Tuesday, August 9, 2016 – Waterfront Place Hotel

7:00 – 8:00 AM   **Registration**
Continental Breakfast

8:00 – 8:05 AM   **Welcome and Introduction**
William Rogers, Multiphase Flow Science Team
U.S. Department of Energy, National Energy Technology Laboratory

8:05 – 8:20 AM   **NETL Multiphase Flow Research Overview**
William Rogers, Multiphase Flow Science Team
U.S. Department of Energy, National Energy Technology Laboratory

<u>Session Chair – William Rogers</u>

8:20 – 9:00 AM   **Keynote Presentation: Multiphase CFD Modelling at CSIRO**
Peter Witt[1], Yuqing Feng[1], Qinggong Wang[1, 2], Jon Boulanger[1], [1]CSIRO
Mineral Resources, [2]Tsinghua University

9:00 – 9:20 AM   **Conversion of Petroleum Coke in a High-Pressure Entrained-Flow Gasifier: Comparison of CFD Model and Experiment**
Allan Runstedtler, Robert Yandon, Marc Duchesne, Robin Hughes, Patrick Boisvert, Natural Resources Canada, CanmetENERGY

9:20 – 9:40 AM   **Solids Mixing in Bubbling Fluidized Beds: CFD-Based Analysis**
Akhilesh Bakshi[1], Christos Altantzis[1, 2], Ahmed F. Ghoniem[1]
[1]Massachusetts Institute of Technology, [2]National Energy Technology Laboratory

9:40 – 10:10 AM   **Break**

10:10 – 10:30 AM   **Numerical Simulation of Coal Gasification in a Counterflow Fluidized Bed Reactor**
Ronak Ghandriz and M. Reza H. Sheikhi
Mechanical and Industrial Engineering Department, Northeastern University

10:30 – 10:50 AM   **Numerical Investigation of Microscale Phenomena in a Multiphase Packed Bed Reactor**
Yongsheng Lian
Mechanical Engineering Department, University of Louisville

10:50 – 11:10 AM   **A Baseline Drag Force Correlation for CFD Simulation of Gas-Solid Systems**
James M. Parker, CPFD Software, LLC

11:10 – 11:30 AM **Simulation and Experimental Study on Dual Dense Medium Fluidization Features of Air Dense Medium Fluidized Bed**
Cheng Sheng[1, 2], Yuemin Zhao[1], Chenlong Duan[1]
[1]Key Laboratory of Coal Processing and Efficient Utilization China, University of Mining and Technology, [2]Forschungszentrum Jülich

11:30 – 11:50 AM **Speeding Up of Gas-Particle Flow Simulations Using Non-Iterative Time Advancement (NITA) Solver**
Shailesh Ozarkar, Sergio Vasquez-Malebran, and Jay Sanyal, ANSYS

11:50 AM – 12:10 PM **Evaluate Mass Transfer Rate of Moving Objects within Fluid Using Immersed Boundary Method**
Chenguang Zhang[1], Chunliang Wu[2], Krishnaswamy Nandakumar[1]
[1]Department of Chemical Engineering, Louisiana State University, [2]Saudi Arabia Basic Industries Corporation Americas

12:10 – 1:10 PM **Lunch**

1:10 – 1:20 PM **Reconvene and Afternoon Introduction**

<u>**Session Chair – William Rogers**</u>

1:20 – 1:40 PM **Computational and Experimental Study of Gas-Liquid Fluid Flows through Flow Cells**
G. Ahmadi,[1,2] W. Zhang,[1] A. Abdollahi Mofakham,[2] K. Jarvis,[1] D. Crandall,[1] G. Bromhal[1], [1]National Energy Technology Laboratory, [2]Department of Mechanical and Aeronautical Engineering, Clarkson University

1:40 – 2:00 PM **Three Dimensional VOF Simulations for Wetting of Corrugated Sheet**
Rajesh K. Singh[1,2] and Janine E. Galvin[1], [1]National Energy Technology Laboratory, [2]Oak Ridge Institute for Science and Education

2:00 – 2:20 PM **Computational Modeling of Fluid and Particle Flows in Rock Fractures**
Goodarz Ahmadi[1,2,3], Amir Abdollahi Mofakham[1], Matt Stadelman[2,3], Kevin Shanley[3,4], D. Crandall[2],[1]Department of Mechanical and Aeronautical Engineering, Clarkson University, [2]National Energy Technology Laboratory,[3]Oak Ridge Institute for Science Education

