

Bringing Australian hearing science to the community and the market

By putting himself in the place of the user, an Australian scientist and inventor—now entrepreneur—has created a new approach to hearing loss. He has combined smart software and hardware with knowledge of the web to deliver improved hearing without the high price and stigma of current hearing solutions. In short, he has removed the barriers to obtaining hearing aids.

Peter Blamey, who has dedicated his 30-year career to assisting the hearing-impaired (Box 1), had a Eureka moment in 1998 at a conference called *Issues in Advanced Hearing Aid Research* at Lake Arrowhead, California. His moment led to the development of new technology for digital hearing aids that are now available online for almost one-third of the cost of their market equivalent. The aids can be fitted in the comfort of your own home—with or without the assistance of an audiologist.

The technology, called Adaptive Dynamical Range Optimisation (ADRO®), is also used now in all Australian cochlear implants and in leading brands of Bluetooth headsets.

At the time of the conference, Peter had been working on the Combionic Program of the CRC for Cochlear Implant and Hearing Aid Innovation at Melbourne University. Combionic refers to the use of two devices—a cochlear implant in one ear and a hearing aid in the other—to assist the profoundly deaf. Since the two devices don't always allow the listener to hear sounds in the same way in each ear, Peter and his team had been grappling with how to overcome difficulties with "gain"—that is, making sounds in the hearing-aid ear loud enough so that it didn't sound like everything was coming from the cochlear implant.

At the Lake Arrowhead conference, Peter says he was struck by how complex the hearing aid specialists were making the need to adjust gain using a method called compression—squashing a wide range of input sounds into a narrower output range.

"From the point of view of the listener with a hearing impairment—all that is important is ensuring that sounds stay within a comfortable range, with the soft sounds not too soft, and loud sounds not too loud," he explains. "It is as simple as that."

Improving hearing devices

Upon his return to Australia, Peter enlisted the help of Brett Swanson, a digital signal processing engineer at Cochlear Ltd in Sydney. The pair wrote some digital signal processing

Peter Blamey

Peter Blamey's 30-year career began as a physicist at Monash University. From 1979 to 2002 he was a key member of the research team for the University of Melbourne and its associated CRC for Cochlear Implant and Hearing Aid Innovation, where he helped develop the first multichannel cochlear implant, the Bionic Ear. Peter is now deputy director of the Bionic Ear Institute and the founder and managing director of Australia Hears Pty Ltd.

(DSP) rules for the ADRO processor to make sure that sounds from the hearing aid wouldn't be too soft or too loud.

"For the cochlear implant, we didn't mess around with a lot of experimental devices," Peter says. "Within two weeks we had ADRO implemented in wearable implants." He trialed those implants in about a dozen patients in Melbourne, and the University filed a patent for the technology in 1999. The technology is now included in all of Cochlear's sound processors.

Peter then set his sights on improving hearing aids with ADRO. The first aids with the ADRO technology were produced in about 2002. While Peter and his colleagues worked on refinements for the ADRO hearing aids, they began negotiating the complex world of commercialization.

The path to commercialization

After development within the CRC, the first funding for ADRO hearing aids was obtained in November 2000—a \$40,000 prize from the Melbourne University Entrepreneurs Challenge for which Peter and his colleagues wrote a business plan despite having little business experience.

This eventually led to \$2 million in Innovation Investment Fund (IIF) Venture Capital funding from Rothschild Biosciences (now GBS

Ventures) and Nanyang Ventures (now Four Hats Capital). In 2002, Peter co-founded the company Dynamic Hearing as a spin off from the CRC for Cochlear Implant and Hearing Aid Innovation. The other co-founder was Elaine Saunders who was a research and commercialization manager at the CRC.

After Dynamic Hearing and the CRC completed successful clinical trials in October 2002, Dynamic Hearing signed its first licensing deal with Intrason, a French hearing aid manufacturer. In June 2003, Dynamic Hearing received a further \$3 million of IIF Venture Capital funding from GBS Ventures and Nanyang Ventures.

In mid-2003, Dynamic Hearing received a \$750,000 start grant from AusIndustry, and in 2004 it received a further \$250,000 from AusIndustry's Biosciences Innovation Fund (BIF). These funds were used to develop new technologies, such as the adaptive directional microphone to improve hearing speech in noisy places and ultra-low delay in sound processing. In August 2005, Dynamic Hearing received a Commercial Ready grant of \$1.28 million from AusIndustry.

Dynamic Hearing is now a leading provider of high quality digital sound processing technology for ultra-low power communication devices, including Bluetooth headsets. Despite success with smaller early adopters, Dynamic Hearing struggled to get the interest of major hearing aid manufacturers.

Gaining acceptance which put the technology into relatively new devices such as headsets and cochlear implants was more straightforward than in hearing aids, Peter notes, because they didn't need to overcome any preconceived ideas.

To pursue their original goal of providing cheaper and better hearing aids to those in need, Peter and Elaine established Australia Hears in 2006. After trialling and refining the technology and the online delivery system to a steadily expanding community of hearing-aid users, Australia Hears is now ready to bring the benefits of the ADRO hearing aids to the broader community.

For more information

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Awards won by Australia Hears founders: Peter Blamey, Elaine Saunders and associated organizations

- *Melbourne Business School Entrepreneurs' Challenge 2000, won by CRC research team*
- *CRC Commercialisation award 2002, shared by Cochlear and Dynamic Hearing*
- *Emerging Exporter of the Year Award, 2003/4, won by Dynamic Hearing*
- *Telstra Business Woman of the Year Award, Government and Corporate sector, 2004 won by Elaine Saunders*
- *Manpower Employee of the Year Award, 2005, won by Peter Blamey*
- *International Award from the American Academy of Audiology, 2007, won by Peter Blamey*
- *Samuel Lybarger Award for Services to Audiology from Industry from the American Academy of Audiology, 2010, won by Elaine Saunders*
- *Leading Woman in Healthcare in Asia, 2011, won by Elaine Saunders.*