STEVENS INSTITUTE OF TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING

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Carnegie Room 315, Time: 4 pm

Micro and Nanomolding toward Bioapplications

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Molding is a technology for the replication of pre-defined structures from a mold insert to a substrate to be patterned, with the capability of very high (sub-10nm) resolution and the potential of low-cost, mass production. It is well established in the macroscale regime and is currently being developed into the micro- and nanometer regime. In particular, its ability to create topological and chemical surface patterns at the micro- and nanometer scale has made the molding technology suitable for researches intersecting the biological and physical sciences in which some of the most exciting, novel, and promising discoveries are being made today. This is because these size scales are extremely relevant to both the biological and physical sciences, resulting in a succession of research advances that combine techniques relevant to the two fields. This talk will be organized as two folds. In the first part, fundamentals to the micro- and nanomolding technology will be introduced, with the aim of achieving high aspect ratio nanostructures for components in research and industrial applications. A focus will be given on the mechanics involved in the demolding process of the micro- and nanomolding technology because demolding is the process step where most of molding failure occurs. The focus in the second part will be moved towards applications of molded structures, in particular, the area interfacing the biological and physical sciences, which include creation of structures mimicking biosystems and/or improving performance of bioanalytic devices.

Dr. Sunggook Park received his B.S. and M.S. in 1996 and 1998, respectively, in the department of Chemical Engineering, Yonsei University, Seoul, Korea. He received his Ph.D. of physics from Technical University Chemnitz, Germany in 2002. The research focus for his Ph.D. was on the electronic properties of surfaces and interfaces of organic semiconductors. Then, he moved to the Laboratory for Micro- and Nanofabrication at the Paul Scherrer Institute, Switzerland, as a postdoctoral researcher in 2002-2004 where he learned expertise on nanomolding and nanofabrication. Since 2005, he has been an Assistant Professor of Mechanical Engineering at Louisiana State University. His current research interest focuses on fundamental to the nanomolding process such as thermal and mechanical behaviors, applications of molded structures in bioMEMS, and 3-D patterning. He is a recipient of the NSF Young Faculty Development CAREER Award in 2007.

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