Purdue School of Materials Engineering and Purdue Center for Metal Casting Research

Present:

Peter G. Winchell Distinguished Lecture Series Keynote Speaker Seminar

Date: Friday, April 12, 2013
Time: 3:30 Refreshments
3:45 Seminar
Place: ARMS 1010

PURDUE MATERIALS ENGINEERING

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Solidification: from Dendrites to Castings

ABSTRACT

Solidification is not only of great interest to producers of metal castings but continues to attract a great deal of research attention in materials science and engineering. This seminar provides an overview of how solidification and transport processes at various length scales interact and affect the quality of castings. Dendrites dominate the structure of castings at a microscopic scale. Closely controlled experiments and computer simulations have only recently enabled the prediction of the evolution of dendritic patterns during solidification. The formation of grain structures in metal castings, such as the columnar-to-equiaxed transition, is a topic that is treated at an intermediate scale with the aid of in-situ x-ray video microscopy and simulation. At the macroscopic scale, heat transfer and convection control solidification, and x-ray computed tomography has provided much insight into the formation of defects in castings. The interplay of all of these phenomena is emphasized throughout the seminar.

SHORT BIO

Dr. Beckermann received his M.S. and Ph.D. degrees in Mechanical Engineering from Purdue University in 1984 and 1987, respectively. He has since been a faculty member in the Department of Mechanical and Industrial Engineering at the University of Iowa (UI), where he currently holds a UI Foundation Distinguished Professorship. His research interests are in the area of solidification and metal casting. Dr. Beckermann has co-authored 130 journal articles that have been cited more than 4,500 times in the literature (h-index: 36). His awards include a 1989 National Science Foundation Presidential Young Investigator Award, the 2009 Sir Humphrey Davy Scientific Merit Award from the American Foundry Society, the 2009 Thomas E. Barlow Award of Honor from the Steel Founders Society of America, the 2010 Bruce Chalmers Award from The Minerals, Metals and Materials Society (TMS), and the 2011 UI College of Engineering Faculty Excellence Award for Research. He is a Fellow of the American Society of Mechanical Engineers (ASME) and a Life Member of TMS.

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