NextFlex: Hybrid Electronics Manufacturing Innovation Institute

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Director of Technology

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Acknowledgment

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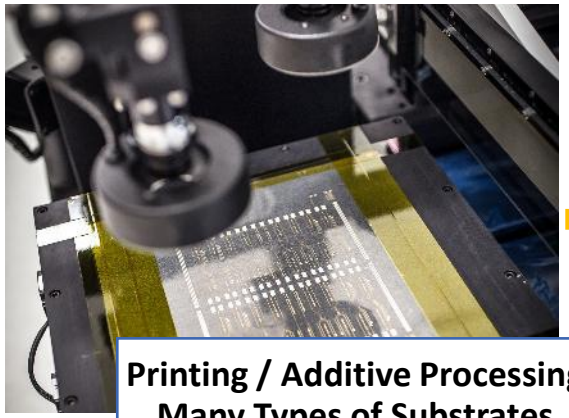
NextFlex Mission: Public-Private Partnership to Create a Strong U.S. Industrial Base for Hybrid Electronics

Advance Technology & Manufacturing	Establish & Grow Manufacturing Industrial Base	Secure Human Capital
Partner with industry to invest in applied research and industrially-relevant manufacturing technologies	Establish regional manufacturing hubs and supply chains for long-term, national impact	Develop manufacturing-specific education and workforce development resources to ensure innovative technology is manufacturable

Transition Technologies to the Commercial and Defense Industrial Base

Hybrid Electronics Manufacturing

Hybrid Electronics (HE) combines additive electronics with electronics assembly, enabling a many device types and spanning electronic packaging to system integration.



Printing / Additive Processing
Many Types of Substrates

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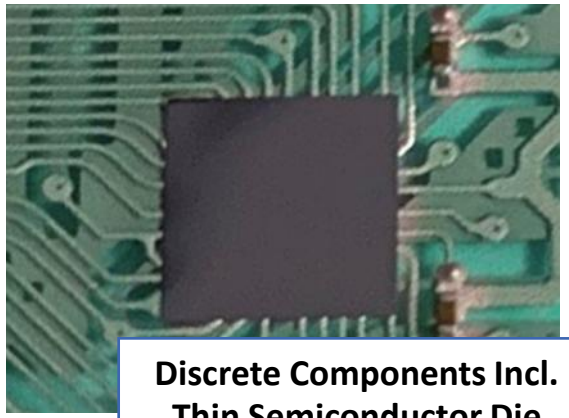


Discrete Components Incl.
Thin Semiconductor Die

=

Edge Device /
Machine Learning

Aerospace &
Automotive

Medical & Wearable

RF / Communications

3D Structural
Electronics

Additive Electronics
Flexible Electronics
Advanced Packaging
…

What We Do

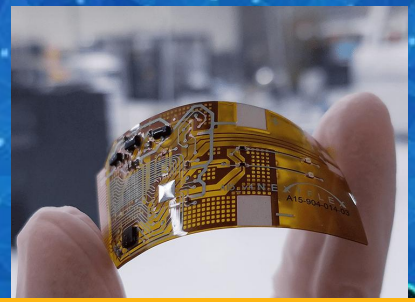
NextFlex Technology Hub: Design & Prototyping Services for DoD and Industry

FHE Consortium: Critical Members from USG, Industry and Academia

Regular Communication, Webinars & Workshops, Events

NEXTFLEX®

Nationwide Workforce Development Programs



Project Calls: Develop FHE Manufacturing Impacting DoD and Industry

Technical Working Groups Develop 5-Year Roadmaps that Validate Market Needs

STRENGTHENING THE U.S. INDUSTRIAL BASE

NEXTFLEX

MATERIALS

brewer science · SUNRAY SCIENTIFIC · DUPONT · NOVAGARD · ANI · applied NANOTECH INC. · EASTMAN · KODAK · Heraeus Precious Metals · iris · MOMENTIVE · electroninks · Celanese · PRECISION CIRCUIT TECHNOLOGIES · NeXolve

EQUIPMENT

OPTOMEC · IDS · Universal Instruments · SCHEUTT · Space Foundry · NANODIMENSION · plasmatreat · KOMORI · CARPE DIEM TECH · FUJIFILM · CHEM CLASSIC · Impossible Objects · bayflex solutions · LITHOZ · NTV USA

