



Thursday, October 4th, 2012, 4:00 P.M.
Room No. 109, DASAN bldg. 1st Floor

(Host: Prof. Sohee Kim / Language: Korean)

Acoustic Sensor and Microrobot for Medical Applications

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MEMS based biomedical devices are widely studied to improve the quality of life. For this purpose, we are working on developing functional biomimetic acoustic sensors for hearing restoration and microrobots for biomedical applications. We developed piezoelectric beam array type acoustic sensors to mimic the functionality of human basilar membrane using Aluminum Nitride (AlN) thin-film. The sizes of the beams were varied to get different resonance frequencies in each beam for frequency selectivity. Our acoustic sensor has 16 channels and the beams have resonance frequencies from 3 kHz to 13 kHz depend of their sizes. The measured results tend to follow our predicted values, which are in the audible frequency range. The results show that the fabricated acoustic sensor has the potential to be used as part of a totally implantable artificial cochlea.

We also fabricated helical microrobot and mobile scaffold by using direct laser writer. A helical microrobot is useful to move in the low Reynold's number fluids because of the flagellum motion. For the wireless control of the microrobot in low Reynold's number fluids, external magnetic fields were used and the surface of the microrobot was coated with magnetic material. By controlling the external magnetic field, the microrobot can be controlled in 3D space. The developed microrobot has the potential to be used for biomedical applications such as imaging, drugs or heat delivery, ablation, biopsy, and so on. In this talk, a microrobot for targeted cell transportation system (mobile scaffold) will be also introduced for possible replacement of small fraction of tissue.

Biosketch

Hongsoo Choi is an Assistant Professor of Robotics Engineering at Daegu Gyeongbuk Institute of Science and Technology since October 2010. He is also serving in the Research Planning Team at Korea Brain Research Institute from 2011. He received his B.S. (2002) in Mechanical Engineering from Yeungnam University (S. Korea), and a M.S (2003) and Ph.D. (2007) from the School of Mechanical and Materials Engineering at Washington State University. He served as a Postdoctoral Scholar at WSU and University of California, Davis before joining Korea Institute of Machinery & Materials as a Senior Researcher in 2009.