

Mechanical Engineering Department Seminar

3:35pm December 9, 2015
1130 Mechanical Engineering
111 Church Street SE, Minneapolis, MN 55455

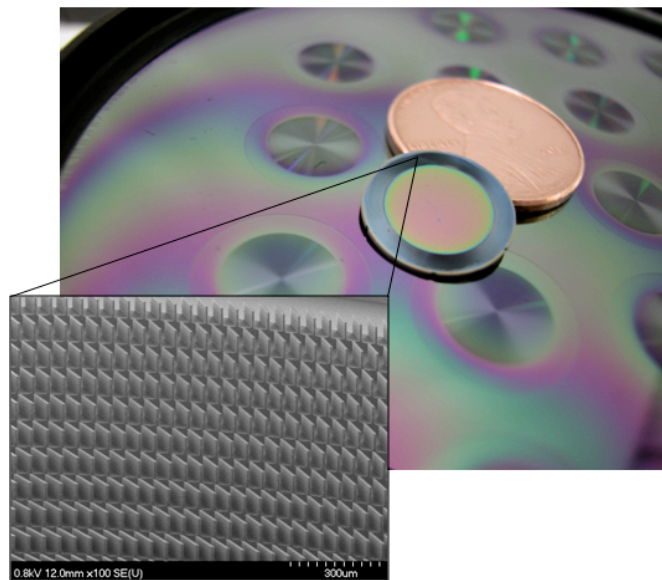


Silicon-Micromachined Turbomolecular Pump

Wei Yang

Principal Research Scientist; Honeywell

Combining silicon microfabrication and high-speed precision rotary machinery, we have created the smallest turbomolecular pump in the world. This accomplishment represents a major milestone in the path of moving ultrahigh vacuum (UHV) systems from laboratories to mobile platforms. Of equal significance, the new pump, by virtue of scaling, extends molecular pumping to a much higher pressure regime, and with further reduction in dimensions and design optimization, holds the promise of operating from UHV to atmospheric pressure with one moving part. With immediate implications for vacuum based portable instruments such as mass spectrometers, this development is also highly relevant to various small-scale thermal mechanical systems. Motivations, challenges, certain aspects of the design, simulation, fabrication, and potential applications will be described.



Bio: Dr. Yang joined Honeywell in 1994 and is currently a Principal Research Scientist at the company's Sensors and Wireless Laboratories in Plymouth, Minnesota. Dr. Yang has functioned as Principal Investigators for a wide range of DARPA funded programs. His primary interests are device physics and microfabrication technology applied to miniaturized sensors and power devices. His most recent research activities include micro turbomolecular pump, chip cooling by micro jet entrainment, transitional flows simulations for microstructures, and precision fabrication/assembly techniques for high-velocity MEMS structures. Dr. Yang holds over 20 U.S. patents and was named one of Minnesota's Top Inventors in 2013 by the Twin Cities Business magazine. Dr. Yang received a B.E. from Tsinghua University, Beijing, China in 1985, and a PhD in Electrical Engineering (Optoelectronics) from the University of Minnesota, Minneapolis in 1995.