

Plenary Talk I

Making Microrobots Move



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Abstract:

Microrobotics has recently entered the phase in which sub-mm sized autonomous robots are being realized. While the potential impact of these devices on society is high, particularly for biomedical applications, many challenges remain in developing genuine microrobots that will be useful to society. This talk will focus on approaches to the locomotion of microrobots in liquid and on solid surfaces. Issues in the design of external systems for providing energy and control of microrobots must be considered, and the use of externally generated magnetic fields in particular appears to be a promising strategy. Theoretical and experimental issues will be discussed.

Short Bio:

Brad Nelson is the Professor of Robotics and Intelligent Systems at ETH-Zurich. His primary research direction lies in extending robotics research into emerging areas of science and engineering. He received a B.S. (Mechanical Engineering) from the University of Illinois at Urbana-Champaign in 1984, an M.S. (Mechanical Engineering) from the University of Minnesota in 1987, and the Ph.D. degree in Robotics (School of Computer Science) from Carnegie Mellon University in 1995. During these years he also worked as an engineer at Honeywell and Motorola, and served as a United States Peace Corps Volunteer in Botswana, Africa. In 1995 he became Assistant Professor at the University of Illinois at Chicago, Associate Professor at the University of Minnesota in 1998, and Professor at ETH in 2002.

He has been awarded a McKnight Land-Grant Professorship and is a recipient of the Office of Naval Research Young Investigator Award, the National Science Foundation Faculty Early Career Development (CAREER) Award, the McKnight Presidential Fellows Award, and the Bronze Tablet. He was elected as a Robotics and Automation Society Distinguished Lecturer in 2003 has been a finalist for and/or won best paper awards at major robotics conferences and journals in 2004, 2005, 2006, and 2007. He was named to the 2005 "Scientific American 50," Scientific American magazine's annual list recognizing outstanding acts of leadership in science and technology from the past year for his work in nanotube manufacturing.

Professor Nelson serves on or has been a member of the editorial boards of the IEEE Transaction on Robotics, the IEEE Transactions on Nanotechnology, the Journal of Micromechatronics, the Journal of Optomechatronics, and the IEEE Robotics and Automation Magazine.