DESIGN/COMPONENT MFG

E Ink · Liquid Wire MADE TO MOVE · ara · BIOSENSOR SOLUTIONS · anthro

SEMICONDUCTOR

LUX · ANALOG DEVICES

DESIGN/MANUFACTURING

FABRIC8LABS · INFINITE CORRIDOR TECHNOLOGY · TAPECON · Promex Microelectronics Assembly Technologies · SIEMENS · ADDITEC Print Different · TTM Technologies · molex · EWI · SYGHT · Khanjur · CALTRONICS

INDUSTRIAL/AEROSPACE

LOCKHEED MARTIN · GE · Raytheon Technologies · BOEING · GENERAL DYNAMICS Mission Systems · NAUTILUS DEFENSE · GE VERNOVA · NORTHROP GRUMMAN · EATON

MEDICAL/WEARABLE DEVICES

GE HealthCare · HUMAN SYSTEMS INTEGRATION · APTIMA Human-Centered Engineering · Vivonics · Intricon

RESEARCH

UES Excellence in Science & Technology · SRI

ACADEMIA

AUBURN UNIVERSITY · EVERGREEN VALLEY COLLEGE · WESTERN MICHIGAN UNIVERSITY · Georgia Tech · Lorain County Community College · PennState · University of Dayton · UNIVERSITY of WASHINGTON · THE UNIVERSITY OF TEXAS AT DALLAS · SJSU SAN JOSÉ STATE UNIVERSITY · BOSTON UNIVERSITY · VIRGINIA TECH · WPI · UMASS LOWELL · BOISE STATE UNIVERSITY · BINGHAMTON UNIVERSITY · Stanford University · RIT · Drexel UNIVERSITY · OHIO UNIVERSITY · NJIT New Jersey Institute of Technology · Missouri State UNIVERSITY · JOHNS HOPKINS APPLIED PHYSICS LABORATORY · Oregon State University · UNIVERSITY OF DELAWARE · University of Massachusetts Amherst · Northeastern University · IOWA STATE UNIVERSITY · TEXAS The University of Texas at Austin · UNIVERSITY OF MARYLAND

