

**NORTH CAROLINA STATE UNIVERSITY
EDWARD P. FITTS DEPARTMENT OF
INDUSTRIAL AND SYSTEMS
ENGINEERING**

ISE 601/801 – Departmental Seminar

**Friday, September 22, 2021
01025 Engineering Building 2
11:00 a.m. to 12:00 p.m.**

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Manufacturing “Living” Biomedical Products

Abstract:

Implants play an important role in improving the quality of life of patients affected by injuries and diseases. While implants have traditionally been made of bioinert metals and polymers, recent scientific and technological advances enable the engineering of “living” tissues using functional biomaterials and cells. In addition to their benefits in medical treatments, these engineered tissues have extensive applications in drug discovery, environmental toxicology, and disease research. This talk will highlight the critical role of manufacturing engineering in the development of these novel products via two of our recent research efforts in this domain: 1) a new ultrasound-assisted 3D bioprinting process to create engineered tissues that resemble their natural counterparts, and 2) a new dielectric spectroscopy technique for non-destructive quality monitoring of such tissues. Challenges and opportunities in bringing these engineered tissue technologies into widespread use will also be discussed.

Bio:

Dr. Rohan Shirwaiker is an Associate Professor and Pleasant Faculty Scholar in ISE and an Associate Director of the Comparative Medicine Institute at NC State. Shirwaiker's research focuses on biomedical manufacturing science and technology. His group develops new tissue engineered medical products, biofabrication processes, and biological quality monitoring technologies, studying the underlying material-process-structure-function interactions using experimental and computational approaches. His research has been supported by grants from the NSF, NIH, DOD, and other funding agencies, which has led to over 130 journal articles, conference proceedings and book chapters, and 3 patents.

Shirwaiker is a recipient of the NSF CAREER Award, SME Outstanding Young Manufacturing Engineer Award, ISE C. A. Anderson Outstanding Faculty Award and several other recognitions. He currently serves in various leadership roles in professional societies including the IISE, SME, ASME, and ASTM.