

Attachment 1 – Research Topic Template

1. **Research Title:** Embedded Sensing for Agile Composite Manufacturing
2. **Individual Sponsor:**
 Dr. Gregory J. Ehlert, AFRL/RXCC
 AFRL/RXCC Bldg 654, Room 239
 2941 Hobson Way
 WPAFB, OH 45433
Gregory.ehlert@us.af.mil
3. **Academic Area/Field and Education Level:** Materials Science & Engineering, Mechanical Engineering, Chemical Engineering, Chemistry, Physics, Polymer Science, or closely related field. BS/BA level preferred.
4. **Objectives:** Research and develop novel embedded sensor for the monitoring of volatile evolution during the curing of polyimide composites. Employ the sensor for use as feedback mechanism for process control in the autoclave during curing.
5. **Description:** Student will undertake study to grow ZnO nanowires on carbon fibers for the development of volatile sensors inside the composite. Student is expected to use bench level chemical methods, nanomaterials characterization techniques, and composite lay up skills. Student will examine high frequency sensing to maximize the information collected. Student is expected to learn to operate experiments independently, take initiative in pursuing goals, analyze data, recommend further action and present results to peers at scientific conferences.
6. **Research Classification/Restrictions:** Research will be unrestricted and submitted for publication in the scientific literature at the Unclassified level.
7. **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)
PA Approval #: 88ABW-2013-3436
 - AFIT (only)
 - USAFA (only)
 If you are submitting a topic for the USAFA, please indicate if you are also interested in sponsoring a USAF Cadet in summer of 2013 (**Avg Cost for USAF Cadet for 33 days was \$5000**)
 - Yes No