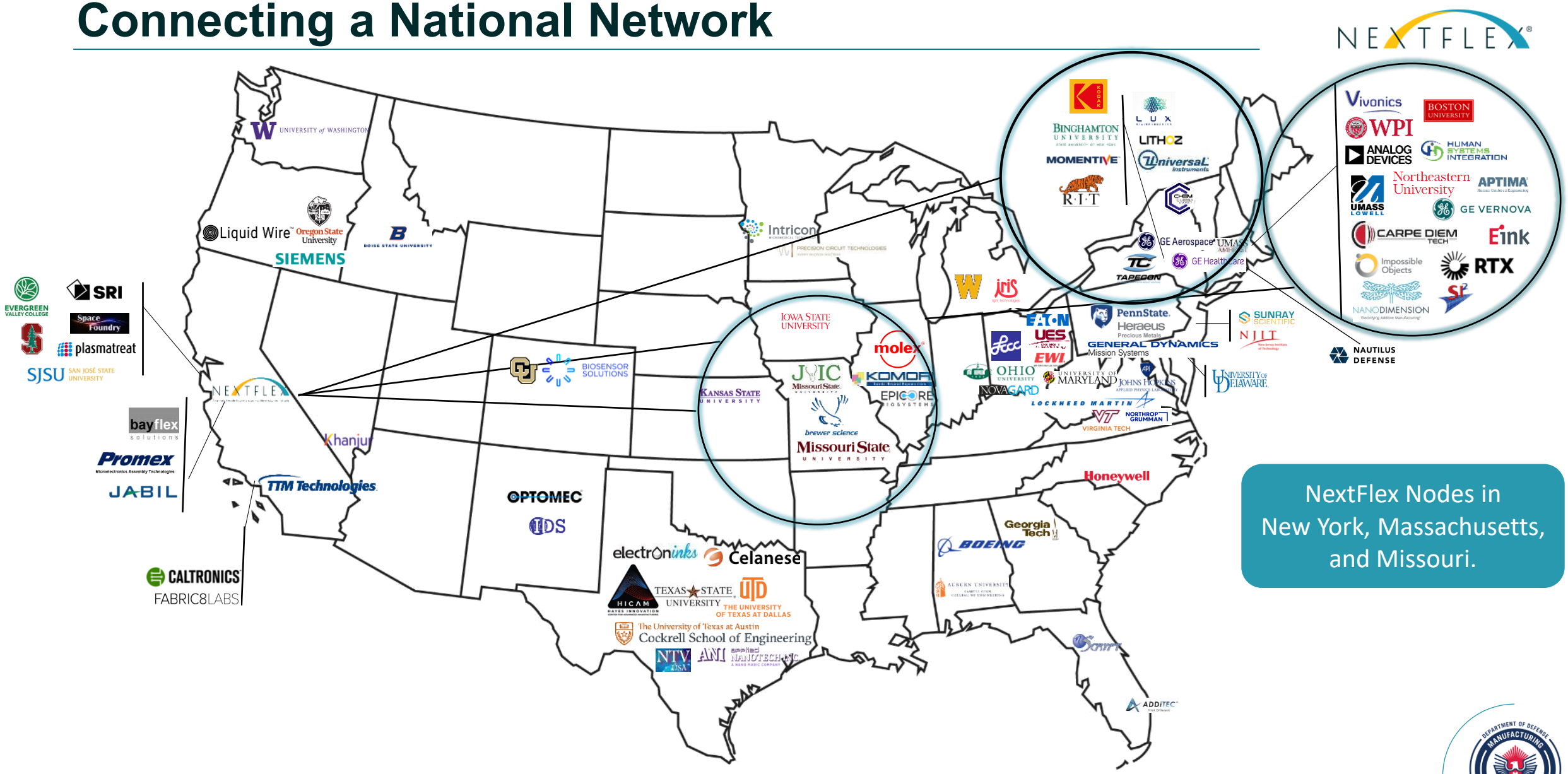
WORKFORCE

NCATC · COLUMBUS STATE COMMUNITY COLLEGE · Cypress College · Shawnee State University · Cuyahoga Community College · BELMONT COLLEGE · MOSI · EAST MISSISSIPPI COMMUNITY COLLEGE · DRAKE STATE COMMUNITY & TECHNICAL COLLEGE · JONES COLLEGE · HOCKING COLLEGE · WASHINGTON STATE COMMUNITY COLLEGE · MERIDIAN COMMUNITY COLLEGE · MANUFACTURING WORKS · ARIZONA SCIENCE CENTER · HICAM · EAST CENTRAL COMMUNITY COLLEGE · MISSION COLLEGE SANTA CLARA · EVERGREEN VALLEY COLLEGE · Cincinnati State · Trenholm State COMMUNITY COLLEGE · NUNEZ COMMUNITY COLLEGE · STEAMBridge · CALHOUN COMMUNITY COLLEGE · UNIVERSITY OF RIO GRANDE · El Camino College · ZANE STATE COLLEGE ZSC · SOUTHWEST · PEARL RIVER COMMUNITY COLLEGE · HCC · iexploral · Stark State COLLEGE · SINCLAIR COLLEGE

ASSOCIATE MEMBERS

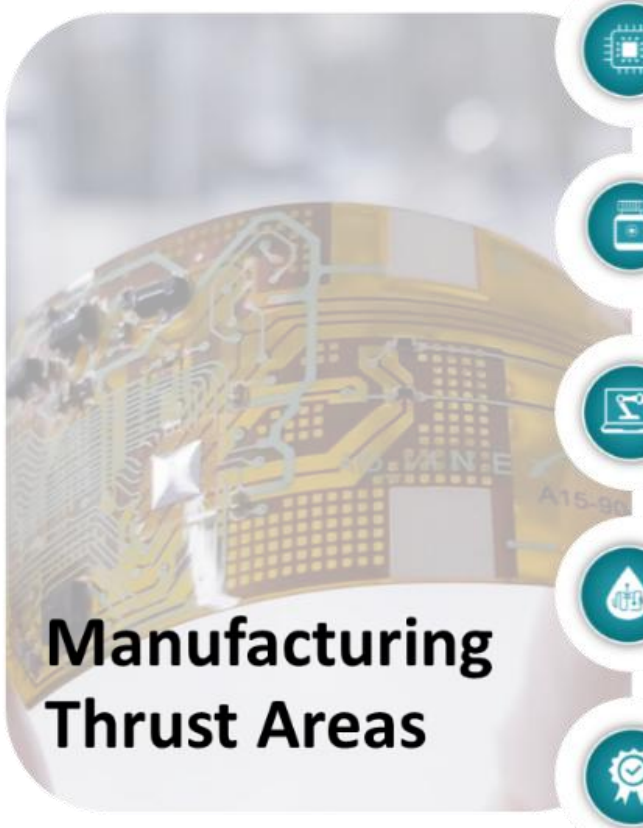
ATG SOLUTIONS · NIRSENSE · BMNT · SMTA · PURDUE UNIVERSITY · IS4S · IPC BUILD ELECTRONICS BETTER · MAXPOWER INC A SPECIAL PURPOSE BATTERY COMPANY

