

## **MULTILAYER TBCs AND EBCs: INTEGRATING DESIGN AND MANUFACTURING INNOVATIONS FOR MULTIFUNCTIONAL PERFORMANCE**

Sanjay Sampath, Center for Thermal Spray Research, Stony Brook University, USA  
sanjay.sampath@stonybrook.edu

TBCs and EBCs are deposited layer by layer to achieve requisite thicknesses suggested by coating thermo-mechanical design. Vast majority of the present day coatings are produced through a common deposition parameters and as such the through thickness attributes in terms of chemistry and microstructural attributes are relatively uniform. As new threats emerge to coating performance in terms of increased thermal loads or from the environment it seems increasingly important to optimize composition and microstructure based on coating locations. This is readily achieved in plasma spray through either parametric changes or changing materials or even combination of both. Furthermore, innovations in process diagnostics/control and deposit formation dynamics allows significant new opportunities for innovation. In this presentation, such as multilayer approaches are presented. In the TBC example multilayers of different chemistries and architectures are investigated while in the case EBCs, a functionally graded strategy is invoked where in the chemistry changes are optimized insitu within the process. These manufacturing strategies can be linked to mechanics guided coating designs to offer a new generation of thermo-structural coatings.