2:20 – 2:40 PM **Data-Driven Smart CFD Proxy: Fast and Accurate Proxy of Multiphase CFD with Big Data Analytics**
Shahab D. Mohaghegh[1, 2], Mehrdad Shahnam[3], Amir Ansari[1], Ali Takbiri[1], and Ebrahim Fathi[1], [1]West Virginia University, [2]Intelligent Solutions, Inc., [3]NETL

2:40 – 3:00 PM	**MFIX-DEM Phi: Performance and Capability Improvements Towards Industrial Grade Open-Source CFD-DEM Simulation Framework with Integrated and Easy-To-Use Uncertainty Quantification Capabilities** *Yang Jiao[1], Aytekin Gel[2], Heather Emady[1], Shaohua Chen[1], Manogna Adepu[1], Charles Tong[3], Jonathan Hu[4],* [1]School for Engineering of Matter, Transport and Energy, Arizona State University,[2]School of Computing, Informatics and Decision Systems Engineering, Arizona State University, [3]Lawrence Livermore National Laboratory, [4]Sandia National Laboratory
3:00 – 3:20 PM	**Discretization Error Estimation for Two-Fluid Models of Gas-Solid Flows** *Ismail B. Celik[1,2], Zhiyuan Ma[1], Sofiane Benyahia[2], Sai S. Guda[1], Madhava Syamlal[2] ,* [1]Mechanical and Aerospace Engineering Department, West Virginia University, [2]NETL
3:20 – 3:50 PM	**Break**
3:50 – 4:10 PM	**Development of Real-Time Velocimetry Imaging Using Capacitive Sensors** *Qussai Marashdeh[1], Fernando Teixeira[2], Naim Chowdhury[2],* [1]Tech4Imaging, LLC, [2]The Ohio State University
4:10 – 4:30 PM	**Computational Study of the Bubbling-to-Slugging Transition in a Laboratory-Scale fluidized Bed** *Emilio Ramirez[1,2], Charles E.A. Finney[1], Sreekanth Pannala[3], C. Stuart Daw[1], Jack Halow[4], Qingang Xiong[5],* [1]Oak Ridge National Laboratory, [2]University of Tennessee, [3]Saudi Arabia Basic Industries Corporation Americas, [4]Separation Design Group, [5]Fiat Chrysler Automobiles US LLC
4:30 – 4:50 PM	**Recent Insights on Disperse Multiphase Turbulence Modeling** *Jesse Capecelatro[1],Olivier Desjardins[2], and Rodney Fox[3],* [1]University of Michigan, [2]Cornell University, [3]Iowa State University
4:50 – 5:10 PM	**Generic Framework for Modeling Radiative Heat Transfer in Gas-Solid Reacting Flows** *Jian Cai,* Department of Mechanical Engineering, University of Wyoming
5:10 – 5:30 PM	**Simulating Gas-Particle Flows Across All Flow Regimes in an Euler-Euler Framework** *Bo Kong[1] and Rodney O. Fox[1,2],* [1]Ames Laboratory, [2]Department of Biological and Chemical Engineering, Iowa State University

Wednesday, August 10, 2015 – Waterfront Place Hotel

7:00 – 8:00 AM   **Continental Breakfast**

8:00 – 8:10 AM   **Reconvene and Introduction**

<u>**Session Chair – William Rogers**</u>

8:10 – 8:50 AM   **Keynote Presentation: High Pressure Oxy-Fluid Bed Combustion Technology Development at CanmetENERGY**
Robin Hughes, Natural Resources Canada

8:50 – 9:10 AM   **Bubble Frequency Determination and Analysis Using Optical Fibre Technique**
Sachin Parikh [1,2] and R Sengupta [1]
[1]Department of Chemical Engineering, The M.S. University of Baroda, [2]Department of Chemical Engineering, V. V. P. Engineering College

9:10 – 9:30 AM   **Experimental Study on the Effects of Cone Angle and Gas Inlet Diameter on the Minimum Spouting Velocity in Conical Spouted Beds**
Ronald Breault[1], Steven Rowan[1,2], Jerome Raque III[1,2], [1]National Energy Technology Laboratory, [2]Oak Ridge Institute for Science and Education

9:30 – 9:50 AM   **A Method to Determine Bubble Size Distributions with Magnetic Particle Tracking**
Jack Halow, Separation Design Group

