

CAPABILITIES STATEMENT

College of Arts & Sciences

1. CORE COMPETENCIES – SURFACE SCIENCE

- Testing: Hardness and elastic modulus of materials and coatings under various loads/at various depths in micro and nano scale.
- Coatings: Scratch resistant & corrosion resistant of industrial coatings. Top-coated, pretreated aluminum and magnesium alloys.
- Surface Analysis, Measurement, and Treatments: Improved techniques, devices/materials in coatings and refinish work.
- Electrochemistry: Potential ability to test lithium and magnesium batteries.

2. EQUIPMENT

- Scanning tunneling microscope (STM); Atomic force microscope (AFM), Scanning probe microscope (SPM)
- Gamry Multi-Function Electrochemical Impedance Spectroscopy System
- Nano Indenter XP system
- Confocal Raman Imaging Microscope System alpha300R of WITec
- Localized Electrochemical Impedance Spectroscopy (LEIS)

3. DIFFERENTIATORS (KEY PERSONNEL; EXPERTISE, TECHNICAL EXPERIENCE)

- Dr. Weidian Shen – Expert in Surface Science, Material Science, Micro and Nano Tribology.
- Dr. Jonathan Skuza has over 12 years of experience in ultra-high vacuum deposition techniques and associated characterization methods. His research focuses on structure-property correlations in thin films and nanostructures fabricated from a wide variety of materials that exhibit interesting magnetic, optical, electrical, and/or mechanical properties.
[Dr. Skuza Faculty Profile](#)
- EMU Textiles Research & Training Institute – Collaboration Lab
- Technology evolution and enhancement through graduate level courses; Industry Focus

4. PARTNERSHIPS; CLIENTS

- 3M
- Guardian Industries Corp
- MASCO Corporation
- Automotive: GM, United States Automotive Materials Partnership LLC (USAMP), Visteon Corp.

5. ADDITIONAL SOURCES OF INFORMATION

- Projects: Understanding of corrosion mechanisms operative in top-coated, pretreated magnesium alloys. Scratch and mar resistance and mechanism of materials and polymeric coatings
- Key Industry Conferences; Coatings & Paints, Surface Coatings, Tribology, Materials Science & Technology; American Society of Testing & Measurements
- EMU Patent Library (URL):
<http://www.emich.edu/techtransfer/patents.php>
- University website (URL):
[Thin Film & Surface Science Lab](#)