

# DEPARTMENT OF MECHANICAL ENGINEERING

## WILLIAM MAXWELL REED SEMINAR SERIES

### “Engineered Surface Integrity from Advanced Finishing Techniques for Sustainable Products and Processes”

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Principal Engineer, OPTIS

**Abstract:** Sustainable Manufacturing is a novel approach to drive holistic and exponential value creation for all stakeholders in the modern manufacturing economy. By reducing negative environmental impacts and offering improved resource and energy efficiency, waste can be minimized while operational safety and personnel health are improved. In order to achieve these goals and address looming issues of depleting resources and rapidly changing demographics, more sustainable and efficient manufacturing processes are required. By focusing specifically on product quality and functional performance, which are greatly influenced by surface and sub-surface properties (i.e., surface integrity) induced by finishing processes, more sustainable products with improved life cycle sustainability can be created. Using an innovative approach based on leveraging size effects between finishing tools and the microstructure of components being processed, surface integrity can be engineered to achieve optimum functional performance. Moreover, control over the thermomechanical mode of deformation in finishing processes through novel cooling/lubrication strategies such as cryogenic cooling often allows for the elimination and/or substitution of less sustainable processes, thus further improving the sustainability of both products and processes. Experimental results demonstrating the validity of this unique method, as well as the presenter’s ongoing efforts in the area of developing computationally efficient predictive models of surface and sub-surface properties induced by advanced sustainable finishing processes will be presented.

**Bio:** Originally, from Hannover, Germany, Julius Schoop received his Bachelor of Arts in Chemical Physics at Centre College in Danville, KY in 2011. During his subsequent doctoral studies between 2011-2015 at the University of Kentucky’s Department of Chemical and Materials Engineering, Julius focused on cryogenic machining of porous powder metals. From 2015-2016, Dr. Schoop held a postdoctoral research associateship at the University of Kentucky’s Institute for Sustainable Manufacturing (ISM), where he worked on a variety of industrial and federally-funded research projects in the field of sustainable manufacturing processes. Dr. Schoop’s particular research expertise is in advanced sustainable finishing processes, such as cryogenic high speed turning, burnishing, polishing and shot peening. Since 2016, Julius has been working in industry as sustainable manufacturing technology development Program Manager and Principal Engineer at OPTIS (a joint venture between TechSolve and Castrol), in Cincinnati, OH.

**Date:** Wednesday, Feb. 14  
**Place:** CB 122

**Time:** 3PM  
**Contact:** Dr. Alexandre Martin 257-4462

Meet the speaker and have refreshments  
Attendance open to all interested persons