MIST CENTER

Multi-functional Integrated System Technology

Harsh Environment Sensing

While readily available commercial sensors may be adequate for consumer IoT and smart systems, smart systems for harsh environments involving one or more extremes of temperature, pressure, corrosive liquids, radiation, etc. often require specialized sensors. Some target applications include aerospace, gas turbine, reactor, as well as seawater and in vivo applications.

Founded in 2014, the Multi-functional Integrated System technology (MIST) Center is a research consortium under the auspices of the Industry/University Cooperative Research Centers program at the National Science Foundation.

Since 2015, the MIST Center has funded $1.5M across 33 projects conducted by 13 faculty members resulting in 11 publications, 3 patents and 2 doctoral student hired by a member organization.

33 PROJECTS RESEARCHING HARSH ENVIRONMENT SENSING

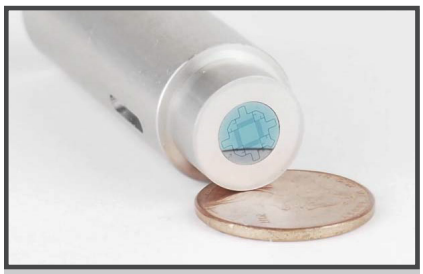
1.5 million dollars of directly funded research

11 IAB-approved journal and conference paper publications

3 patents issued with the possibility for royalty-free licensing

13 faculty at three institutions have contributed to this body of work

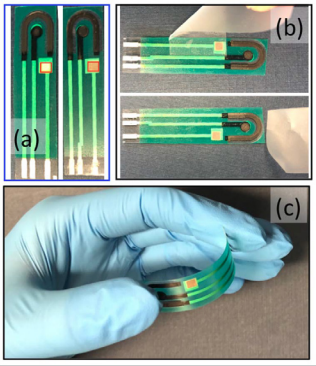
2 doctoral student hired by a member organization



Prof. Mark Sheplak's complete sensor package for a flush-mounted, dual-axis differential capacitive wall shear stress sensor.

Related Intellectual Property

1. Combined Electrochemical pH/Phosphate Sensor. Provisional Patent No. 62/900,160. Application Date = Sept. 13, 2019. Status = Provisional Filed.
2. Low cost disposablemedical sensor fabricated on glass, paper or plastics. Patent No. 16/206,493. US. Application Date = Nov. 30, 2018. Status = Utility Filed
3. A Flush-Mount Packaging Method for Micromachined Transducers. Patent No. 10,737,933. US. Application Date = Sept. 13, 2018. Status = Patent Issued Aug. 11, 2020.



Prof. HJ Cho's fabricated pseudo-reference electrode on a flexible substrate for heavy metal ion detection

List of Projects

1. Room Temperature Ultra-fast IR Detectors Using Patterned Graphene Absorbers on MCT (A. Ghosh, D. Chanda). 2021.
2. Controlling Infrared Modulation with Thermal Resistances (P. Hopkins). 2020-2021.
3. MWIR/LWIR Imaging Fiber Bundle Development (K. Renshaw). 2020.
4. High Bandwidth Heat Flux Sensor (M. Sheplak). 2020.
5. Conformal Electrochemical Sensors for Heavy Metal Detection (H.J. Cho, W.H. Lee). 2019.
6. Flat-Packaged Optical Pressure Sensor for Extreme Temperature Environments (M. Sheplak). 2018-2021.
7. Flexible MOS/Polymer Composite Films for Multifunctional Sensing Applications (H.J. Cho). 2018.
8. Avalanche Photodiodes for Biological Detectors (J. Campbell). 2018-2019.
9. Integrated sensors for environmental monitoring (Y.K. Yoon). 2018-2020.
10. AlGaN/GaN High Electron Mobility Transistor (HEMT) Based Sensor for Heart Attack Detection (F. Ren, S. Pearton). 2017.
11. Technology Development Towards a MEMS-Based Multi-Hole Probe with Optical Transducers (M. Sheplak). 2017-2020.
12. Technology Development for a Dual-Axis Wall Shear Stress Sensor System (M. Sheplak). 2017-2020.
13. 5-axis Laser Micromachining Capabilities for Ceramics Manufacturing (M. Sheplak). 2016-2017.
14. Thermal Stress Minimization for Harsh Environment Packaging (M. Sheplak, T. Jiang). 2015-2016.
15. Laser Micromachining of 3-D Miniature Parts in Harsh Materials (M. Sheplak). 2015.
16. Nanowire Gas Sensors (H.J. Cho). 2015-2017.

Publication lists available upon request

The MIST Center is a research consortium under the auspices of the Industry/University Cooperative Research Centers program at the National Science Foundation.

UF UNIVERSITY of FLORIDA

UNIVERSITY of VIRGINIA

UCF UNIVERSITY OF CENTRAL FLORIDA

Learn more @ **MISTCENTER.ORG**