9:50 – 10:20 AM   **Break**

10:20 – 10: 40 AM   **Multiphase Flow Research on the International Space Station**
Brian J. Motil and John B. McQuillen, NASA

10:40 – 11:00 AM   **Enhancement of MFiX DEM for Industry-Relevant Flows**
Peiyuan Liu[1], Hariswaran Sitaraman[2], Timothy Brown[3], William D. Fullmer[1], Ray Grout[2], Thomas Hauser[3] and Christine M. Hrenya[1]
[1]Department of Chemical and Biological Engineering, University of Colorado, [2]Computational Sciences Center, National Renewable Energy Laboratory, [3]Research Computing, University of Colorado

11:00 – 11:20 AM   **Endeavors to Improve Coarse Grained CFD-DEM Simulations Using Representative Particle Model**
Husam Elghannaya[1], Kuahai Yub[2], and Danesh Tafti[1], [1]Department of Mechanical Engineering, Virginia Polytechnic Institute and State University, [2]Department of Engineering Mechanics, Henan University of Science and Technology

11:20 – 11:40 AM **Particles Climbing Along a Vibrating Tube: Numerical Simulation using the Discrete Element Method (DEM)**
Yupeng Xu[1,2], Jordan Musser[1], Tingwen Li[1,3], William A. Rogers[1], [1]National Energy Technology Laboratory, [2]Oak Ridge Institute for Science and Education, [3]AECOM

11:40 – 12:00 PM **Implementation of Physics Based Hard Sphere Collision Model for Particulate Flow Systems**
Husam Elghannaya[1], Kuahai Yub[2], and Danesh Tafti[1], [1]Department of Mechanical Engineering, Virginia Polytechnic Institute and State University, [2]Department of Engineering Mechanics, Henan University of Science and Technology

12:00 – 1:00 PM **Lunch**

Session Chair – Tingwen Li

1:00 – 1:10 PM **Reconvene and Afternoon Introduction**

1:10 – 1:30 PM **CPFD Analysis of a Vortexing Bed Riser System**
Michael Bobek[1, 2], Ron Breault[1], [1] National Energy Technology Laboratory, [2]Oak Ridge Institute for Science and Education

1:30 – 1:50 PM **Coarse Grained Particle Method for Simulation of Liquid-Solids Reacting Flow**
Liqiang Lu[1, 2], Kisoo Yoo[1, 2], Sofiane Benyahia[1], [1]National Energy Technology Laboratory, [2]Oak Ridge Institute for Science and Education

1:50 – 2:10 PM **L-Valve Investigation for Chemical Looping Reactor Implementation**
Richard C. Stehle,[1,2] Ronald W. Breault[1], Frank Shaffer[1], Jared Charley[1,3], [1] National Energy Technology Laboratory, [2]Oak Ridge Institute for Science and Education, [3]AECOM

2:10 – 2:30 PM **Microwave Doppler Sensing of Sliding or Intermittent Particle Flows**
B.T. Chorpening[1],Michael Spencer[1,3], Richard C. Stehle[1,3], Jared Charley[1,2] and D.W. Greve[4], [1]National Energy Technology Laboratory, [2]URS Corporation, [3]Oak Ridge Institute of Science and Engineering, [4]Department of Electrical and Computer Engineering, Carnegie Mellon University

2:30 – 2:50 PM **MFiX integrated with Trilinos for High Fidelity Multiphase Flow Simulations**
V M K Kotteda[1], A Chattopadhyay[1], Vinod Kumar[1], W Spotz[2], [1]University of Texas El Paso, [2]Sandia National Laboratories

2:50 – 3:10 PM   **Momentum transfer in Multiphase Flow with Non-spherical Particles**
Long He and Danesh Tafti, Department of Mechanical Engineering,
Virginia Polytechnic Institute and State University

3:10 – 3:20 PM   **Meeting Wrap Up**

Posters

MFIX-DEM Phi: Performance and Capability Improvements Towards Industrial Grade Open-Source DEM Simulation Framework with Integrated and Easy-To-Use Uncertainty Quantification Analysis
Shaohua Chen[1], Manogna Adepu[1],O. Mor[1], N. Ellingwood[4] , Aytekin Gel[2], Heather Emady[1], Yang Jiao[1], Charles Tong[3], Jonathan Hu[4], [1]School for Engineering of Matter, Transport and Energy, Arizona State University,[2]School of Computing, Informatics and Decision Systems Engineering, Arizona State University, [3]Lawrence Livermore National Laboratory, [4]Sandia National Laboratory