Attachment 1 – DAGSI Research Topic Template

NOTE: Under the Cooperative Agreement, Technical Directorates have three options for topics. First, a topic can strictly be considered in the pool for the state allocation of funding. DAGSI will work across the TDs for this allocation. Second, the TD can be prepared to be a funding partner with the State of Ohio. This would include: providing additional funds to support additional recipients of a topic, or expand the proposers team to include additional members on a topic. Third, the TD may elect to fully fund a topic not selected for State of Ohio funding or to pursue University teams outside the State of Ohio. Contact lindsay.kotouch.2@us.af.mil for questions.

1. **Research Title:** Self-Healing Elastomers for Extreme Environments
2. **Individual Sponsor:**

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3. **Academic Area/Field and Education Level:** Related Engineering Degree, Physics, Chemistry, Applied Math, or Additive Manufacturing (MS or PhD level)
4. **Objectives:** Understand and develop self-healing elastomers for use in extreme environments
5. **Description:** Self-healing elastomers can autonomously repair internal and external damage, thus extending the service life and enhancing the durability of applications such as wearable devices, soft robots, and artificial muscles. However, the effectiveness of self-healing mechanisms is significantly altered at extreme temperatures, hindering their applicability in extreme environments. To address the need for self-healing elastomers in extreme environments, this project calls for proposals with novel approaches to: (1) advance our understanding of self-healing processes in elastomers at extreme temperatures, and (2) develop strategies to enhance their performance in extreme conditions. In addition, the proposals should employ advanced characterization techniques to assess the self-healing efficiency and mechanical properties of elastomers at various temperatures. Solutions leveraging novel strategies—such as incorporating thermally responsive components, optimizing molecular architecture, and designing new chemistries for self-healing elastomers in ultra-low temperatures that can be additively manufactured— are highly encouraged.
6. **Research Classification/Restrictions:** Unclassified and Unrestricted. Eligible for Public Release. Open to U.S. Citizen Students Only.
7. **Eligible Research Institutions:** All DAGSI Institutions
8. **PA Approval #:** AFRL-2024-4688

NOTE: Topics submitted to DAGSI must be approved for public release.