FROM THE BIONIC EAR TO A BIONIC ERA
**Introducing the Bionics Institute**

The Bionics Institute is an independent, not-for-profit research organisation working in the field of medical bionics.

Our multidisciplinary research teams are led by researchers who were integral to the success of the cochlear implant developed in Australia during the 1970’s and 80’s.

We have built on years of research experience and technological expertise in cochlear implants to develop the prototype bionic eye and experimental treatment devices for epilepsy. Utilising this wealth of know-how we will deliver new solutions to major health problems.

**Our Research**

We are focused on providing bionic solutions for otherwise untreatable or drug-resistant conditions of the nervous system.

Our three research programs – bionic hearing, bionic vision and neurobionics – encompass the improvement and development of devices to address hearing loss, severe vision impairment, and a range of intractable central nervous system and psychiatric disorders.

**The keys to our success are:**

- Our talented and dedicated teams of scientists and engineers
- Our collaborations with other institutions and industry, as well as important links with eminent clinicians from major national and international hospitals.
- Our involvement in every step of the process - from research concept to clinical outcome and commercialisation.
Our research aims to improve the performance of cochlear implants and hearing aids and expand their application to many more adults and children with hearing impairments.

The cochlear implant is one of the most successful bionic devices ever produced, but there is always room for improvement. We are designing new stimulation strategies to improve the hearing sensations provided by cochlear implants.

We are investigating ways to enhance the perception of music and speech in noisy situations.

We are developing techniques to introduce therapeutic drugs into the inner ear to support or halt the degeneration of the hearing nerves following deafness.

We are designing new stimulation strategies for those that use both a cochlear implant and a hearing aid to ensure these devices work in synchrony.

We are learning how the brain adapts to the electrical stimulation provided by the cochlear implant.

Daniela lost her hearing quite suddenly at the age of 27. Fortunately, there was a solution for her. In March 2010, after being deaf for 15 months, Daniela received two cochlear implants. She is amazed at how quickly her life turned around. She uses the telephone again, watches television without subtitles and plays the piano.

“The leaves rustle, the twigs crunch beneath my feet, and the birds sing once more….”

Bionic Hearing
In 2012, and as part of the Bionic Vision Australia consortium, three patients were implanted with Australia’s first prototype bionic eye device which was designed, manufactured and tested at the Bionics Institute. Years earlier the Institute began research into a bionic eye and it was the success of this research that helped convince the federal government to invest in the project.

The device, which sits at the back of the retina, is the first of its type in the world, and will be used over a period of 18 months to gather information on the visual perceptions of recipients so that optimal vision processing strategies can be developed.

The prototype device has 24 electrodes and is a first generation wide-view device. The next prototype will have 98 electrodes, aiming to give recipients the ability to see the edges of objects and light and darkness, thereby providing increased safety and independence in daily life.

The consortium is concurrently developing a high-acuity device which aims to provide more detailed central vision, and may allow recipients to read large print and recognise faces.

“Not being able to see people’s facial expressions or body language is something I have had to live with since losing my sight. As such, my ability to fully communicate with others in every aspect of my life is impacted. If the bionic eye could enable me to access this information it would absolutely be life changing.”
Neurobionics

Our research aims to develop new implantable devices to safely and effectively treat people who have severe neurological or psychiatric conditions that do not respond to other treatments. We are working on a brain implant that predicts when an epileptic seizure is about to take place, and apply a therapeutic stimulus to prevent it occurring.

We are creating an advanced and flexible medical bionics platform that can be tailored to suit a range of drug-resistant conditions including Parkinson’s disease, essential tremor, severe depression, obsessive-compulsive disorder, and others.

We are collaborating with eminent clinicians from Melbourne’s major hospitals to ensure that our research and bionic technologies result in clinical outcomes.

▼ Epilepsy can prevent people from enjoying the things the rest of us take for granted – swimming, driving, even holding down a job – as seizures can strike at any time.

Current treatment options are drugs and surgery, but for some epilepsy patients such as Hannah these may not be effective.

“*When you have epilepsy you feel useless. You crave independence.*”

▼ Hannah pictured with Professor Mark Cook (Director of Neurosciences, St Vincent’s Hospital Melbourne), the Chair of the Institute’s Honorary Clinical Research Fellows.
Supporting us

There are many ways you can help deliver improved health and quality of life to those with chronically disabling conditions.

▸ Regular or one-off donations to our research programs
▸ Conduct your own fundraising event with the proceeds going to the Institute
▸ Consider a student scholarship or research fellowship in your name
▸ Leave a bequest to the Institute in your Will
▸ Become an Ambassador and speak about living with a bionic ear

Bequests, fellowships and scholarships do not have to be large to make a significant impact.

Medical Bionics is not just a new frontier of medical science; it is revolutionising what is and isn’t possible.