



August 24-28, 2015
 Hyatt Regency Louisville
 Louisville, KY

Preliminary Program Agenda

Monday, August 24	
7:00 a.m.–5:15 p.m.	Registration
8:00 a.m.–8:25 a.m.	Opening Remarks and Welcome
8:25 a.m.–9:25 a.m.	An Industry View on the Need for Simulation Tools
9:25 a.m.–9:40 a.m.	Break
9:40 a.m.–10:40 a.m.	An Introduction to the Physics of AM Technologies
10:40 a.m.–12:10 p.m.	A General Introduction to Laser-Matter Interactions with Particular Focus on Laser based Additive Manufacturing
12:10 p.m.–1:00 p.m.	Lunch (provided)
1:00 p.m.–2:30 p.m.	A General Introduction to Electron-Matter Interactions with Particular Focus on Electron Beam based Additive Manufacturing
2:30 p.m.–3:15 p.m.	Motivation for ‘Finite Media’ Based Numerical Strategies -Thoughts on Boundary Value Problems
3:15 p.m.–3:30 p.m.	Break
3:30 p.m.–4:15 p.m.	Motivation for ‘Finite Media’ Based Numerical Strategies -Thoughts on Boundary Value Problems, Continued
4:15 p.m.–5:15 p.m.	Motivation for ‘Finite Media’ based numerical strategies in Additive Manufacturing-Thoughts on Geometry and BVPs
Tuesday, August 25	
7:00 a.m.–4:30 p.m.	Registration
8:00 a.m.–9:30 p.m.	Multi-scale Microstructural Characterization of Metallic Parts Fabricated Using Additive Manufacturing
9:30 a.m.–9:45 a.m.	Break
9:45 a.m.–11:15 a.m.	Multi-scale Microstructural Characterization of Metallic Parts Fabricated Using Additive Manufacturing, Continued
11:15 a.m.–12:15 p.m.	Motivation for ‘Multi-scaling’ in ‘Finite Media’ Based Numerical Strategies a. Energy Source Multi-scaling b. Material Multi-scaling c. Geometrical Multi-scaling
12:15 p.m.–1:00 p.m.	Lunch (provided)

1:00 p.m.–3:00 p.m.	Formulation and Implementation of Simple 1D, 2D, and 3D Problems Using Finite Element Methods a. Weak Form Formulation b. Boundary Condition Insertion c. One Element Stiffness Matrix d. Assembly Stiffness Matrices e. Solution
3:00 p.m.–3:15 p.m.	Break
3:15 p.m.–4:15 p.m.	Formulation and Implementation of Simple 1D, 2D, and 3D Problems Using Finite Element Methods, Continued
Wednesday, August 26	
7:00 a.m.–3:30 p.m.	Registration
8:00 a.m.–9:00 a.m.	Formulation and Implementation of a Multi-scale 3D Problem Using Finite Element Methods with No Non-linearity
9:00 a.m.–10:00 a.m.	Formulation and Implementation of Multi-scale 3D Additive Manufacturing Problems Using Finite Element Methods with Geometric and Material Non-linearities
10:00 a.m.–10:15 a.m.	Break
10:15 a.m.–11:30 a.m.	Formulation and Implementation of Multi-scale 3D Additive Manufacturing Problems Using Finite Element Methods with Geometric and Material Non-linearities, Continued
11:30 a.m.–12:30 p.m.	Lunch (provided)
12:30 p.m.–3:00 p.m.	Thermodynamics and Kinetics of Phase Evolutions in Additively Manufactured Parts Fabricated Using Metal Melting Based Additive Manufacturing
2:00 p.m.–3:00 p.m.	Question and Answer, Group Discussion Time
3:00 p.m.–3:30 p.m.	Break
3:30 p.m.	Board Bus at Hyatt Regency and Depart for Tour
4:00 p.m.–5:30 p.m.	Tour of Rapid Prototyping Center at University of Louisville
5:30 p.m.–6:00 p.m.	Board Bus and Return to Hyatt Regency
Thursday, August 27	
7:00 a.m.–5:30 p.m.	Registration
8:00 a.m.–9:00 a.m.	Solidification of Physics Primer
9:00 a.m.–9:45 a.m.	Grain Morphology Simulations
9:45 a.m.–10:00 a.m.	Break
10:00 a.m.–11:00 a.m.	Effect of Alloying Elements in Determination of Melt Pool Characteristics
11:00 a.m.–12:30 p.m.	Neutron Diffraction: Experiments and Simulation of Residual Stresses in Welds and Directed Metal Deposition Processes
12:30 p.m.–1:30 p.m.	Lunch (provided)

1:30 p.m.–3:00 p.m.	Powder Bed Simulation Commercial Software Demonstration
3:00 p.m.–3:15 p.m.	Break
3:15 p.m.–4:45 p.m.	Directed Metal Deposition Simulation Commercial Software Demonstration
4:45 p.m.–5:00 p.m.	Question and Answer Period
6:00 p.m.–9:00 p.m.	Graduation Dinner
Friday, August 28	
7:00 a.m.–12:00 p.m.	Registration
8:00 a.m.–9:30 a.m.	Finite Element Modeling of Laser based Direct Metal Deposition Processes
9:30 a.m.–9:45 a.m.	Break
9:45 a.m.–11:15 a.m.	Finite Element Modeling of Electron Beam Melting Processes
11:15 a.m.–12:00 p.m.	Closing Remarks
12:00 p.m.	Course Concludes