CENTER FOR DERMAL RESEARCH

RUTGERS' CENTER FOR DERMAL RESEARCH (CDR) SEMINAR SERIES

Guest speaker: **Tuğrul Özel, Ph.D.**

Rutgers, The State University of New jersey

December 7, 2015

"Microneedle Arrays for Transdermal Delivery"

BIOGRAPHY:

Tuğrul Özel is Associate Professor in the Department of Industrial and Systems Engineering since and the Director of Manufacturing & Automation Research Laboratory at Rutgers University. His research program mainly focuses on computational modeling, physics-based simulation, and optimization of advanced manufacturing processes at multi-scale (e.g. high speed machining, micro-milling, laser micro-machining, laser material processing, additive selective laser melting/ sintering, biomanufacturing processes). His research has been funded by NSF, DoC NIST, NASA, and industry. He has published over 125 research articles in journals and conference proceedings. He is the co-author of four edited books including "Micro-Manufacturing: Design and Manufacturing of Micro-Products", (Wiley, 2011) and "Advances in Medical Device Design, Prototyping, and Manufacturing", (Wiley, forthcoming in 2016). He holds a patent application on Polymer-Based Micro-Needle Array Design and Fabrication for Drug Delivery. He is the Editor-in-Chief of the International Journal of Mechatronics and Manufacturing Systems as well as member on the editorial board of eight international journals, and a member of scientific or program committee over 30 international conferences. He is a senior member of Society of Manufacturing Engineers, American Society of Mechanical Engineers, North American Manufacturing Research Institute, and an associate member of CIRP, the International Academy for Production Engineering.

ABSTRACT:

Micro-needles are new medical devices with the same purpose of classic hypodermic needles but fabricated on micro-scale often in the form of arrays in various materials. These devices aim to replace the hypodermic needles and consist of a patch with micro-sized needles. These patches generally do not induce pain since these micro-sized needles penetrate into the skin small enough and do not reach pain receptors and they can be applied without the help of a health professional. The basic premise of painless micro-needles patches is to design micro-needles so small that they cannot reach the dermis layer of human skin and do not agitate pain receptors. Considering this design requirement and desired shape, micro-needles can be fabricated in metals, silicon or silicon dioxide, polymers and glass. Micro-needles also offer a broad range of advantages when compared with traditional hypodermic needles. This talk will provide the current state-of-the-art on microneedle research for drug delivery. It will present a summary of the materials utilized for the microneedles with their distinct advantages and disadvantages, and discusses the manufacturing process chains employed in fabricating the microneedle arrays (MNA).

LOCATION: Life Sciences Building Rutgers - The State University of New Jersey, 145 Bevier Road, Piscataway, New Jersey 08854, New Jersey Center for Biomaterials Suite - Conference Room 102

TIME: 5:30PM

HOST: Bozena B. Michniak-Kohn, Ph.D., M.R.Pharm.S. Director, Center for Dermal Rsearch, Professor of Pharmaceutics, Ernest Mario School of Pharmacy