

Electrical and Computer Engineering Department

Friday, October 23, 1 pm in EB258

Bioelectromagnetism research at RMIT University

Electromagnetic fields (EMF) of all frequencies represent one of the most common and fastest growing environmental influences, about which anxiety and speculation are spreading. All populations are now exposed to varying degrees of EMF, and the levels will continue to increase as technology advances. Research on possible RF health effects dates back more than 50 years and continues to serve as the basis for exposure standards and public health judgements around the world. Potential biological and medical effects of electromagnetic fields within the whole range of frequencies have attracted extensive research efforts.

The wide range of research in the area of influence of electromagnetic radiation to living systems is done at RMIT.

One direction is focused at investigating influence of EMF on biomolecular activity based on the Resonant recognition Model which propose that selectivity of protein activity/interactions is electromagnetic in nature. This theory has been already successfully validated on a number of examples both using EMF radiation to modulate protein function as well as designing de novo peptides based on the RRM theory and number of these examples will be presented.

The other direction involves investigations in the area of influence of electromagnetic radiation on human body, in particular on brain (EEG) and heart activity (ECG). We have found a significant but frequency dependent influence of EMF on brain activity particularly in alpha rhythm. These studies led to more specific investigation of EMF influence on sleep patterns, relaxation, heart activity and skin properties. The results revealed a possibility of altering human EEG activity in alpha and beta bands by exposures to magnetic field at the particular frequencies.

The effects of mobile phone-like electromagnetic radiation on the human brain activity will also be presented. The research was focused on both well studied radio frequency exposures and the less investigated low frequency exposures. These findings revealed a reduced alpha band frequency activity during pulsed radio frequency and low frequency radiations exposures.

Professor Irena Cosic

Professor Irena Cosic is currently a Professor of Biomedical Engineering and an Associate Pro-Vice Chancellor, Research and Innovation, Science Engineering and Health College at RMIT University. She is also Research Director of the Australian Centre for Radiofrequency Bioeffects Research (ACRBR), NHMRC centre of Research Excellence (2004-2009), and a Research Leader in the newly established RMIT Research Institute of Health Innovations.

Prof Cosic's research is in the area of biomedical engineering and electronics particularly in influence of electromagnetic radiation on the living systems from biomolecules, cells, tissues and the whole human body,

The main breakthrough in her research is the Resonant Recognition Model (RRM), which propose that selectivity of protein interactions is electromagnetic in nature

She published a research book and over 150 papers including book chapters, journal and refereed conference papers. She holds international patents protected in USA, Europe, Japan and Australia. Prof. Cosic has been the Chief Investigator in a number of major government grants including NHMRC (Australia), ARC (Australia). NIH (USA), NSF (USA), CNRS (France). In 2004 she was awarded RMIT Research Award and Vice-Chancellor Award for Excellence in Research and Leadership. She is a senior member of IEEE, Fellow of Engineers Australia and an active member of a number of other national and international professional societies.