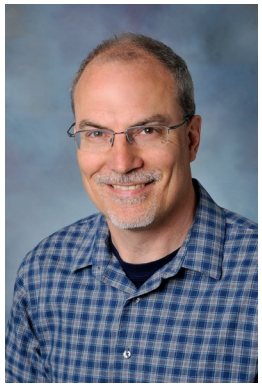
Faculty Member

Timken Foundation Center for Precision Manufacturing

Contact Information



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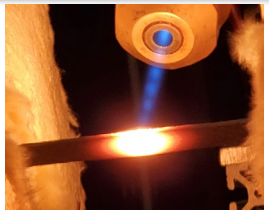
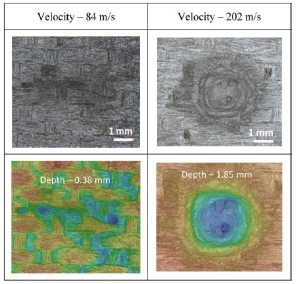
Research Interests

- High temperature ceramic matrix composites
  - Characterization
  - Damage Development
  - Microstructure/Property Relationships
  - Extreme environments: subsonic, supersonic and hypersonic up to 2000°C
  - Foreign object damage and particle ingestion
- Health monitoring techniques
  - Acoustic Emission
  - Electrical Resistance
  - Digital Image Correlation

Sample Research I: FOD of Ceramic Matrix Composites

- High velocity impact of materials and/or coatings with small (1/16”) bearings (steel, Si_3N_4 or WC) to assess effect of impact particle density on SiC-based ceramic matrix composites
- Solid or molten particle (small) impact at room and elevated temperature via powder ingestion in a burner rig under stress conditions on SiC-based and oxide-based ceramic matrix composites





Sample Research II: Monitoring Damage via Acoustic Emission and Electrical Resistance

- Acoustic emission is a passive technique that tells you when, where and possibly what happened as to the source of damage (in composites, typically transverse cracks, interlaminar cracks, fiber breaks, etc…)
- Electrical resistance, for at least semi-conductive materials such as Si, SiC and/or C containing materials, can also yield similar information and also has the potential to be an inspection technique.