From the Editor

Advances in technology have brought forth many changes in cochlear implants. Just several years ago, a general review of cochlear implant coding strategies was sufficient to capture the differences among cochlear implants. In recent years, the signal-processing and speech-coding strategies implemented in cochlear implants from different manufacturers have become more divergent. In this issue, 2 cochlear implant manufacturers provide updates on their cochlear implant systems and discuss future directions of cochlear implants.

In the first article, Patrick, Busby, and Gibson provide an overview of the evolution of Nucleus cochlear implant systems and the rationale behind the development of the Nucleus Freedom system. They also discuss issues related to the reliability of cochlear implants, new electrode array options, bilateral cochlear implants, combined electroacoustic stimulation, advances in coding strategies, and improvements in programming paradigms.

In the second article, Hochmair, Nopp, Jolly, Schöber, Garnham, Schmidt, and Anderson review the rationale behind the development of the MED-EL MAESTRO cochlear implant system and describe its features and a new speech-coding strategy. In addition, they provide updates on the research and development of bilateral cochlear implants, newly integrated devices for combined electroacoustic stimulation, and the concept and preliminary results of a drug-delivery system through cochlear implants.

About the Authors

Jim Patrick is a chief scientist and senior vice president at Cochlear Limited. He received a bachelor of science degree in 1970 and a master of science degree in 1972 from the University of Melbourne, majoring in physics and electrical engineering. Following further postgraduate studies in digital communication, he joined Professor Graeme Clark's research group at the University of Melbourne, Department of Otolaryngology, in 1975 as a research fellow, with

overall responsibility for the development of the university prototype 10-channel cochlear implant. Between 1975 and 1981, he was involved in a range of neurophysiology and psychophysics experiments. At Cochlear Limited, Mr Patrick has had a range of R&D leadership roles, and he has been involved in the design, construction, and clinical application of 4 generations of cochlear implant systems. In addition, he currently holds honorary appointments of deputy director at the Cooperative Research Centre for Cochlear Implant and Hearing Aid Innovation; associate professor at the Department of Otolaryngology, University of Melbourne; and special research fellow at the Bionic Ear Institute in Melbourne.

Peter Busby is currently a principal clinical research specialist at Cochlear Limited. He received a bachelor of arts degree from Monash University, Melbourne, in 1975 and a master of arts degree from Australian National University in 1980, majoring in linguistics and acoustic phonetics. Dr Busby then obtained a diploma in audiology in 1981 and PhD in 1998, both at the University of Melbourne. In 1979, he joined Professor Graeme Clark's research group in Melbourne as a research assistant and was involved in studies with the first subjects implanted with the University of Melbourne 10-electrode device. In 2000, he joined Cochlear Limited in Melbourne, where he conducts research in the psychophysical and electrophysiological properties of electrical stimulation and clinical outcomes. Dr Busby also holds an honorary senior research fellow position at the Department of Otolaryngology, University of Melbourne, and at the Cooperative Research Centre for Cochlear Implant and Hearing Aid Innovation in Melbourne.

Peter Gibson is the head of business planning and analysis at Cochlear Limited in Sydney, responsible for planning and definition of new cochlear implant systems and devices. He received a bachelor of engineering degree from the University of Sydney in 1982 and a master of business administration degree from Macquarie University, Sydney, in 2000. At Cochlear Limited, Mr Gibson led the design team for the Nucleus 24 Contour, during which time he

developed a detailed knowledge of the design of cochlear electrodes. He holds a number of patents.

Ingeborg Hochmair is the founder, the chief executive officer, and the technical director of the MED-EL Group. She received a diploma in engineering in 1976 and a doctor of technology degree in 1980 from Technical University in Vienna, Austria, and a doctor of medicine degree from the Technical University Rechts der Isar, in Munich, Germany, in 2004. Dr Hochmair, together with Erwin Hochmair, developed the first microelectronic multichannel cochlear implant, which was implanted in a patient in December 1977 in Vienna. She founded MED-EL in 1989 after spending 12 years at the Universities of Vienna and Innsbruck. Since then, she has been the technical director and CEO of the MED-EL Group. Dr Hochmair is also an inventor and holds a number of patents.

Peter Nopp received a diploma in engineering and a doctor of technology degree in electrical engineering from the Technical University of Vienna, Austria, in 1994. He joined MED-EL in 1996 and has been active in the field of coding strategies for cochlear implants since then. Dr Nopp is the topic leader for coding strategies and bilateral cochlear implantation.

Claude Jolly received a PhD in bioengineering from the University of Washington, Seattle, in 1996. He has conducted research studies in field distribution generated by electrode configurations in the cochlea. Dr Jolly joined MED-EL in 1996, and he manages electrode development. He is responsible for designing and developing drug-delivery devices for inner ear implantation and for combination with the cochlear implant.

Marcus Schmidt received a diploma in engineering in electrical engineering from the Technical

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Hansjörg Schöber received a diploma in engineering degree in electrical engineering from the Technical University of Graz, Austria, with a main focus on biomedical engineering in 1997 and a doctor of technology degree in electrical engineering from the Technical University of Vienna, Austria, in 2002. He joined MED-EL in 2002, and he is the head of product management. In addition, Dr Schöber is responsible for the research topic of electrically evoked compound action potential recordings.

Carolyn Garnham received a bachelor of science degree from the University of Exeter in 1985, a master of philosophy degree from the University of Liverpool in 1989, a doctor of philosophy degree in medical physics from the University of Sheffield in 1996, and a master of science degree in audiology from the University of Manchester in 2000. She joined MED-EL in 1998. Dr Garnham is the basic research manager for audiology and neurology and the topic leader for drug delivery.

Ilona Anderson received her professional degree in audiology and speech pathology from the University of Witwatersrand, Johannesburg, South Africa, in 2002. She joined MED-EL in 2001. Ms Anderson is the director of clinical research and rehabilitation and the topic leader for small children.

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Guest Editor