Macquarie researchers played a critical role in developing the ground-breaking chip technology which has enabled what the world now takes for granted – high-speed Wi-Fi. They were then involved in marketing the intellectual property rights which netted half a billion dollars.

Most recently, in the Excellence in Research for Australia (ERA) 2012 evaluation our engineering research received a rating of ‘performance at world standard’.

Research within engineering falls into five research groups: electromagnetic and antenna group, nonlinear electronics group, integrated wireless communication systems group, nonlinear optics group, and wireless communications and networking group. In addition, a research program in mechanical engineering related to precision manufacturing is being established with an emphasis on medical devices and applications.

Macquarie collaborates with many industry leaders to produce products with real-world applications. Partners include CSIRO ICT Centre, Agilent Technologies CA, NHEW Research, Macom Technologies, Cadence, Applied-Wave Research, Jazz Semiconductor, Intel, and universities in the USA, Europe and China.

As an HDR candidate you will have the opportunity to research alongside some of the world’s best scholars whose cutting-edge research continually pushes the boundaries of knowledge, and you’ll also benefit from our working partnerships with many of the global high-tech companies neighbouring our campus in Australia’s largest high-technology precinct.
Highlights

- In 2010 Macquarie became the first university in Australia to forge a research partnership with CSIRO under the revitalised Science Industry Endowment Fund, when $2 million from the fund was awarded to create a Chair in Wireless Communications.

- Adjunct Professors Neil Weste and David Skellern’s research into WLAN IEEE 802.11 technology, which enabled today’s high-speed Wi-Fi, resulted in Macquarie’s most successful IT-related commercial start-up, Radiata Communications, which was bought by Cisco Systems for a record $US295 million.

Support

HDR candidates are provided with strong academic and administrative support. This includes:

- Commencement and Completion programs
- Discipline-specific research training units, including workshops in research communication, presentation skills, academic writing skills, thesis planning, and poster preparation
- Experienced supervisors and department-based higher degree research directors
- Financial support for research project costs, including top-up scholarships from industry
- Regular progress reports and interviews, and/or work-in-progress presentations in which research candidates receive feedback on their work from a panel of academics in their field

Research leaders

Macquarie is home to many internationally renowned researchers, including:

Professor Michael Heimlich has worked in the wireless technology industry and has had several positions as an engineer and engineering manager. He has published on a wide range of topics including antenna design and microwave photonics, and holds a patent in software interoperability. His research interests include RF/microwave MMIC modelling, design flow theory, low temperature co-fired ceramic (LTCC) design, GHz packaging and signal integrity, and microwave photonic EDA.

Professor Karu Esselle leads the electromagnetic and antenna engineering group, which is the largest university-based research group in this field in Australia. In the last decade his research team has been involved with grants, contracts and PhD scholarships worth over nine million dollars, and he is responsible for the establishment of research collaborations with several international experts and Australia’s CSIRO ICT Centre. He holds numerous awards which include an Outstanding Branch Counsellor Award from the Institution of Electrical and Electronic Engineers), and a Macquarie University Vice-Chancellor’s Award for Excellence in Higher Degree Research Supervision. His mentees have also been awarded extremely competitive postdoctoral fellowships and many awards and prizes for their research achievements.