

## DAGSI Research Topic Template

1. **Research Title:** Develop, Test, and Validate Biomarker Sensors
2. **Individual Sponsor:** List the AFRL research topic sponsor's contact information

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3. **Academic Area/Field and Education Level**

Electrical Engineering, Biomedical Engineering, or Chemical Engineering  
Electronic, Electrochemical, Optical Biomarker Sensor Development and Platform  
Miniaturization  
Previous work with chem/bio sensors, microfluidics, and LabVIEW/C-coding are strongly  
desirable.  
BS Level

4. **Objectives:** 1) Develop chemical/biochemical sensors; 2) Integrate sensors into microfluidics; 3) Interface the sensors to flexible/wearable electronics; 4) Evaluate and validate the sensors; and 5) Explore sensor data processing.
5. **Description:** Chemicals and biochemicals indicative of human physiological and psychological status vary person-to-person and the measurement point in time. Developing sensors that report an individual's chemical and biochemical levels will greatly benefit USAF personnel health and performance. Zero footprint, noiseless, and low-powered sensing platform without the need for calibration and drift correction is highly desirable in developing a wearable or attachable personal sensor suite. Miniaturizing device size and increasing sensitivity and selectivity of chemical/biochemical/optical sensors are key elements in building such sensor suites. In this research, nano sensors are systematically probed by using both experiments and computations. The nano sensor is further explored for its capability to detect the chemical and biochemical targets of interest. The sample collection, delivery, signal processing, and device-to-device communication for the miniaturized sensors and devices are to be explored collaboratively with both internal and external partners.
6. **Research Classification/Restrictions:** Unclassified/Unrestricted
7. **Eligible Research Institutions:** Wright State U, University of Dayton, University of Cincinnati, AFIT, Ohio State U, Ohio U, Miami U

**PA Approval #:** Case Number: 88ABW-2017-4536. The material was assigned a clearance of CLEARED on 19 Sep 2017.