



**STEVENS INSTITUTE OF TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING**

Wednesday, May 17, 2006
Carnegie Bldg, Room 315, Time 10 am

MEMS and Microfluidics

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Micro-electro-mechanical Systems (MEMS) are smart micro systems with mechanical and electronic components integrated by micro-fabrication technologies. There are numerous possible applications for MEMS in industries like automobile, power and energy, biotechnology, communications etc. I will present my work on the development of a new type of MEMS -power MEMS including micro-gas-turbine-engine, micro-rocket-engine for portable power sources. Microfluidics is also known as Lab-On-a-Chip (LOC) which targets on fulfilling a whole set of functions of chemical and biological analysis on a tiny piece of chip. A brand new type of microfluidics –Induced-Charge-Electro-Osmosis (ICEO) will be introduced with potential applications in micro-pumping and micro-mixing. In this talk, I will also discuss the effects of surface roughness and rarefaction on gaseous flows in micro-channels.

Dr. Hongwei Sun received his Ph.D. from Chinese Academy of Sciences in 1998. From 1998 to 2001, he was a postdoctoral fellow at the University of Rhode Island (URI) working on the project entitled “fluid flow and heat transfer in micro-channels” funded by National Science Foundation (NSF). After his postdoctoral research at URI, he became a research scientist at Massachusetts Institute of Technology (MIT). His work at MIT focused on developing a new type of MicroElectroMechanical Systems (MEMS) - power MEMS including quarter-sized micro-gas-turbine-engine and rocket engine. In 2005, Dr. Sun joined the Department of Mechanical Engineering at University of Massachusetts at Lowell as an Assistant Professor. His on-going research covers micro/nano thermal-fluid system design and analysis, MEMS fabrication, design and packaging, NanoElectroMechanical Systems (NEMS) and microfluidics (BioMEMS).