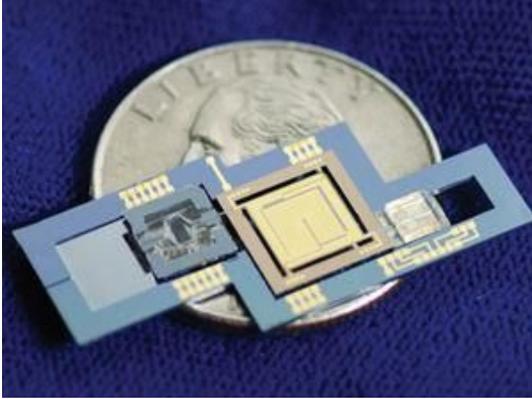


## Research Areas at WIMSS

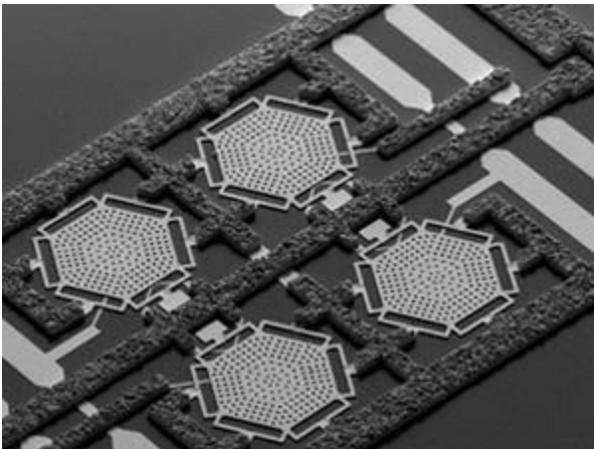
### Environmental Sensors and Subsystems



- GC-on-a-Chip
- $\mu$ Sensors/ $\mu$ Actuators
- Nanomaterials
- Complex Mixtures
- Explosives/Pollutants
- Field Prototypes

The Environmental Sensors and Subsystems (ESS) Thrust is developing MEMS sensors, actuators, and micro-instrumentation for analyzing complex mixtures of chemicals in air and biological media, as well as a range of physical parameters. These devices and multi-device ensembles serve as the information-gathering modules of wireless microsystems whose small size, accuracy, and low-power dissipation will enable their widespread dissemination in applications ranging from homeland security, environmental- quality monitoring, industrial process control, and global climate studies, to biomarker monitoring, and medical surveillance.

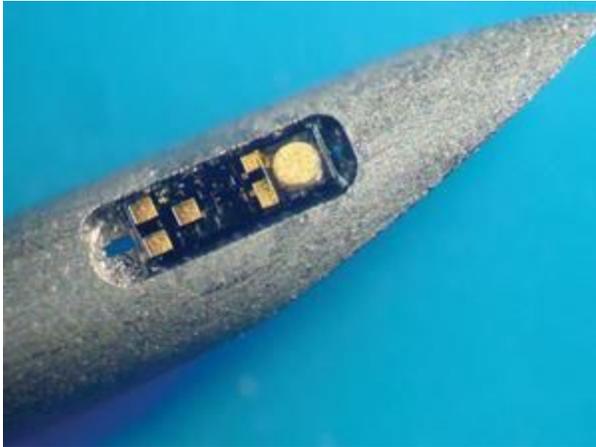
### High Frequency MEMS



- 
- RF MEMS
- Terahertz MEMS
- Optical MEMS

The High Frequency MEMS Thrust undertakes research in three subject areas: RF MEMS, Optical MEMS, and THz MEMS, all from basic science as well as applied research perspectives. The Thrust is exploring advanced RF devices and microsystems, high-Q optical and acoustic resonators, terahertz modulators, imagers and sources, miniaturized antennas, MEMS meta-materials, plasmonics, and near-field optics. The microsystems developed under this thrust have applications in reconfigurable radios, medical and subsurface imaging, satellite mapping, and remote sensing, to name a few.

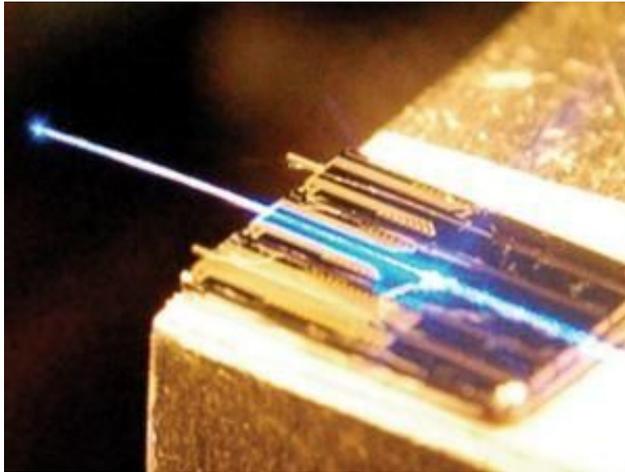
## Advanced Materials, Processes, and Packaging



- Device Concepts
- Non-Traditional Materials
- Vacuum Packaging
- Wafer-Level Packaging
- Wafer Bonding

Successful development of MEMS and microsystems requires a number of technologies for their fabrication, assembly, and low-cost packaging. The Thrust includes research in the following general areas: wafer-scale bonding and vacuum packaging; assembly, interconnect, and related thin-film technologies; etching and deposition methods for new materials and exploratory applications; and mechanical protection and thermal issues.

## Biomedical Sensors and Subsystems



- Implantable Biomedical Devices
- Neural Interface and Microsystems
- Lab-on-a-Chip
- Microfluidic Assay Chips
- Point-of-Care Diagnostics

The Biomedical Sensors and Subsystems Thrust is developing electronic interfaces to living systems for the gathering of diagnostic information and to provide treatment for various diseases and functional disorders. The thrust studies implanted devices for chronic monitoring of physiological, biochemical and vital signals as well as ex-situ devices for diagnostics of diseases, screening of drug efficacy and immune responses.