

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 Terry.Cunningham.2@us.af.mil for questions

1. **Research Title:** Develop and Apply Topological Data Analysis for Multi-Sensor Exploitation
2. **Individual Sponsor:**

Dr. Trevor Bihl, AFRL/RYPAR
AFRL/RYPAR Bldg 620
2241 Avionics Circle
WPAFB, OH 45433-7333
Trevor.Bihl.2@us.af.mil

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

Electrical Engineering (MS or PhD level)
Computer Science (MS or PhD level)

4. **Objectives:** Employ Topological Data Analysis across multiple sensor sources to look at combining high dimensional data across disparate data sources.
5. **Description:** An ongoing goal of combining and fusing information is to identify the relationships between disparate types of sensor data. In the past, the relationships were limited to geospatial, and temporal data sources. By using new topological techniques it is possible to combine and develop relationships between large dimensional disparate data sources from sensors and from information networks (social networks). The goal of this project would be to apply topological data analysis techniques to demonstrate capabilities across remotely sensed data such as from imagery, such as LiDAR and Synthetic Aperture Radar (SAR), with social network related data and information. The project would be used for combinations of sensor data and sensor and social data before being extended to multiple sensors and social network sources simultaneously. This would enable mathematical techniques to support not only combining data but providing new techniques to reduce dimensionality and support information visualization.
6. **Research Classification/Restrictions:** unclassified
7. **Eligible Research Institutions:** Ohio State, Ohio University, University of Cincinnati

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