



## RESEARCH GRANT “MRI-safe Implantable Electrodes” Final Outcome Report, October 2015

The outcome statement in our application commenced

*We hope to discover a design change that reduces or eliminates the chance of an MRI scan causing harm to a patient through heating at the distal end of an implanted electrode.*

We have discovered not *one* but **three** such design changes. We also stated

*Initially we will explain in a clear form the mechanism that has proved hazardous to patients*

And we have achieved this goal too. We have already published two conference papers (“Cause and Amelioration of MRI-Induced Heating Through Medical Implant Lead Wires”, McCabe & Scott, 21st Electronics New Zealand Conference, Hamilton, 20-21 Nov 2014, and “Electromagnetic Techniques to Minimize the Risk of Hazardous Local Heating around Medical Implant Electrodes During MRI Scanning”, McCabe, Scott & Butler, European Microwave Conference, Paris, September 2015).

We also said

*We will attempt to patent any designs that could lead to the establishment of a business making MRI-safe electrodes.*

We have achieved this outcome. At time of writing (May 2015) two patents are being filed (“IMPLANT CONDUCTOR WITH IMPROVED RADIO FREQUENCY PROPERTIES” and “IMPLANT LEAD WITH IMPROVED RADIO FREQUENCY PROPERTIES”). We are in negotiation with a Sydney-based company to license our IP embodied in these patents.

We will present a conference paper at the International Microwave Symposium (IMS) in May 2016, and a journal paper will be submitted to the IEEE Transactions on Microwave Theory and Techniques.

The project concluded, precisely on the advertised schedule in the original application. We believe this project has been unconditionally successful, and we are grateful to the WMRF for its confidence and support. The prospects are strong for MRI-safe electrodes to be routinely available within a few years.