Connecting a National Network



NextFlex Nodes in New York, Massachusetts, and Missouri.

Technical Working Groups (TWGs)



Manufacturing Thrust Areas

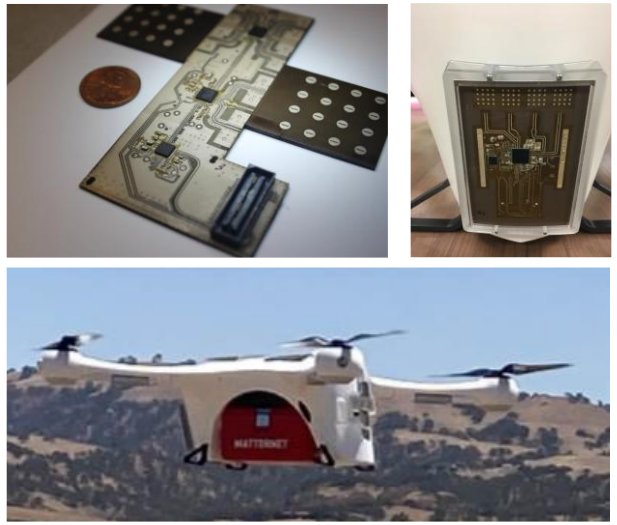
- Device Integration & Packaging
- Materials
- Modeling & Design
- Printed Components & Microfluidics
- Standards, Test & Reliability

Technology Platform Demonstrators

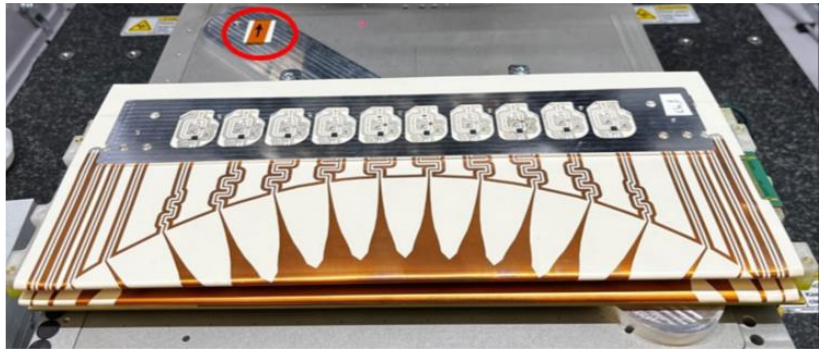
- Automotive
- Asset Monitoring Systems
- Flexible Power
- Human Monitoring Systems
- Integrated Antenna Arrays
- Soft & Wearable Robotics

Project Call Outcome Examples

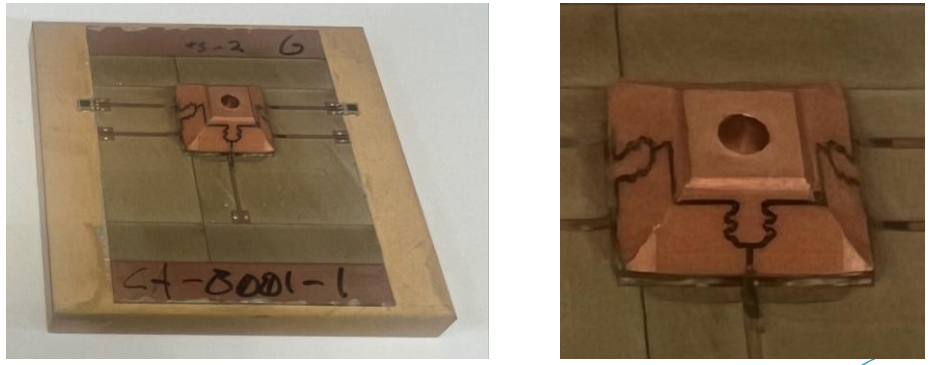
High speed wafer feeder from Universal Instruments Corp. and Binghamton University



