NICTA microchip accelerates Australian bionic eye project

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NICTA has developed a new microchip which is accelerating progress towards an Australian bionic eye.

Professor Stan Skafidas, NICTA Research Group Leader, Optics and Nanoelectronics, explains: "This microchip is one step towards the driver of our high-acuity retinal implant, which aims to restore a sense of vision for people with retinitis pigmentosa and age-related macular degeneration."

Researchers have completed probe testing of the high-acuity chip, with encouraging results, and further testing is underway. The team will now work towards delivering a version of the chip with 1000 electrodes and wireless transfer of data and power. This microchip could then proceed to preclinical testing.

Professor Anthony Burkitt, Director of Bionic Vision Australia said: "This is an outstanding achievement, which will enable the team to progress with testing to inform the next iteration of the high-acuity device."

The successful fabrication of this microchip means that researchers can now begin working on a design for the microchip with 1000 stimulation points, to be used in the high-acuity bionic eye device. The aim of this research is to develop technology that will provide enough visual detail for patients to be able to recognise faces and read large print.

“Our design also shows that the manufacturability of our device is a very real possibility. The substantial progress we have made in this regard is due to our strong working relationship with IBM, which has manufactured our chip,” Professor Skafidas added.

"IBM welcomes the news that tests of this first microchip are progressing well," said Glenn Wightwick, Director, Research & Development, IBM Australia. "IBM has had a long and successful partnership with NICTA and we are proud to be involved in this truly iconic project. NICTA brings world-leading nanoelectronics design capability and this is reflected in a number of innovations that are being included in the high acuity bionic eye. We are delighted to be able to support the fabrication of this device, enabling intelligence and wireless data transfer with smarter silicon.”

How it works

The high-acuity bionic eye will consist of a camera, attached to a pair of glasses, which captures images and sends them directly to a retinal implant, containing a microchip. This information is decoded by the microchip and informs the electrical stimulation of the retina. These signals are then passed along the optic nerve to the brain where they are interpreted as vision. This technology aims to restore some sense of vision to people experiencing blindness due to degenerative conditions such as retinitis pigmentosa and age-related macular degeneration.

Provided by Nicta

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