



**Dr. Said Jahanmir**  
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Tribology deals with friction, wear and lubrication of contacts. Mechanical systems contain moving components that carry or support the load at such contacts. Examples of mechanical systems where tribology becomes the limiting factor include gas turbine engines in aerospace transportation and power generation, reciprocating engines in automobiles or ships, small bearings used in computer hard drives, even smaller bearings and gears in MEMS devices, and natural articulating joints in humans and animals. The load carrying contacts in these disparate systems must be designed for low friction and high durability. The controlling effect of tribology is often ignored in the design stage and leads to tribology related failures with concomitant effects of down-time cost, replacement cost and unfortunately, loss of human life.

Study of tribology and its application in design of mechanical systems is complex due to numerous fundamental events that take place at microscopic contacts. True understanding of tribology and the design of such components require a comprehensive knowledge of physics, chemistry, materials science, solid mechanics, fluid mechanics, among others. This presentation provides a brief overview of fundamental tribology concepts including different lubrication regimes and wear mechanisms. The structure of real surfaces and concept of real area of contact will be discussed. The process of wear by contact deformation and fracture will be described and distinctions will be made between the behavior of different classes of materials such as metals, ceramics, polymers and composites. A brief overview of lubrication with thin films and hydrodynamic lubrication will be provided. Control of friction and wear through lubrication and lubricant additives that involve adsorption and chemical reaction with the sliding micro-contacts will be described.

**Brief Bio:** Dr. Said Jahanmir, the ASME's 137th president, is president and chief executive officer of the engineering consulting firm Boston Tribology Associates in Cambridge, Mass. Since September 2015, he has been serving as Senior Legislative Fellow in the U.S. House of Representatives through the ASME Federal Government Fellowship Program, providing advice to Rep. Tim Ryan (D-OH) on manufacturing, science and technology policy, STEM education, and workforce development. Jahanmir had previously served as president and CEO of MiTiHeart Corp. of Albany, N.Y., and as vice president of its parent company, Mohawk Innovative Technology Inc., guiding R&D efforts involving implantable blood pumps, high-temperature coatings, high-speed micro-machining, and high-speed oil-free-compressors. From 1987 to 2002, Jahanmir served in several positions at the National Institute of Standards and Technology (NIST), including leader of the Ceramic Manufacturing Group. He was also the inaugural director of the Tribology Program at the National Science Foundation from 1985 to 1987, senior research engineer at Exxon Research and Engineering Co. from 1980 to 1985,

assistant professor of mechanical engineering at Cornell University from 1977 to 1980, a lecturer at the University of California at Berkeley from 1976 to 1977, and an instructor at the Massachusetts Institute of Technology from 1975 to 1976.

**Thursday October 25, 2018 2:00 – 3:00 PM Rowan  
Auditorium**