2018 Technical Excellence Award

Dr. Zahra Kazem-Moussavi, P.Eng.

Dr. Zahra Moussavi, P.Eng., graduated with a bachelor's degree in Electronic Engineering from Iran in 1987 and arrived in Canada in 1989. She obtained her M.Sc. in 1993 from the University of Calgary and her Ph.D. in 1997 from the University of Manitoba, both in Biomedical Engineering. She subsequently worked as a post-doctoral research fellow for one year at John Hopkins University in Baltimore, Maryland before joining the Department of Electrical and Computer Engineering at the University of Manitoba, where she is now a full professor. She joined the Telecommunication Research Lab (TRTech) in Winnipeg as Adjunct Scientist in 2003.

Dr. Moussavi was appointed Canada Research Chair (Tier II) in Biomedical Engineering at the University of Manitoba in 2009. Subsequently, she was promoted to the position of Director, Biomedical Engineering Program at the university in 2012. She has also enjoyed cross-appointment as Professor in the Department of Psychiatry since 2011.

Dr. Moussavi is keenly interested in biomedical research. She applies her electronic engineering expertise for detection of Obstructive Sleep Apnea (OSA), by recording a few minutes of breathing sounds during wakefulness and analysing the data with respiratory acoustics signal processing. Prior to this, she developed the first Acoustic Detection System of OSA during sleep with the support of TRTech, which led to the design of portable sleep apnea home-monitoring prototype systems capable of recording breathing and snoring sounds as well as pulse oximeters readings, transmitting this data to smart expert software which detects apnea/hypopnea events and presents the apnea/hypopnea index along with other clinical information to a treating physician. Her OSA research has been recognized internationally and has yielded seminars and workshops invites from around the world. Zahra holds four approved patents in this area of her work. Two of these patents have been licensed to BresoTec Inc. for commercialization.

One of Zahra's current major research passion is in the area of early detection and treatment of Alzheimer's disease. Her studies on spatiotemporal processing of human brain data shows deterioration with age for all healthy participants but much more significantly in individuals at the onset of Alzheimer's. Since 2014, Zahra has offered an eight-week Memory Program Series for the public and has recently designed a computer application with five to eight games for testing and continuing brain exercises for seniors and individuals with dementia.

Dr. Moussavi undertook the very first pilot study in North America of applying repetitive Transcranial Stimulation (rTMS) for Alzheimer's treatment and maintenance up to 1.5 years. The results presented in three conference papers and published in one journal paved the way to receive $1.8 million funding for a large, multi-centre international clinical trial, with McGill and Monash (Australia) Universities. She has an active research program in three laboratories at Riverview Health Centre in Winnipeg. Zahra

currently leads a team of 13 graduate students, three research associates, one post doctoral fellow, and between five and eight undergraduate students. She has authored and co-authored more than 242 peer reviewed publications.

Dr. Moussavi is active within her profession by associating with a number of technical societies and having the role of Associate Editor for four different medical and biomedical engineering journals. She also frequently gives educational talks for the public on how to age with a healthy brain and Alzheimer's related research, in conjunction with the Alzheimer's Society of Manitoba, University's Alumni Association, Riverview Health Centre, and Lindenwood Retirement home.

In recognition of her technical contributions, outstanding leadership, mentorship, and service to the engineering profession, Engineers Geoscientists Manitoba is pleased to present the 2018 Technical Excellence Award to Dr. Zahra Kazem-Moussavi.