



Vision for BioEM Research

Our BioEM will continue to be the world's major interdisciplinary scientific society exploring biological effects of non-ionizing electromagnetic fields. From this research endeavor will come discoveries that will be adapted by other much larger societies who will garner large private sector investment for further development. One area on the horizon is the non-invasive deep brain stimulation which will result in new safe treatment for psychiatric, neurodegenerative and cognitive enhancing therapies. BioEM members will be, as they have in the past, the innovators that will drive the field.

My Research Program:

Develop leading-edge medical imaging technology to be used by teams in hospital-based research institutions to a) uncover the mechanism of disease, b) allow early diagnosis to limit permanent damage, c) monitor therapy and d) limit detrimental side effects.

Since introducing MRI in Canada in 1982 I have been investigating non-thermal and non-ionizing biological effects of magnetic fields. This has included development of new assessment tools for detection of effects in animals and humans. For example, in the publication by my former post-doctoral fellow (Dr. Elena Choleris) we developed a test to measure the effect on mice of an extremely low frequency pulsed magnetic field (Neurosci. Biobehav Rev, 2001 25:235-260; 892 citations (Google Scholar) with over 60 in 2023).

Currently my BioEM research includes two major areas that I presented at the BioEM 2023 meeting in Oxford: a) Introduction of genes from magnetic bacteria into mammalian cells introducing magnetic properties detectable by Magnetic Resonance Imaging (MRI) and b) detection of probiotic bacteria in the gut by MRI. (This is based on a discovery that bacteria dependent on manganese metabolism have MRI characteristics that distinguishes them from all MRI characteristics of mammalian cells.)

My Administrative Experience:

2007-present: Assistant Scientific Director Lawson H.R.I. St. Joseph's Health Care

2001-present: Imaging Program Leader Lawson H.R.I. St. Joseph's Health Care

2003-2023: Adjunct Research Professor Dept. Physics and Astronomy, Western University

1992-present: Professor Dept. of Medical Imaging, Western University

1992-present: Professor Dept. of Medical Biophysics, Western University

2001-2004: President Elect/President/Past President of BEMS (Bioelectromagnetics Society)

1987-1991: Vice President/President of CCPM (Canadian College of Physicists in Medicine)

2008-2017: Chair, NRC, Canadian National Committee of Union of Radioscience International (URSI)

2008-2011: Chair of URSI Commission K (Electromagnetics in Biology and Medicine)

2023-present: Professor, School of Biomedical Engineering, Western University

2022-2024: BioEM board member; Journal Committee (chaired by Dr. Rich Nuccitelli); Education Committee (chaired by Dr. Olga Zeni).

Scientific Record:

- Scopus – Life-time citations 6861, h-index - 46
- Google Scholar – Life-time citations 11,769; h-index - 60
- Over 300+ peer-reviewed publications (275 papers); 675+ abstracts; 186 invited presentations
- 65 grad students & PDFs; 50+ grad student committees since 2012; 30+ grad student exam committees
- 13 patents and 4 spin-off companies
- \$125,000,000 + research funding as program leader; \$30,000,000 + as principal investigator