding contributions in wireless communication theory” by IEEE Canada.

IEEE Canada is the Canadian region of the IEEE (Institute of Electrical and Electronics Engineers). IEEE is the trusted “voice” for engineering, computing and technology information around the globe. Each year IEEE Canada showcases Canadian engineering achievements by recognizing the individual achievement of its members with various awards. The IEEE Canada awards the R.A. Fessenden silver medal to outstanding Canadian engineers recognized for their important contributions to the field of telecommunications.

R.A. Fessenden is certainly one of the unsung pioneers of wireless and radio technology. Although Marconi received much of the limelight with his work, Fessenden had a much greater insight into the workings of radio technology. He achieved many "firsts". He was the first to develop a method of generating a continuous wave signal and to use it. He was the first to transmit voice, and to make a sound broadcast. He developed and was the first to use the heterodyne principle that forms the basis of almost every radio today. He was the first to establish two-way communication across the Atlantic, and to send a voice signal across the Atlantic. In many ways, Reginald Fessenden made huge contributions to the technology of radio, and yet he is comparatively little known. Even when people do recognize his name, he is often thought of as an American, whereas in fact he came from Canada. His son summarized his greatest achievements in one sentence: "By his genius, distant lands converse and men sail unafraid upon the deep."

Over Dr. Beaulieu's illustrious career he has contributed to many aspects of the telecommunications field and the university community. He has published 248 refereed journal articles, 353 refereed conference papers and received over \$15,000,000.00 in research funding to continue his research outputs in telecommunications. Among many extraordinary contributions, Dr. Beaulieu has contributed a mathematical technique called the "Beaulieu Series" used by researchers worldwide to solve problems in wireless communications. A paper in (IEE Proc.-Commun., June 2006, p. 349) states, “Many research studies on the performance characteristics of communications applications are based on the Beaulieu series approach.” US Patent 7,394,875 owned by Texas Instruments is titled “Beaulieu series approach to optimal UMTS RACH preamble detection estimation.” A longstanding problem, important in many fields is determining the distribution of a sum of lognormal random variables. Dr. Beaulieu's work in this field has been cited in 16 different research disciplines, (see Google Scholar and ISI Web of Science). He also derived a novel electrical pulse shape that is better than the raised-cosine pulse. Other researchers, around the world, are using the new pulse as the new benchmark pulse for data transmission. The linear threaded algebraic space-time (TAST) codes co-invented by the nominee are the best known linear block space-time codes. A TAST code has been incorporated in the Industry Standard IEEE 802.16e, the “WiMax Standard.” He also co-invented the most efficient Rayleigh fading simulator design.

Dr. Beaulieu's current research interests include broadband digital communications systems, ultra-wide bandwidth wireless systems, ad hoc wireless networks and cooperative wireless networks, fading channel modeling and simulation, diversity systems, multiple input multiple output (MIMO) systems, space-time coding, synchronization in interference channels, and cognitive radio.

Dr. Norman C. Beaulieu will accept this prestigious award at the Award Banquet on May 3, 2010 at the 23rd Canadian Conference for Electrical and Computer Engineering (CCECE 2010) to be held in Calgary, Alberta, May 2-5, 2010.