



Dr. Benjamin J. Leever, Senior Materials Engineer. Dr. Leever is currently a Senior Materials Engineer in the Air Force Research Laboratory (AFRL) Soft Matter Materials Branch. His primary roles are Advanced Development Lead and Government Chief Technology Officer of NextFlex, a \$170M public-private partnership established to create a domestic manufacturing ecosystem in flexible hybrid electronics. In support of AFRL's investments in Soft Matter Materials and Materials for Man-Machine Interface, Dr. Leever determines technical strategy, manages AFRL contracts, and establishes and leads industrial, academic, and governmental collaborations. Prior to assuming his current duties, Dr. Leever led a research team focused on the development and modeling of multifunctional materials for structural power applications. He also served as a program manager for Flexible Materials & Devices, contributing to the strategy for \$1M in annual research & development investments while also managing programs with the industrial base. Dr. Leever began his career at AFRL in the Manufacturing Technology Division, where he managed programs related to electro-optics systems.

Benjamin Leever Seminar

Building a Manufacturing Ecosystem for Flexible Hybrid Electronics: a Focus on Aerospace Opportunities

November 30th, 2017 @ 2:00pm – 3:00pm in MRGN 121

As advanced electronics proliferate in both the commercial and defense sectors, they continue to be largely limited to rigid form factors with bulky packaging dictated by traditional electronics manufacturing processes and fragile components. Yet for applications ranging from wireless, low-profile medical devices to smart food labels to aircraft with embedded stress sensors, there's a need for high-performance electronics that conform to the shape of our bodies, vehicles, and consumer goods. Flexible Hybrid Electronics (FHE), which combine additive manufacturing processes with flexible silicon, will enable these capabilities. To move these concepts from the lab to the manufacturing floor in the United States, the Department of Defense established NextFlex, America's Flexible Hybrid Electronics Manufacturing Institute in 2015. Based in San Jose, CA, NextFlex is a \$170M public-private partnership that is building a domestic FHE manufacturing ecosystem by developing manufacturing processes and tools with its member companies and universities, standing up an FHE manufacturing pilot line in Silicon Valley, and establishing education and workforce development programs to train tomorrow's workforce. This presentation will focus on the FHE opportunity, the NextFlex FHE manufacturing roadmaps, and NextFlex projects in areas such as device integration & packaging, modeling & design tools, and printed flexible components.

In addition, the presentation will highlight opportunities for FHE to impact the Air Force, including projects focused on conformal antennas for aircraft as well as wearable performance monitors for airmen. In-house research capabilities at AFRL will be discussed, including printing and characterization facilities. Finally, several AFRL projects related to FHE will be highlighted, such as work focused on flexible Li ion batteries, novel ink development, printed structures with embedded electronics, and printed multi-layer capacitors.