SESSION 5  
WEDNESDAY, AUGUST 28 | 1:00 PM - 2:00 PM  

5D – Dimensional Measurements |  
A Proposal for Developing Competency-Based, Dimensional Certification  
Dr. Joseph Fuehne, Director and Associate Professor, Purdue Polytechnic Columbus  

Abstract:  
The Purdue Polytechnic Institute in Columbus, working together with corporate partner Cummins Inc., has developed a metrology training program that includes competency-based credentialing based on hands-on activities rather than a written test. This work includes specific details of the training program with activities required for competency-based credentialing. Many training programs include only a lecture/discussion format that usually include some written examination to demonstrate competency. In this plan, the Purdue Polytechnic Institute in Columbus utilizes metrology tools with targeted measurement artifacts, which may be 3-D printed or machined, to facilitate learning and provide opportunities to demonstrate competency, leading to badges awarded by Purdue Polytechnic Institute for satisfactory performance. An initial activity presents an assembly line with different methods for ensuring fit and quality of the final product. Participants will see how the properly chosen tools can greatly facilitate production operations. Digital measurement tools are utilized as well as 3D printed go-no go gauges that demonstrate their tremendous value in an efficient manufacturing production line. Analog and digital calipers, analog and digital micrometers, Pi tapes, bore micrometers, and dial indicators are all demonstrated and employed during the training. Trainees are required to complete measurement forms that are developed using a spreadsheet program and submit those completed forms for assessment. Sufficient exercises are required with different instruments to award competency badges to individuals who successfully complete the measurements. The proposal is that badges can then be stacked to award successful individuals a certification for dimensional measurement. Most training materials are 3D printed and measurement tools are common. The total equipment package is designed to be portable and available to NCSLI local section meetings for testing and use. Potentially, a kit could be developed which would be available for check out through the NCSLI.  

Learning Objectives:  
1. Evaluate measurement tools, measurement artifacts and measurement methods for potential to be used in creating a dimensional measurement certification.
2. Inspect 3D printed measurement artifacts for their use, portability, and manufacturing repeatability for other organizations.

3. Discuss competency-based learning activities with significant hands-on exercises that are developed into measurement tool badges and, ultimately, a dimensional measurement certification.

Instructor Curriculum Vitae (CV):
Dr. Joe Fuehne is the Director and Associate Professor of Mechanical Engineering Technology at the Purdue Polytechnic Institute in Columbus. He earned a BS degree in Aeronautical/Astronautical Engineering from the University of Illinois and MS and PhD degrees in Mechanical Engineering from Texas A&M University. He is a registered Professional Engineer in both Texas and Indiana. He has industrial experience in the aerospace, oil, and automotive industries and has been at Purdue since 2002.