

Brajendra Mishra, FASM, Worcester Polytechnic Institute

Title: “Materials Regeneration for Societal Sustainability”

Abstract:

Materials are the enablers of all kinds of technologies we rely on today to support human life and happiness. With global population approaching ten billion by the middle of this century, scientific advances have to keep pace to maintain the materials availability. Metals and materials production from primary sources, such as ore, are highly energy intensive, expensive and environmentally unfriendly. Materials are non-renewable and, therefore, their supply is limited. Post-consumer as well as manufacturing wastes are valuable secondary resources. Most structural and functional materials used today, can be regenerated and put back into service at a much lower cost and energy consumption through conscious reuse, recycling and recovery programs. Most production wastes, such as mineral processing tailings, mechanical processing swarfs and solid pyrometallurgical processing effluents, as well as, post-consumer wastes from the aerospace, automotive, energy-storage and electronic industries, present tremendous opportunities to improve resource productivity. To ensure secure materials supply and attenuate supply-demand imbalance, it is of utmost importance to look at opportunities to regenerate materials from secondary sources and put them back to use. This presentation will describe the technological developments made to convert these valuable resources into functional manufactured materials for industrial applications.

Biography:

Professor Brajendra Mishra is the Kenneth G. Merriam Distinguished Professor of Mechanical & Materials Engineering, and the Director of the Metal Processing Institute at Worcester Polytechnic Institute. Prof. Mishra is also the Director of the NSF’s Industry/University Collaborative Research Center on Resource Recovery & Recycling (CR3) – the first National Center of its kind.

Prior to joining WPI, Prof. Mishra was a Professor of Corrosion and Physico-chemical Processing in Metallurgical & Materials Engineering at the Colorado School of Mines (CSM) where he also served as the Associate Director of the Kroll Institute for Extractive Metallurgy. Prior to joining CSM in 1990, Prof. Mishra served at Tata Steel in India. Prof. Mishra was the President of the Faculty Senate at CSM and served as a Distinguished Chair Professor of Chemical Engineering at the Petroleum Institute in Abu Dhabi for six months.

Prof. Mishra has authored over 600 technical publications in refereed journals and conference proceedings. He holds twelve patents and has authored/edited 23 books. Mishra received the Distinguished Service Award from the Minerals Metals & Materials Society (2010) and the highest award of Honorary Membership from the Indian Institute of Metals (2008). He served as the 2006 President of The Mineral, Metals & Materials Society (TMS) of AIME and the 2011 President of the American Institute of Mining, Metallurgical & Petroleum Engineers. Prof. Mishra received the Presidential Citation of AIME in 2015.

Brajendra Mishra’s research focuses on sustainable stewardship of earth’s resources by developing technologies to advance commercially viable metals/materials processing. He is involved in the design and development of industry-oriented methods for energy and materials sustainability, which is one of the greatest challenges in the 21st Century.

Professor Mishra believes that an institution such as Alpha Sigma Mu, is for the education, growth and nurturing of students – both undergraduates and graduates. Student involvement in research activities is the part of education that allows them to be in concert with the state-of-the art in their field of profession.