Nontraditional Manufacturing Laboratory at the University of Florida

Hitomi Yamaguchi Greenslet
Dept. of Mechanical and Aerospace Engineering
University of Florida
Phone: 352-392-0812, E-mail: hitomiy@ufl.edu

Vision: Scientific Discovery of Engineered Surfaces

What surfaces lead to desired functions?
How to create desired surfaces?

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Research Focuses

- Characterization of polishing using *Magnetic field-assisted finishing (MAF)*
- Surface functionalization

  Friction, Wear, Fatigue, Wettability,

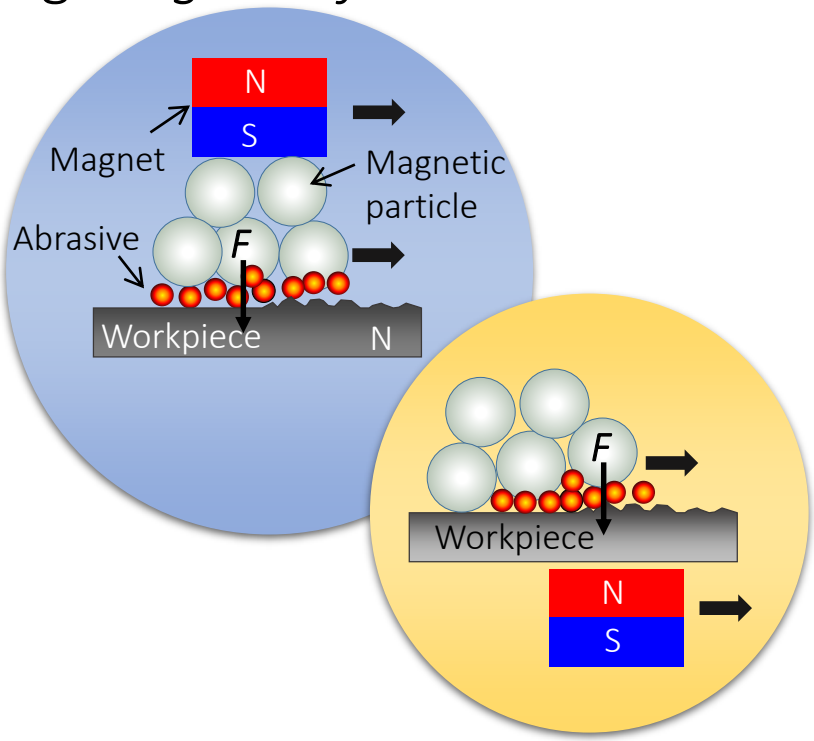
  Coating adhesion/removal, Cleanability,

  Bio-cell/blood-cell adhesion/removal,

  Friction with tissue/skin/fluid,

  Light reflectivity/refractivity/scattering,

  Aerodynamics, Fluid flow, Aesthetics
- Medical device development



Magnetic field-assisted finishing

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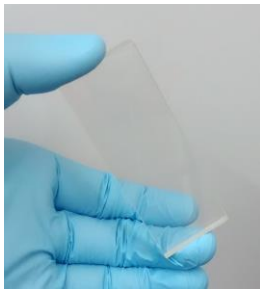
Hitomi Yamaguchi Greenslet: hitomiy@ufl.edu

Ongoing Research Topics

- Characterization of polishing using MAF
  - Polycrystalline laser ceramics and laser glasses
  - Nonaxisymmetric and freeform surfaces (e.g., 3D cams, knee prostheses, airfoils, dies, and molds)
  - Biodegradable magnesium alloy stents



YAG ceramic

Hardened steel 3D cam

CoCr knee prosthesis

Mg stent

- Medical device development
  - Coaxial needle system for breast cancer biopsy
  - Polymeric heart valves

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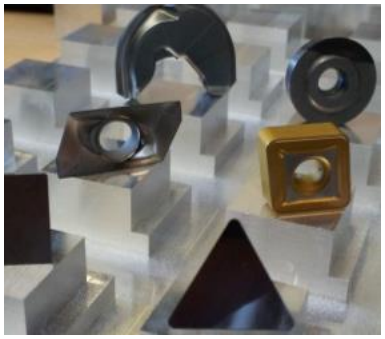
Ongoing Research Topics (contd.)

- Surface functionalization
  - Cutting tool surfaces for high-speed machining of Ti-6Al-4V
  - Cleanability of stainless steel sanitary tubes for the food industry
  - Structural coloration of metal surfaces
  - Cell adhesion on and wear of components made using selective laser melting



Cutting tools

Outcomes:

High-performance manufacturing
High-performance components
New sensing technology
Minimally invasive operations

→ Save energy
Improve quality of life

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