UNIVERSITY OF DELAWARE

University Colloquium Series:
New Directions in Nanotechnology

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"New Directions in Nanotechnology,
Or: How Can Universities Compete In This Brave New World of Nanotech?"

For many years, the strategic pathway for university micro--- and nanofabrication facilities was clear: do what Intel does, but one or two generations behind. This very successful strategy has led to the university---initiated growth of many new fields: e.g., new CMOS architectures, MEMS, and advanced---material---based electronic devices such as solid---state lighting. However, as these areas become successively more commercialized, many universities find they cannot compete with the very industries they have spawned to create the latest research results. Thus, as we move deeper into the 21st century, university nanotechnology facilities are beginning to look more like nano---maker spaces than process lines, with the need to accommodate exotic materials, develop 'one---off' processes and even fabrication tools, and focus on device or system performance rather than quantity of producible die. This approach will be illustrated by means of the presentation of three research projects that exploit these new directions: ultracompact energy conversion devices based on nanolaminated magnetic metallic alloys; permanent and biodegradable implants for monitoring chronic and acute conditions within the human body; and the microfabrication of proteins to produce artificial biological constructs.

Mark G. Allen received the B.A. degree in chemistry, the B.S.E. degree in chemical engineering, and the B.S.E. degree in electrical engineering from the University of Pennsylvania, Philadelphia, and the S.M. and Ph.D. (1989) degrees from Massachusetts Institute of Technology, Cambridge. In 1989 he joined the faculty of the School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, ultimately holding the rank of Regents' Professor and the J.M. Pettit Professorship in Microelectronics, as well as a joint appointment in the School of Chemical and Biomolecular Engineering. While at Georgia Tech, he held several additional positions, including Senior Vice Provost for Research, Director of the Georgia Electronic Design Center, and Executive Director of the Institute for Electronics and Nanotechnology. In 2013 he left Georgia Tech to become the Alfred Fitler Moore Professor of Electrical and Systems Engineering and Scientific Director of the Singh Nanotechnology Center at the University of Pennsylvania in Philadelphia, PA. His research interests are in the development and the application of new micro- and nanofabrication technologies, as well as MEMS. Dr. Allen was Editor-in-Chief of the Journal of Micromechanics and Microengineering, was a previous co-chair of the IEEE/ASME MEMS Conference and the PowerMEMS Conference. He has co-founded multiple companies based on micro and nanotechnology, including CardioMEMS, Inc., and Axion Biosystems. He is a Fellow of the IEEE.

10:00 AM, Trabant Theatre, refreshments 9:45 AM in Lobby

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