

Innovation in MEMS Industry

Sixth Workshop for MEMS Consortium

When: **15th September 2011, 9.00 a.m. to 1.30 p.m.**
Where: **Institute of Microelectronics, Singapore**
11 Science Park Road Singapore Science Park II Singapore 117685

Dr. Gregory J. Galvin

President and CEO of Kionix
Chairman and CEO of Rheonix

Abstract: "Microfluidics for Diagnostics: Applications and Trends"

For decades researchers have predicted that microfluidics will revolutionize the diagnostic world. The vision of fully integrated microfluidic-based systems, so called "laboratories on a chip," in which microscale pumps, valves, reaction chambers and the like performed complex biochemical analyses was a compelling one. Yet the commercial reality of such devices largely failed to materialize, primarily due to technical obstacles as well as high cost factors. In the past few years, however, the situation has changed significantly. Microfluidics, or perhaps more accurately millifluidics, is beginning to fulfill its long awaited promise by overcoming many of the technical obstacles. Although cost issues remain, multiple highly automated diagnostic systems are now available in the marketplace with more on the horizon. Entire molecular diagnostic laboratories have truly been reduced to a benchtop scale instrument. Demand for diagnostics from human medicine, veterinary medicine and environmental applications are strong and growing rapidly worldwide. Rheonix has developed a novel, polymer-based, microfluidic technology that enables a wide variety of diagnostic systems. Not only have the technical obstacles been overcome, but Rheonix can provide the most cost effective instrumentation and disposables that we are aware of. This talk will review the Rheonix technology, its position in the larger microfluidic diagnostic marketplace, and future opportunities.

Biography

Dr. Galvin founded Kionix in 1993 to commercialize a novel micromechanical technology pioneered by researchers at Cornell University. From 1993 to 2000, Kionix grew from its two founders to over 40 employees and developed products in inertial sensors, microfluidics, data storage, micro-relays, and micro-optics. Late in 2000, Kionix was acquired for its optical switching technology by Calient Networks of San Jose, CA and renamed Calient Optical Components. Just prior to the acquisition, a new company was spun out to the then Kionix shareholders to pursue inertial sensor, microfluidics, and data storage markets. This company regained the Kionix name post acquisition. From the acquisition until June 2002, Dr. Galvin served as President and CEO of Calient Optical Components and on the boards of both Calient Networks and the new Kionix. In July 2002, he returned full time to Kionix as President and CEO and advanced the Company to its 2009 acquisition by Rohm Co., Ltd. of Japan as a wholly-owned subsidiary. In addition to continuing service as Kionix's President and CEO, Dr. Galvin also serves as Chairman and CEO of Rheonix, Inc., a corporate entity established in December 2008 to commercialize a unique polymer chip microfluidic technology developed by Kionix scientists.

Dr. Galvin has a B.S. from the California Institute of Technology in Electrical Engineering and a Ph.D. in Materials Science and M.B.A. from Cornell University. Dr. Galvin served for over five years as the Deputy Director of the Cornell Nanofabrication Facility (CNF) in which the Cornell micromechanical research was conducted. Prior to founding Kionix, he was employed by Cornell University as Director of Corporate Research Relations, focusing on transferring technology from the university to industry. Dr. Galvin's graduate research was in the areas of thermodynamics of silicon under ultrafast melting, ion beam analysis, and thin film technologies. He is a member of several scientific societies, has published over 20 technical papers, and holds 58 patents. Dr. Galvin is a member of the Cornell University Board of Trustees, Advisory Council of the Cornell Engineering College, and serves as a Director of the Boyce Thompson Institute for Plant Research, BinOptics, Tompkins County Area Development, Inc., the Kensa Group, the El Portal de Belén Foundation, and Ithaca's Sciencenter. He is a founding member, and former chairman, of the Finger Lakes Entrepreneurs Forum. In June 2010, Dr. Galvin was named a regional winner of the Ernst & Young Entrepreneur Of The Year® award. A leading authority on MEMS product innovation, Dr. Galvin is frequently invited to speak at meetings and conferences in the United States, Europe, and Asia.

Dr. Oren Levy

Group Manager, TAMAM Division, Israel Aerospace Industries (IAI)



Abstract: “High Performance Rugged Sensors: Applications and Trends”

The small size, low power consumption and low price of MEMS devices introduce new possibilities for new innovative products. Low-grade inertial sensors are widely used in mobile devices and cars but their performance is not sufficient for more accurate applications such as GPS free navigation.

Designing and manufacturing high sensitivity MEMS inertial sensors are a real challenge and require a lot of experience and expertise. This sensor requires overall integrity and extra preciseness with tight tolerances since every deviation will damage the sensor performance.

In this presentation I will discuss some basic principles of designing high performance MEMS accelerometers.

Biography

Dr Levy undertook the responsibility as Group Manager for IAI and provided oversight in leading the group on research and development of MEMS devices. With a focus on leadership in MEMS technological activity spanning mathematical models, simulations, fabrication and characterisation, he eventually established a characterisation lab. Prior to this, he worked in RAFAEL, and was responsible for the research and development of a MOEMS device. The project spanned across design, prototyping and characterisation of devices, and the mathematical models. Earlier, Dr. Levy was a Senior Lecturer at Tel Aviv University, Faculty of Engineering in 2002. He was involved in building a new MEMS experiment for the lab. Under his stewardship, Dr Levy served to revise the lab teaching and provided counsel on few experiments while continuing his mentorship to final year students.

Dr Levy obtained his Ph.D in Engineering from Aviv University, Israel in 2007 and conducted his doctoral research on the study of microdisplacement of optical sensing methods for integrated MOEMS, leading to the development of new novel MOEMS devices and industry collaboration within the Israeli MOEMS consortium. Dr Levy has also established cooperative ties with several research groups in the Faculty of Engineering and is a recipient of the Applied Materials prize in 2005.