Mechanical and Aerospace Engineering Seminar

Dr. David P. Field
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Will present a talk titled:

Development and Analysis of Heterogeneous Microstructures in Polycrystalline Metals

Abstract: Severe plastic deformation techniques have been used to develop structures with fine grain sizes in an attempt to improve the resultant mechanical properties. This has subsequently led to techniques that can produce structures with gradients in grain sizes and crystallographic textures that result in improved properties, sometimes both strength and ductility are improved simultaneously. The processes employed typically involve complex flow patterns and sometimes recrystallization in either dynamic or static conditions. This presentation focuses on microstructures observed from specimens produced by various gradient producing techniques including severe shot peening, high pressure torsion, and shear assisted pipe extrusion (ShAPE forming). The microstructure evolution during these processes are complex and result in structural gradients during the forming process before the final structure is reached. Textural analysis along with crystal plasticity modeling can be used to back out the material flow during these processes by identifying the major shear planes and directions as indicated from the observed textures. Measurements using electron backscatter diffraction (EBSD) are used to demonstrate the rich structures that can be developed.

Date:: April 8, 2022
Time: 11:00 am
Location: CAMP 176
Zoom:
https://clarkson.zoom.us/j/94333678632?pwd=b25DRlY3STRkak9iNGFmMUY1UjNPZz09
Meeting ID: 943 3367 8632
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David Field is Professor and Associate Dean for Research in the Voiland College of Engineering and Architecture at Washington State University. He received his Ph.D. in Mechanical Engineering in 1991 from Yale University. From 1990 to 2000 he was employed as Sr. Engineer at Alcoa Technical Center and as Director of Technology at TexSEM Laboratories. He joined the School of Mechanical and Materials Engineering at Washington State University in August, 2000. His research interests include structure evolution in polycrystalline solid materials, anisotropy of materials, thin film and integrated circuit interconnect reliability, and advanced experimental and characterization techniques. Field is the author or co-author of about 200 technical articles and has given more than 100 invited presentations at national or international meetings, universities, and national laboratories. He is a fellow of ASM International and is the current Editor-in-Chief of Materials Characterization.