## School of Industrial Engineering

## CENTER FOR MATERIALS PROCESSING AND TRIBOLOGY DISTINGUISHED SEMINAR

# ShAPEing the Future: Novel Structural Materials via Solid State Processing

**Suveen N. Mathaudhu**[1,2]
[1]Mechanical Engineering Department / Materials Science and Engineering Program
University of California, Riverside
[2]Energy and Environment Directorate, Pacific Northwest National Laboratory

## Wednesday, February 13, 2019 – 11 AM
## Potter 234, The KS Fu Room

**Abstract**

Conventional approaches to materials manufacturing have often relied on processing within a temperature range that results in liquid phase formation of some of the constituents. These methods are often limited by the equilibrium phase formation states available from the melt. In this work we will present findings on a recently-developed processing approach that enables complex, unique microstructural evolution (often to pervasively metastable states) while remaining in the solid phase state. Specifically, the shear assisted processing and extrusion (ShAPE) method will be highlighted via a number of vignettes from various classes of structural materials. Novel microstructural pathways, textural formation and mechanical properties will be discussed. These results point to the ability to design and engineering novel materials with unprecedented properties and performance.

**Bio sketch:** Suveen Mathaudhu studies the underpinning mechanisms that will make metallic materials and composites lighter and stronger. His research interests encompass all aspects of the fundamental processing-microstructure-property-performance relationships in metallic and composite materials. Mathaudhu is a Fellow of ASM International, and the 2015 AAES Norm Augustine Award winner for Outstanding Achievement in Engineering Communication, and a 2016 NSF CAREER Awardee. He is active in several technical societies, and also an expert on the science of superheroes as depicted in comic books and their associated movies. Mathaudhu received his B.S. from Walla Walla University and Ph.D. from Texas A&M University, all in Mechanical Engineering.

**Jointly Sponsored by the School of Materials Engineering**

Additional information from S. Chandrasekar (chandy@ purdue.edu)