

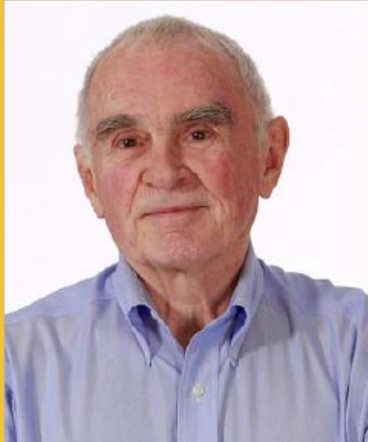


College of Engineering
Department of
Mechanical & Industrial Engineering

The Sidney E. Fuchs Seminar Series

3:00-4:00pm, Friday, October 6, 2017

1100 Patrick F Taylor Hall Conference Room



Trends in Power Ultrasonic Manufacturing Processes

by **Karl Graff***

Principal Engineer - EWI, Professor Emeritus - The Ohio State University

The use of intense levels of ultrasonic energy – aka ‘power ultrasonics’ is finding increasing applications in manufacturing processes. Operating in the 20kHz to 100kHz frequency range, and at power levels of 100’s to 1000’s of Watts, expanding power ultrasonic (PU) applications include welding, additive manufacturing, the casting and forming of metals and the rapidly expanding field of ultrasonic machining (the application of PU to traditional machine tool processes). Discussion will highlight the principles of PU, including physical effects on materials, key manufacturing applications – and note several ‘green’ technologies that are emerging. Fundamental research challenges in PU processes will be identified.

* Dr. Graff obtained his BS and MS degree from Purdue University and PhD in Theoretical and Applied Mechanics from Cornell University. Dr. Graff served on the engineering faculty of The Ohio State University for many years, including serving as chair of the Department of Welding Engineering while collaborating with the renowned developer, inventor, and teacher of ultrasonics, Dr. Robert C. McMaster. Dr. Graff led the effort to found EWI and was the company’s executive director from 1987-2000. He oversaw EWI’s growth from a small startup to a world-leading organization in materials joining and allied manufacturing technologies. Since 2000, he has continued research in high power ultrasonics in transducers, soldering/brazing, welding, additive manufacturing, machining and forming. He is an authority in the field of power ultrasonics, including transducers, applications, and systems. While on the faculty at The Ohio State University, he headed the Sonic Power Laboratory for a number of years, overseeing research programs in diverse fields such as rock drilling, wire drawing, welding, metal forming, cutting, grinding and stress relief. While at OSU, he chaired the welding engineering department and led the 1984 effort to form EWI, then headed the institute through its early growth. Following his retirement in 2000, he returned to the field of PU, leading many of the developments to be discussed in the seminar.