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### Biography

Hiroshi Toshiyoshi received the M.E. and Ph.D. degrees in electrical engineering from The University of Tokyo, Tokyo, Japan, in 1993 and 1996, respectively. He joined the Institute of Industrial Science, The University of Tokyo in 1996 as a Lecturer. From 1999 to 2001, he was a Visiting Assistant Professor at the University of California, Los Angeles, CA, USA. In 2002, he became an Associate Professor with the Institute of Industrial Science (IIS), The University of Tokyo. From 2002 to 2007, he was a Codirector of LIMMS/CNRS-IIS UMI-2820, an international joint laboratory of the Centre National de la Recherche Scientifique, Paris, France. Since 2009, he has been a Professor with the IIS, The University of Tokyo. His research interests include optical MEMS, power MEMS, and CMOS-MEMS.



### Abstract - MEMS Vibrational Energy Harvesters for IoT Wireless Sensors

IoT or Internet-of-Things is a buzzword in the field of microelectromechanical systems (MEMS), and one might associate it to small sensors integrated in things. On the extension of it, we would have no difficulty in visualizing a grain-size gadget equipped with sensors, processors, and wireless communication interface. In our opinion, nonetheless, the true implication of the MEMS technology in the emerging IoT is in the power sources. Provided that electronics have been made to be small enough to fit in a tiny chip, how are we going to supply power to it? Cables are already larger in size than such a MEMS-based IoT device. Small batteries will do the job but for only a limited duration of time, and therefore perpetual power sources are definitely needed to keep them running for long. In our research group, we perform development of MEMS vibrational energy harvesters based on the electrical induction current caused by the permanent electrical charge so called the electrets. In this talk, we look into the mechanism of power generation using electret and discuss the methodology to improve the energy conversion efficiency in terms of the electrical and mechanical designs.