

IIT Symposium on Sustainability and Product Development, August 7-8, 2008
Keynote Speaker: Professor I.S. Jawahir – University of Kentucky

Title: Beyond the 3R's: 6R Sustainability Concepts for Next Generation Manufacturing

Abstract:

This presentation will begin by giving a historical perspective, showing the evolution of principles and practices from lean to green to sustainable manufacturing, and will then present the new challenges for next generation manufacturing that require sustainability principles for product and process innovation to enable economic development, environmental protection and societal benefits. This presentation of these principles will also discuss total life-cycle considerations in product design and manufacture covering the effects of four life-cycle stages (pre-manufacturing, manufacturing, use and post-use). In essence, innovative sustainable manufacturing must be based on the transformation of the traditional 3Rs (reduce, reuse and recycle) concepts into 6Rs (reduce, reuse, recycle, recover, redesign, remanufacture). Societal, environmental and economic benefits of implementing sustainable product design and manufacturing will be highlighted. A summary of product and process sustainability assessment methodologies will be presented, drawn from recent case studies covering: (a) sustainability evaluation in machining processes; (b) sustainability scoring method in a consumer electronic product – laser printer; and (c) sustainability analysis in autobody design and manufacture using a total life-cycle evaluation. Finally, national and international trends in sustainable manufacturing research and applications will be outlined and scientific and technological challenges for the future will be summarized.