

Hard Turning and ATP

Shreyes N. Melkote, Ph.D.
Assistant Professor of Mechanical Engineering

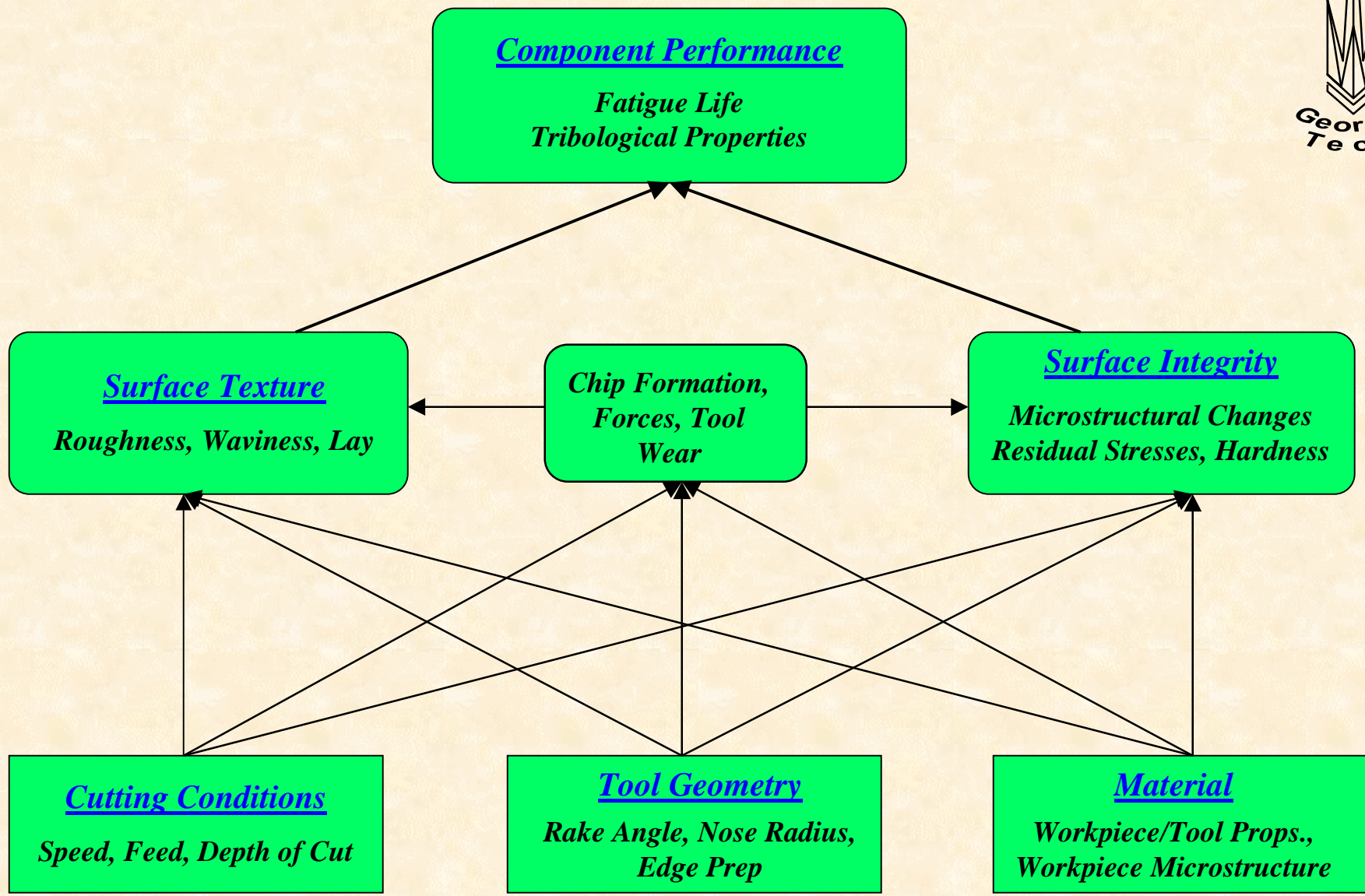
PMRC Industrial Advisory Board Meeting

October 18, 2000

Hard Turning Research Goals



- ***To develop a fundamental understanding of material removal and surface generation mechanisms, and tool wear in hard turning.***
- ***To develop predictive models and advanced process control strategies.***



Project Presentations



- **Stephen Smith, PhD student:**
“Performance Characteristics of Hard Turned Surfaces”

- **Ty Dawson, PhD student :**
“Effect of Cutting Parameters and Tool Wear in Hard Turning”

- Others (Poster):**
 - **Anand Ramesh, PhD student:**
“Finite Element Modeling of Hard Machining Processes”

NIST ATP



■ **Project Title:**

Enabling Technologies for Lean Manufacturing of Hardened Steel Applications

■ **Joint Venture Partners:**

- Delphi Automotive Systems
- Torrington Co.
- Georgia Tech
- Hardinge Inc.
- Kennametal
- Third Wave Systems
- Masco Tech
- Ohio State Univ.

■ **Total Project Value: \$11,747K**

■ **Project Duration: 4 years, Starting Oct. 1, 2000**

NIST ATP - Objectives



- development of predictive models of the hard turning and precision forming mechanics, part quality, and integrity
- development of new tooling and fixturing technologies
- development of process monitoring and control of part quality, integrity, and tool life
- design and development of advanced machine tool technology
- development of an integrated lean manufacturing cell
- comprehensive process and product validation of the integrated system

NIST ATP - Expected Highlights



- Systems approach to the solution of problem manufacture of hardened steel components
- Hard turning process simulation software
- Advances in machine, cutting tool, and workholding design
- Advances in part quality sensing monitoring technology
- Accelerate use of hard turning technology in functionally-critical applications