

1. **Research Title:** Reconfigurable Liquid Metal Electronics
2. **Individual Sponsor:**

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

Material Science and Engineering; Chemistry; Electrical Engineering
 Masters or PhD candidate level

4. **Objectives:** Develop novel approaches to manipulating gallium based liquid metal alloys to enable physically reconfigurable RF and DC components.
5. **Description:** Gallium liquid metal alloys (GaLMAs) present a new class of materials that are conductive room temperature fluids and can be utilized in reconfigurable and flexible electronic architectures. Several fundamental hurdles exist before the realization of fully integrated microfluidic GaLMA components is achievable, specifically related to the surface of the liquid metal alloys which oxidizes and reacts with other metal surfaces. The research should encompass designing and fabricating novel microfluidic electronic components, testing material properties, and correlating common device metrics such as connection switching speeds, contact resistance, power handling, and life-time reliability. A complete understanding of the function of devices are affected by operational environments, such as low oxygen levels in hermetically sealed devices and operating temperatures from -60C to 150C, will provide enormous benefit to utilizing GaLMA materials in flexible and reconfigurable electronics in Air Force and commercially relevant applications.
6. **Research Classification/Restrictions:** The work to be carried out under this effort is unclassified and not restricted.
7. **Eligible Research Institutions:** Wright State University, AFIT, Ohio State University, University of Dayton, Miami University, Ohio University, University of Cincinnati



DAGSI (Wright State University, AFIT, Ohio State University, University of Dayton, Miami University, Ohio University, University of Cincinnati) NOTE: Topics submitted to DAGSI must be approved for public release. Need PA Approval #



AFIT (only)



USAFA (only)

If you are submitting a topic for the USAFA, indicate if you are also interested in sponsoring a USAF Cadet in summer 2019 (Average cost for USAF Cadet for 33 days is \$5000)

Yes

No