RESEARCH EXPERIENCES FOR TEACHERS

Enhancing knowledges and skills in modern manufacturing

18 May 2018

Project #2: Advanced Manufacturing – 4 teachers

Project #2a: Additive Manufacturing

- Research topic: Relating quality of metal and plastic 3D printed parts with processes parameters
- Focus: One week on additive manufacturing (3D printing) processes
- Lab training: This project allows participants to have hands-on experiences when exploring 3D printing using both plastics and metals. Contact and non-contact metrology techniques will be used to qualitatively and quantitatively assess the quality of a fabricated component.
- Authentic research experience: Teachers would understand 3D printing principles and help in collecting data for a funded project on post-polishing of 3D printed stainless steel parts.
- Equipment: *3D printers:* Different 3D printer systems for metal and plastics; *Metrology:* optical measuring microscope, profilometer, digital microscope with 3D profile measurement.
- Expected outcomes: Understand the 3D printing process/limitations. Experience with advanced metrology techniques for dimension/form measurement. Since the costs of plastic 3D printers are reasonable, teachers could apply their new knowledge by having these at their schools.

This module will be repeated 3 times (week #3, 4, and 5) for groups of 4 participants.

Date	Topic	Note
Mon – Jun 25 – Jul 2 – Jul 9	Introduction to AM [Wayne] Compare AM with other manufacturing processes Classification	Tour: 3-5 pm, EIC Submit alternative penholder projects
Tue – June 26 – Jul 3 – Jul 10	Process presentations: – stereo lithography [Group1] – fused deposition modeling [Group2] – selective laser melting [Group3] – electron beam melting [Group4] – polyjet photopolymer [Group5] – laminated object manufacturing [Group6] – new developments [Wayne]	Tour: 3-5pm, MCF
Wed – June 27 – Jul 4 (off) – Jul 11	– Defects and limitations [Wayne] – Post processing	Lab: Fatigue testing
Thu – June 28 – Jul 5 – Jul 12	Lab: Polishing ABS and Inconel.	Lab: Surface characterizing.
Fri – Jun 29 – Jul 6 – Jul 13	– Group discussion: 3D printing implementation and challenge – Tentative topic and plan for implementation – Houstex (Feb 26-28, 2019): AM student competition	Group social activity follows