

**Research Title: Process Modeling for Polymer Matrix Composites****Individual Sponsor:**

Dr. Davide L. Simone, AFRL/RXCC  
Bldg 654, Room 237  
2941 Hobson Way  
WPAFB, OH 45433  
davide.simone@us.af.mil

**Academic Area/Field and Education Level**

- Ph.D. or Ph.D. candidate Materials, Composites, or Chemical Engineering Discipline

**Objectives:**

- 1) Develop a flow model for low melt viscosity, high temperature polymer resins.
- 2) Define and measure key resin properties (viscosity, pot life etc.) that will be used to develop the flow model.
- 3) Validate flow model with actual resin injection experiments in a flat panel mold or a more complex part geometry.

**Description:**

Resin Transfer Molding (RTM) of high performance composites provides a number of advantages such as decreased cost, cycle time and the potential to utilize 3D fiber preforms over traditional hand-layup, autoclave-based, part fabrication. The goal of this research topic is to develop a model using commercial RTM modeling packages that reflects the permeability of state-of-the art high temperature polymer resins with fiber preforms. The research will require the acquisition of key resin properties and engineering parameters suitable to provide a model that can be validated with actual flat panel or more complex mold geometries.

**Research Classification/Restrictions:**

US Citizens only. The resins that will be used in the program are considered at the least, commerce controlled.

**Eligible Research Institutions:**

University of Dayton, Ohio State University