Materials Science & Engineering Seminar Series

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presents

Multiphase Reacting Flow in the Blast Furnace

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ABSTRACT:
The blast furnace is a critical component of the industrial ironmaking process in integrated steel mills. As a counter-current chemical reactor containing three phase flow (gas, liquid, and solid), the modern blast furnace is an incredibly complex process requiring advanced analysis technologies and control systems to maintain efficient operation. Since the process is also relatively mature, improvements to the technology require a better understanding of phenomena within the blast furnace, including heat transfer, mass transfer, chemical reactions, and multiphase flow. Towards this end, computational simulation and visualization technologies have been applied to study blast furnace phenomena such as iron ore reduction, coke and injected fuel combustion, and cohesive zone formation and position. The Center for Innovation through Visualization and Simulation (CIVS) at Purdue University Northwest (PNW) has developed state-of-the-art models for simulating phenomena within the blast furnace using computational fluid dynamics (CFD) and applied these models for design, optimization, and troubleshooting at real-world industry blast furnaces across North America.

BIOGRAPHY: Dr. Tyamo Okosun is a Senior Research Engineer at Purdue University Northwest's Center for Innovation through Visualization and Simulation (CIVS). He has a Ph.D. in mechanical engineering from Purdue University, and his current research focuses on computational modeling of iron and steelmaking processes. He serves as a team leader for blast furnace and reheat furnace research at the Steel Manufacturing Simulation and Visualization Consortium (SMSVC), mentoring several graduate and undergraduate students. His published research on combustion and fuel injection in the blast furnace has received multiple best paper awards, including the AIST Josef S. Kapitan award and the AIST AIME Hunt-Kelly award.

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