High frequency radar demonstrator and UAV integration from Boeing, Matternet, Boise State University, UMass Lowell



Compact RF boards and direct write die integration from Lockheed Martin, Binghamton Univ., Optomec, Univ. of Maryland



Additive RF components, interposers, and 3D packaging by UMass Lowell, Raytheon

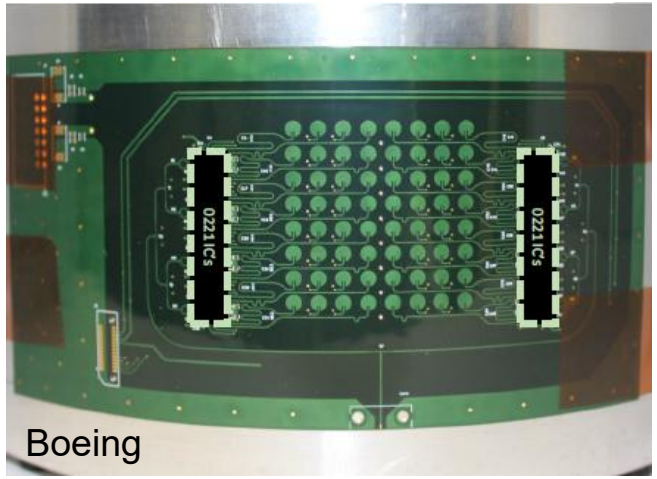
Emerging Themes

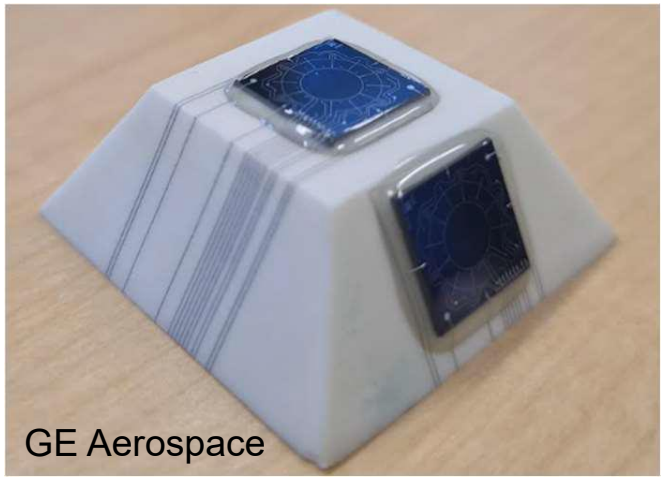
- **Theme #1: Additive Processes for Advanced Packaging**
- **Theme #2: Demonstrated Reliability / Extreme Environments**
- **Theme #3: AI for Hybrid Electronics *and* AI enabled by Hybrid Electronics**
- **Theme #4: Scaled Manufacturing**
- **Theme #5: Technology Transitions**

Benefits of Working with NextFlex

1. Networking
2. De-risk before investing
3. New suppliers / developers / partners
4. Learning
5. Leveraging the investment of others

"NextFlex brings together creative, passionate, and hard-working individuals with diverse backgrounds and experiences within the FHE manufacturing and research ecosystems. By partnering with early adopters within the Department of Defense, NextFlex and its members have matured numerous manufacturing processes, resulting in the demonstration of prototype devices for both commercial and defense applications."
– **Dr. Benjamin Leever, AFRL**


Boeing


GE Aerospace

Upcoming events: Workshop

Confirmed speakers from:

- Auburn University
- Boeing
- Economic Development Partnership, AL
- NASA
- AVNIK Defense Solutions
- Nextek
- IS4S
- LPKF Laser
- AeroVironment
- GE Aerospace
- Lockheed Martin
- And more!

Networking activities include a Welcome Reception at the Space and Rocket Center and Dinner at Topgolf!

Thank you!

Scott M. Miller, Ph.D.

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