PURDUE UNIVERSITY | Weldon School of Biomedical Engineering

***BME Seminar***
**Friday, April 24, 2026**
**1:30 – 2:30 pm, MJIS 2001**
**Microsoft Teams meeting**
**Join: https://teams.microsoft.com/meet/22049467071196?p=au4llnusy8YLxUDZuE**
**Meeting ID: 220 494 670 711 96**
**Passcode: 6rV6MC29**

# "Ecological Bioengineering: Engineering Ecosystems to Control Cancer and Regeneration"

**Scott Verbridge, PhD**
Program Director – National Institutes of Health

***Abstract:*** Cancer remains difficult to treat because tumors behave not simply as collections of malignant cells, but as dynamic, ever-adapting ecosystems shaped by immune, stromal, vascular, and microbial interactions. This seminar introduces Ecological Bioengineering as a quantitative, engineering-driven framework to understand and control these multiscale dynamics for therapeutic benefit. Dr. Scott Verbridge will present advances from his research program in tumor microenvironment modeling. This work includes studies of tumor–microbiome interactions, with emphasis on the role of the invasive oral oncomicrobe *Fusobacterium nucleatum* in driving key hallmarks of cancer, alongside the development of pulsed electric field–based ablation strategies designed to selectively target malignant cell phenotypes, reshape local immunity, and promote durable anti-tumor responses. The talk highlights how biophysical perturbations can be linked mechanistically to immune activation and tissue regeneration, establishing a foundation for programming therapeutic outcomes at the tissue ecosystem level. Drawing on his experience leading translational initiatives at the NIH, he will conclude by outlining a vision for integrating ecological bioengineering with Purdue's strengths in quantitative engineering, biomedical science, and translational research to build and align scientific and translational ecosystems that accelerate discovery, enable scalable therapeutic development, and train the next generation of bioengineers.

***Bio:*** **Scott S. Verbridge, PhD,** is a biomedical innovator and translational research leader with more than two decades of experience engineering biological systems to improve human health. Trained as a physicist at Cornell University and as a postdoctoral fellow within the NIH Physical Sciences in Oncology Center, his work has helped shape cancer engineering as a discipline integrating quantitative modeling, tumor ecology, and therapeutic translation. He previously served as tenured faculty in the Virginia Tech–Wake Forest School of Biomedical Engineering and Sciences, where he led pioneering research in engineered tumor microenvironments, tumor–microbiome interactions, and pulsed electric field–based immunoengineering approaches. He currently serves as a Program Director at the National Institutes of Health, overseeing a Tissue Engineering and Regenerative Medicine portfolio and leading national efforts to accelerate pathways for translating bioengineered therapies from discovery to clinical impact.