Bioinspired MEMS to assist, enhance and expand human auditory capabilities

I.C. Gebeshuber[1,2] and B.Y. Majlis[1]

[1] Institute of Microengineering and Nanoelectronics
Universiti Kebangsaan Malaysia
43600 UKM Bangi, Selangor, Malaysia

[2] Institute of Applied Physics
Vienna University of Technology
Wiedner Hauptstrasse 8-10/134
1040 Wien, Austria

Contact email: ille.gebeshuber@mac.com

Biomimicry and biomimetics deal with knowledge transfer from Nature to technology. The human body is equipped with six general senses: smell, hear, taste, touch, see and temperature sensing. These senses are of extraordinary value but we cannot change them even if this proves to be a disadvantage in our modern times. However, we can assist, enhance and expand these senses via micro-electromechanical systems (MEMS). MEMS technology enables micro devices fabricated from silicon or related materials through micromachining processes based on microelectronics or semiconductor fabrication technology. Our eyes cannot see the finalized MEMS devices without the use of high-powered microscopes. Their microscopic size and compatibility with integrated circuit processing techniques enable them to be fabricated with the electronic circuits, thus making them smart sensor systems. Some examples of micro MEMS devices are accelerometer, pressure sensor, micro-mirror, micro-switch and others that can be used in automotives, medical, military, telecommunication and aerospace applications. Current MEMS cover the range of the human sensory system, and additionally provide data about signals that are too weak for the human sensory system (in terms of signal strength) and signal types that are not covered by the human sensory system. We will present specific examples for bio-inspired MEMS regarding assistance, enhancement and expansion of human auditory capabilities.