

Department of Materials Science & Engineering Indian Institute of Technology, Kanpur



An in-house workshop on Modelling of steelmaking processes February 16th, 2019 @FB421

During the last half a century (1969-2019), physical and mathematical modelling has made a firm footing in the arena of steelmaking process analysis and design. Modelling of steelmaking processes entails multi-physics and this inherently necessitates simulation of a variety of co-existing phenomena, necessitating in turn, simultaneous solution of a large number of non-linear, coupled partial differential equations (PDE's). The task is inherently complex and indeed challenging. Understanding of steelmaking process and associated fundamentals therefore assume key importance in any modelling effort. Often a synergistic approach combining physical and mathematical modelling, supported by plant scale measurements, is needed to fully exploit the potential of mathematical modelling as a powerful process analysis tool. The workshop aims to highlight and review the fundamentals of mathematical modelling and discuss applications by several, globally acclaimed, steelmaking process modellers.

Programme (Saturday, 16th February, 2019)

Welcome address : 9.30-9.40 am		
Speakers	Title of presentation	Time
Prof. Dipak Mazumdar, IIT Kanpur	<i>Essentials of modelling of steelmaking processes</i>	9.40-10.25
Prof. Rodolfo Morales, IPN, Mexico	<i>Multiphase flows in steelmaking and casting</i>	10.25-11.10
Prof. Kinnor Chattopadhyay, University of Toronto, Toronto, Canada	<i>Modelling and plant scale measurements in steelmaking and casting</i>	11.10-11.55
Prof. Amarendra Kumar Singh, IIT Kanpur	<i>Integrated modelling of ladle, tundish and caster for quality cast product</i>	11.55-12.40
Lunch : 12-45-2.15 pm (VH)		
Dr. Bikram Konar, University of Toronto, Toronto, Canada	<i>Mould flux design in continuous casting</i>	3.00-3.30
Mr. Prince Kumar Singh, IIT Kanpur	<i>Ladle to tundish transfer: An insight of steel –argon flow in a ladle shroud</i>	3.30-4.00
Mr. Ali Asgarian, University of Toronto, Toronto, Canada	<i>Modeling of atomization of steel and production of steel powders</i>	4.00-4.30
Discussion and Q & A		4.30-5.15
Coffee: 5.30 pm		

SPEAKERS



Rodolfo Morales is currently a Visiting Professor at the University of Toronto, Department of Materials Science, Toronto, Canada. A Professor at the Instituto Politecnico Nacional, Mexico, he is also the President of K&E Technologies, developing about 70% of the flow control systems in the North America Industry. He is renowned personality in the field of process modeling and simulation of metallurgical processes and supervised more than 25 PhD and 35 MSc Theses.



Kinnor Chattopadhyay is a Professor at the University of Toronto and a technical consultant, and has 10 years of experience in process metallurgy. Kinnor is currently teaching process simulation and design, iron and steel processing, and developing a course on sustainability and strategy in mining and metals. His research includes physical and mathematical modelling of metallurgical processes.



Amarendra Kumar Singh worked with Tata consultancy Services (TCS) for over two decades before joining IIT Kanpur in 2014. He is currently a Professor in the department of Materials Science and Engineering at the Indian Institute of Technology, Kanpur. He is currently engaged in additive manufacturing research, intelligent modelling and CFD. Professor Singh is a fellow of the Indian Institute of Metals.



Dipak Mazumdar is a Professor at Indian Institute of Technology, Kanpur and currently holds the Ministry of Steel Chair. He has been teaching at IIT Kanpur for more than three decades subjects such as Transport phenomena in metal processing, Process Modelling and iron and steelmaking. He also works as a consultant for more than a dozen steel and refractory industries in the country.



Bikram Konar is a postdoctoral researcher at University of Toronto, working on parameterization and optimization of fluid flow in the continuous casting mold. He holds a doctoral degree from McGill and is an active member of American Iron and Steel Technology (AISTech) foundation, American Ceramic Society and CALPHAD.



Ali Asgarian is pursuing his PhD at the University of Toronto. His research focuses on physical and mathematical modelling of atomization process for metal powder production. He is also an active licensed professional engineer in Ontario, Canada with more than 10 years of professional experience spanning across a number of well-known global organizations including HATCH Ltd. and AMEC.



Prince Kumar Singh is pursuing PhD at Materials Science and Engineering Department, Indian Institute of Technology, Kanpur. He is working on physical and mathematical modelling of multiphase flow inside ladle shroud during transfer of molten steel from ladle to tundish.

Prof. Dipak Mazumdar is coordinating the workshop. He can be contacted at 9415134718 or an e-mail can be sent to: dipak@iitk.ac.in.