

1. Research Title: Performance and characterization of advanced composites for air and space applications in extreme environments

2. Individual Sponsor:

Dr. Craig P. Przybyla, AFRL/RXCCP
AFRL/RXCCP
2230 Tenth Street
WPAFB, OH 45433
Craig.przybyla@us.af.mil

3. Academic Area/Field and Education Level: Materials Engineering, Mechanical Engineering, Aerospace Engineering, Electrical Engineering and/or Computer Science or related (BA/BS, MS or PhD level)

4. Objectives: The objectives for this program are to develop new computational and/or experimental approaches for polymer matrix composites and ceramic matrix composites for:

- a. Rapid quantification and characterization of composite material data
- b. Accurate performance prognosis of composite materials in application relevant environments
- c. Progressive damage models and protocols for virtual testing of composite materials

5. Description: Advanced composites are employed extensively in current air and space defense systems. However, as scientists and engineers continue to push the envelope to produce ever more capable systems, materials often become the limiting factor when trying to close the design envelope. This is especially the case in extreme environments such as those found in propulsion system, hypersonic systems or space systems. This program is specifically focused on developing new approaches and frameworks to better quantify and characterize material structure, provide more accurate performance prognosis in application relevant environments and develop progressive damage models and modeling protocols for effective virtual materials testing.

6. Research Classification/Restrictions: US Citizenship require.

7. Eligible Research Institutions: This is open to all accredited academic institutions.