Advanced Self-Powered Systems of Integrated Sensors and Technologies (ASSIST)

Qualifications and Capabilities

ASSIST's vision is to use nanotechnology to impact healthcare and manage wellness

SYSTEMS TESTBEDS
Integration and Packaging

Health and Environmental Tracker (HET)

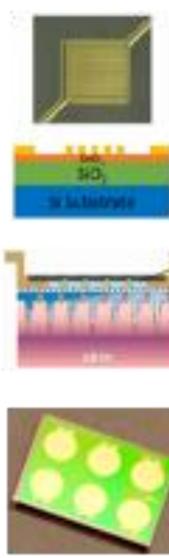Self-Powered Adaptive Platform (SAP)

HET: Multi-modal health and environmental sensing over long periods

SAP: Continuous monitoring of health parameters via self-powered platforms

- Enables correlation of health and environment
- Provides multi-modal sensing

- Enables vigilant monitoring
- Improves user compliance
- Identifies new trends

ASSIST Sensor Research:

ALD based metal oxides environmental sensors

CMUT based VOC sensors

Silver nanowire bioelectronic sensors
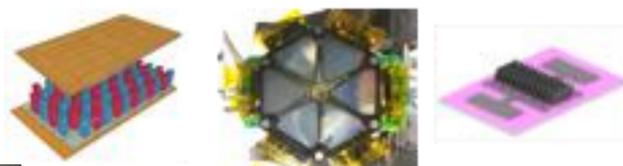
Polymer based Cortisol and alcohol sensors

Hydrogel microfluidics

Nanocellulose based biochemical sensors
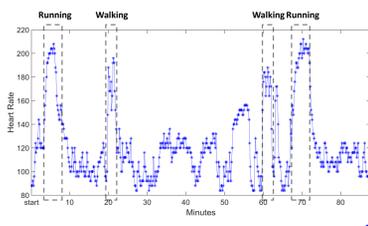
ASSIST Energy harvesting Research

Rigid and flexible thermoelectric materials

Piezoelectric energy harvesing

Medical Validation:
Ozone sensor and handheld spirometer validation
Multimodal physiological monitor testing
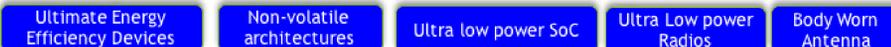Minute ventilation estimation

Research Areas of Interest

Healthcare Costs → 17% U.S. GDP

75% : Chronic Disease

1 in 3 Americans: Multiple Chronic Diseases

Doctor Visits: 4 times a year

1 in 4 Americans : Poor air quality

By building self-powered wearable, wireless, multiple sensor platforms that enable:

Long-term monitoring of personal health & environment
Correlation of multiple sensors
Increased compliance through hassle-free usage
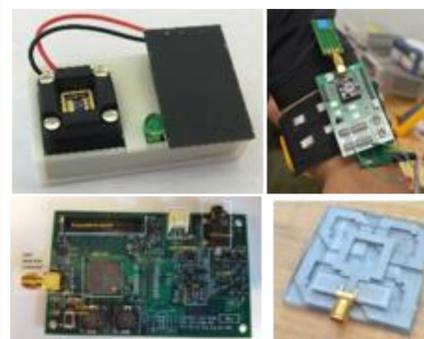
▶ Energy Harvesting and Storage (I)

| Thermoelectrics | Piezoelectrics | Reverse Electro-wetting | Storage |

▶ Low Power Nanoelectronics (II) and Low Power SoC (IV)

| Ultimate Energy Efficiency Devices | Non-volatile architectures | Ultra low power SoC | Ultra Low power Radios | Body Worn Antenna |

▶ Low Power Health and Environmental Sensors (III)

| Ozone and VOC Sensing | Next Gen (Pulse-ox and BP) | Sweat Biochemical Glucose and Cortisol | ISF Extraction |

▶ Wearability and Data (V)

| Data | Flexible Materials | Integration in Testbeds | Human Factors |

Wearable sensor system
Self-powered wellness monitoring

- Flexible sensors, energy harvester, energy storages
- Low power circuits and systems
- Low power sensors

Wearability, data, and Human factor

- Flexible integration
- Big data

ASSIST Center is seeking for collaborations in the area of low-power sensor and systems, breath sensors, non-invasive and reliable biochemical sensors.

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