

FALL 2022

MSE 690 SEMINAR SERIES

MONDAY, OCTOBER 3RD, 2022 | 3:30–5:00PM

ARMS 1010



DR. ROGER NARAYAN

Distinguished Professor

Department of Biomedical
Engineering at University of
North Carolina & North
Carolina State University

“Additive Manufacturing of Active Medical Devices”

Abstract: We have examined the use of many types of additive manufacturing technologies, including digital micromirror device-based stereolithography and two photon polymerization, to create small-scale medical devices for transdermal drug delivery and transdermal sensing. The non-linear nature of two photon absorption enables the use of two photon polymerization for the processing of medically-relevant structures with features below the diffraction limit. For example, we have used additive manufacturing techniques to prepare hollow microneedles that may be used for direct interaction between a sensor and subsurface tissues. Several types of sensors have been integrated with arrays of hollow microneedles. Multiplexed microneedle sensors may potentially be used for the simultaneous detection of several physiologically-relevant molecules. In this talk, recent efforts to improve additive manufacturing of medical devices and facilitate clinical translation will be considered.

Biography: Dr. Roger Narayan is a Distinguished Professor in the Joint Department of Biomedical Engineering at the University of North Carolina and North Carolina State University. He is an author of over one hundred publications as well as several book chapters on the processing, characterization, and modeling of biomedical materials. He currently serves as an editorial board member for several academic journals, including as associate editor of Applied Physics Reviews (AIP Publishing). Dr. Narayan has received several honors for his research activities, including the University of North Carolina Jefferson-Pilot Fellowship in Academic Medicine and the American Ceramic Society Richard M. Fulrath Award. He has been elected as a Fellow of the American Ceramic Society, ASM International, AAAS, ASME, AIMBE, and the Materials Research Society.



School of Materials Engineering