



veski
innovation
fellow

Professor
Colette McKay

research project

Objective programming of cochlear implants and other devices for electrical stimulation.

project summary

Cochlear implants have become a universally accepted method of restoring hearing to profoundly deaf individuals with infants as young as four-months old being implanted with the devices.

Programming is a difficult and lengthy process involving finding the range of electrical current producing an audible but not-too-loud sound on the many electrodes implanted in the cochlea; usually by asking the patient for feedback on the loudness.

This process is not feasible in infants and takes considerable clinic time, even in adults. Therefore a system that achieves the programming automatically by objectively measuring the neural responses to sound is urgently needed.

Not all users obtain a high level of speech understanding which is why it's important that the programme converting sounds to electrical pulses is individually optimised.

Professor McKay's research programme in Manchester has shown that the response of the hearing brain, rather than the hearing nerve in the cochlea, provides improved programming accuracy. New measurement and analysis techniques are needed to make it efficient enough for clinical use.

This project will demonstrate proof of principle of the new measurements and analysis techniques, and then work with Cochlear Ltd to implement the techniques in the clinics.

Professor McKay will also investigate Deep Brain Stimulation (DBS), used for a range of medical conditions that don't respond to alternative therapies, such as movement disorders, certain psychiatric disorders, and chronic pain.

The Bionics Institute, with the cooperation of Cochlear Ltd, has started a major neurobionics programme to develop a DBS device with better design and functionality than the existing commercial devices, and which utilises the platform technology of the cochlear implants.

This novel and important development in health technology is led by the Bionics Institute in Melbourne, and the results will be commercially implemented and trialled in clinics by the spin-off company Bionic Enterprises; supporting the clinical and commercial success of a new Victorian company.

personal history

In September 2013, Professor Colette McKay accepted a senior **veski** innovation fellowship worth \$200,000 over three years. The funding will be matched in cash and in-kind by her host organisation the Bionics Institute.

Prior to returning to Victoria, Professor McKay was the Chair of Applied Hearing Research at the University of Manchester from 2007 to 2013. She relocated to the United Kingdom in January 2005 to take up a chair position at Aston University in Birmingham, where she developed and directed the new Bachelor of Science (Hons) in Audiology course.

In 2009, the British Society of Audiology awarded her the Thomas Simm Littler prize for contributions to auditory research.

On her return to Melbourne, she became the Leader of Translational Hearing Research at the Bionics Institute.

At 14, Professor McKay, encouraged by her physics teacher, wanted to be a nuclear physicist.

She completed her undergraduate degree and PhD in Physics and Mathematics at the University of Melbourne and following this, also undertook clinical training in Audiology.

Professor Colette McKay

“The focus of my research is on ameliorating the impact of deafness in people’s lives. When an infant is born deaf and if their deafness goes untreated that will prevent them from developing oral language skills. And in adults deafness is a very severe social handicap ... they can’t find employment and it impacts upon their social lives.”

From 1989 to 2004, she held full-time research fellow positions in the University’s Department of Otolaryngology. During this time, her research focussed on psychophysics, speech perception, and signal processing in cochlear implants, although she contributed more widely to other areas, such as auditory processing in patients with schizophrenia.

She also helped in the development and evaluation of the SPEAK processing strategy which, after more than 20 years, still provides the principles on which the majority of cochlear implants function today.

In 1998, she was awarded a Senior/ Principal Research Fellowship from the Garnett Passe and Rodney Williams Memorial Foundation, and in 2003, an NHMRC Principal Research Fellowship.

In 2002, she was elected a Fellow of the Acoustical Society of America for her research to improve speech understanding in cochlear implant users.

Since 2012, Professor McKay has held dual appointments with the University of Manchester and the Bionics Institute.

other innovation fellowship recipients

Professor Andrew Holmes AM FRS FAA FTSE
Professor Marcus Pandy
Dr Gareth Forde
Dr Alyssa Barry
Professor Michael Cowley FTSE
Professor Sarah Hosking
Professor Ygal Haupt
Dr Ross Dickins
Dr Mark Shackleton
Professor Edwin van Leeuwen FTSE
Dr Matthew Call
Dr Christopher McNeill
Dr Seth Masters
Associate Professor Tiffany Walsh
Professor Cameron Simmons
Dr Ethan Goddard-Borger
Dr Luke Connal

fellows in an ambassadorial role include

Professor Adrienne Clarke AC
Professor Peter Doherty AC
Professor Alan Trounson
Mr Brian Jamieson
Dr Janine Kirk AM
Professor Christina Mitchell
Professor John Denton

further information

veski.org.au
+613 9635 5700
info@veski.org.au

background information

veski delivers three of Victoria’s most prestigious fellowship programs including the **veski** innovation fellowships which bring world-leading scientists and researchers back to Victoria.

Since 2004, **veski** has awarded 18 **veski** innovation fellowships worth more than \$3.7 million delivering a return on investment in excess of \$45 million of funds brought into Victoria for research and infrastructure and attracting a range of globally competitive individuals to Victoria to work on important research into areas such as dengue and malaria, cancer, inflammatory diseases, musculoskeletal health and obesity.

veski is supported by the State Government of Victoria.

