

Artificial Retinal Implants, Technology and Application in Patients

Albrecht Rothermel, Ph.D.

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Time: 2:00PM – 3:00PM

Location: Technology Square Research Building (TSRB), Room 423

Host: Maysam Ghovanloo (mgh@gatech.edu)

Since 2006 Dr. Rothermel is working in a German consortium, designing microelectronics for retinal implants, which are sometimes also called bionic eyes. He will give a short overview of the concepts which are pursued around the world, and after that he will detail the German approach of sub-retinal stimulation. With the first chips from his lab being in patients since 2014, a significant improvement in lifetime could be achieved. Some details of the device from circuit to system level will be shown together with the surgery procedure.



Albrecht Rothermel received the Dipl.-Ing. degree in electrical engineering from the University of Dortmund, and the Dr.-Ing. (Ph.D.) degree from the University of Duisburg, both Germany, in 1984 and 1989, respectively. From 1985 to 1989, with the Fraunhofer Institute of Microelectronic Circuits and Systems, Duisburg, he worked on integrated digital CMOS and BICMOS circuits, especially for high-speed applications. From 1990 to 1993, with THOMSON multimedia, Corporate Research, Villingen-Schwenningen, Germany, he worked on digital signal processing concepts for present and future TV and HDTV sets. He managed work package 1 in the European JESSI project AE 10 for HDTV receiver IC design. As manager of the IC design laboratory, He was involved in analog and mixed circuit

design for audio and video applications. Since 1994, he is with the Institute of Microelectronics, University of Ulm, as a Professor of Electrical Engineering. In 2002, he was a co-founder of the Competence Center for "Automotive Electronics and Information Systems".

Dr. Rothermel's research today focuses on mixed-signal circuit design (such as clock and data recovery, D/A conversion, low power analog signal processing). Design goals are improving performance and lifetime of medical implants for sensing and stimulating applications. In 1997, he was on leave at THOMSON multimedia headquarters in Indianapolis, Indiana, contributing to the architectures of second generation US digital TVs. In 2002/03, as a visiting professor at the Edith Cowan University in Perth, Western Australia, he was working on electro-optical systems with Prof. Kamran Eshraghian. In 2006 he was a guest professor at Shandong University, Jinan, China, and in 2013 he visited Prof. Jun Ohta at the Nara Institute of Science and Technology in Nara, Japan, working on prostheses for blind people.

He has published more than 140 papers, book chapters and patents. He received the 1985 outstanding young scientist award of the German VDE, the 1991 outstanding publication award of the German GME, the 2003 award for remarkable cooperation between industry and university, the 2006 best paper award of the IEEE ICCE, and the 2016 remarkable cooperation award of the University of Ulm.

After acting as associate editor of the IEEE JSSC, TPC-Chair of the IEEE ICCE-B, distinguished lecturer of the IEEE, and TPC-member of the ISSCC, he now is a member of the program committees of ESSCIRC, and ICCE. He is member of the German Society of Electrical Engineers (VDE), the German TV and Cinema Technology Society (FKTG), and senior member of the IEEE.