

DAGSI Research Topic Template

1. **Research Title:** Biosensors to Monitor Operationally Stress-Induced Biosignatures
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3. **Individual Sponsor:** List the AFRL research topic sponsor's contact information

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

Bioengineering/molecular biology/ (BS, MS or PhD level)

5. **Objectives:** Design and validate biosensors that respond monitor unique biosignatures resulting from physical stressors (such as extreme temperature or hypoxic environments) or environmental exposures (such as chemicals, particles, or radiation).

6. **Description:** Provide a brief background and/or description of the proposed research topic

The USAF has a need to continuously monitor and sense (in real time) molecular biosignatures of airmen in operational and training environments for improved human performance. Maintaining performance could be accomplished through the discovery of novel human stress biosignatures which could then be "transferred technology" for the development of wearable sensing devices. The goal of this research to discover new molecular human biosignatures associated with fatigue, diminished cognitive capability, g-force, noise, physiological stress and environmental elements which are key stressors than can adversely affect airmen performance during operational settings. There is an increasing need to develop biosensors that are capable of responding to these stressors in a physiologically-relevant manner and continuously monitoring unique biosignatures. Features of advanced biosensors should include increased sensitivity, lower detection limits, portability, compactness, integrability with other technological platforms (wireless-based). The key phases of the project will include a review of recent biosensors approaches, design of a novel biosensor for biosignature monitoring, and validation of the constructed device.

7. **Research Classification/Restrictions:** NA

8. **Eligible Research Institutions:** Indicate to what organizations this topic should be provided

DAGSI (Wright State University, AFIT, Ohio State University, University of Dayton, Miami University, Ohio University, University of Cincinnati)

Topic can be submitted for public release

AFIT (only)

USAFA (only)

NOTE: Topics submitted to DAGSI must be approved for public release. Need PA Approval #