Delivering a Low Carbon Future for the Metals Industries

**THURSDAY, September 26 | 4 P.M. | HILL HALL 202**

Global demand for manufactured products continues to grow unabated. How can we reconcile this demand with the IPCC’s recommendation to cut global carbon dioxide emissions by at least 40% by 2050? In this talk, I highlight immediate opportunities for engineers to contribute to the sustainability of manufacturing by widening the boundaries of their analyses in both space and time, connecting business and consumer activities to global scale effects. Such an approach clarifies the impact of an activity, and enables identification of the technical developments or system changes that would have the largest environmental benefit. The engineer is then well placed to help analyze the new system and develop the new processes. I demonstrate the above approach across multiple scales. I examine the large material flow systems of the steel and aluminum industries (together contributing 10% of global anthropogenic carbon dioxide emissions). This analysis identifies multiple material efficiency strategies that would, if enacted, result in significant cuts to the demand for liquid metal. I discuss three of these options in detail: (1) the industry-wide potential to reuse components at product end-of-life; (2) solid state recycling technology for aluminum scrap, including the necessary deformation conditions required to produce a strong bond; (3) increased product end-of-life recycling in the face of increased scrap contamination and changing demand. Finally, I discuss the need for engineers to collaborate with experts from other disciplines in order to produce an informed analysis of the whole picture of sustainability.