

Indo-German Symposium on

Advanced Measurements and Multiscale CFD Simulations for Intensification of Multiphase Flow Processes

03-05 October 2018

Senate Hall (Main Building), IIT Delhi

Organized by

Department of Chemical Engineering
Indian Institute of Technology Delhi

as a part of

Indo-German Partnership (IGP) project between IIT Delhi and FAU
Erlangen

Multiscale Modeling, Simulation and Optimization for Energy,
Advanced Materials and Manufacturing



IIT Delhi



FAU-Erlangen

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About the symposium

The Indo-German Symposium on “Advanced Measurements and Multiscale CFD Simulations for Intensification of Multiphase Flow Processes” is being organized as a part of the ongoing Indo-German Partnership (IGP) project between Indian Institute of Technology (IIT) Delhi and Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany (FAU-Erlangen). Multiphase flow processes are widely used in upstream oil and gas industry, oil refining, energy/power generation, chemical process industry, fine chemicals and pharmaceuticals, biochemical, mineral processing and metallurgical, and nuclear applications. With increasing demands for the development of environmentally benign, energy efficient and safer processes involving multiphase flow processes accompanied with transport phenomena and chemical reactions, it has become increasingly important to characterize multiphase flow processes through advanced flow characterization techniques and to develop multiscale computational models to simulate complex multiphase flow processes. The present Indo-German Symposium is planned to discuss recent advances in experimental characterization of multiphase flows, development of computational methods to simulate multiscale multiphase flow processes i.e. from industrial-scales to the scales of individual bubbles/drops/particles and their applications to intensify industrial processes.

Objectives

- To bring together researchers from IIT Delhi, FAU-Erlangen, other IITs, other academic institutes, research laboratories, and industry professional/practicing engineers working on research & development, applications of multiphase flow processes.
- To discuss advances in experimental characterization of multiphase flow processes, development of computational models for multiscale simulations, process intensification, development of novel/intensified reactors.

Scientific program

Day 1: 03 October 2018 (Wednesday)

08.15-09.00 AM Registration (Dogra hall foyer)

09.00-09.30 AM Inauguration

- Prof. M. Balakrishnan (Deputy Director, Strategy & Planning, IIT Delhi)
 - Prof. K. K. Pant (Head, Dept. of Chem. Eng., IIT Delhi)
 - Prof. Dr. Ulrich Ruede, Institute of System Simulation, FAU Erlangen, Germany
 - Prof. Dr. Thorsten Poeschel, Institute of Multiscale Simulation, FAU Erlangen, Germany
 - Prof. Shantanu Roy, Dept. of Chem. Eng., IIT Delhi
 - Prof. Vivek Buwa, Dept. of Chem. Eng., IIT Delhi
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09.30-10.15 AM	Plenary Lecture-1 FACILITATING PROCESS INTENSIFICATION THROUGH DIRECT NUMERICAL SOLUTIONS <i>Prof. J. B. Joshi, Homi Bhabha National Institute, Mumbai</i>
10.15-11.00 AM	Plenary Lecture-2 MULTIPHASE FLOWS IN MICROFLUIDICS: INSIGHTS OBTAINED FROM ANALYTICAL APPROACHES <i>Prof. S. Pushpavanam, Dept. of Chem. Eng., IIT Madras</i>
11.00-11.30 AM	Tea break (Dogra hall foyer)
	Advanced Experimental Characterization
11.30-12.00 NOON	RADIOACTIVE PARTICLE TRACKING TECHNIQUE AND ITS APPLICATION TO DIFFERENT MULTIPHASE FLOW REACTORS <i>Prof. Rajesh Upadhyay, Dept. of Chem. Eng., IIT Guwahati</i>
12.00-12.30 PM	APPLICATION OF GAMMA-RAY DENSITOMETRY FOR VOID FRACTION MEASUREMENT IN MULTIPHASE REACTORS <i>Dr. Ashutosh Yadav, BPCL R&D Centre, Greater Noida</i>
12.30-01.00 PM	MULTIPHASE CFD MODELING OF MINERAL SEPARATORS PERFORMANCE: VALIDATION AGAINST IMAGING AND TOMOGRAPHY <i>Prof. M. Narasimha, Dept. of Chem. Eng., IIT Hyderabad</i>
01.00-02.00 PM	Lunch break (Dogra hall foyer)
02:00-02.45 PM	Plenary Lecture-3 MULTIPHASE CFD SIMULATIONS OF CAVITATING VENTURI <i>Prof. A. B. Pandit, Dept. of Chem. Eng., ICT Mumbai</i>
02.45-03.15 PM	RADIOTRACER METHODS, CFD AND SCALE-UP <i>Prof. Shantanu Roy, Dept. of Chem. Eng., IIT Delhi</i>
03.15-03.45 PM	ADVANCED VISUALIZATION TECHNIQUES AND THEIR INDUSTRIAL APPLICATIONS <i>Dr. Sagar Deshpande, Pulp and Fiber Innovation Center, Grasim Industries Ltd., Mumbai</i>
03.45-04.15 PM	Tea break (Dogra hall foyer)
04.15-04.30 PM	Group photograph (Photo-point, next to the Security Control Room)
	Reactor-Scale Simulations & Industrial Applications
04.30-05.00 PM	CFD STUDIES ON FLOW MODULATION IN TRICKLE BEDS: PRESENT STATUS AND CHALLENGES <i>Prof. Arnab Atta, Dept. of Chem. Eng., IIT Kharagpur</i>
05.00-05.30 PM	MULTIPHASE MODELING OF ATOMIZATION PROCESS INSIDE CARBON BLACK REACTOR <i>Dr. Manoj Kandakure, Aditya Birla Science and Technology Co. Pvt. Ltd, Talaja, Navi Mumbai</i>
05.30-06.00 PM	MULTIPHASE CFD APPLICATIONS IN OIL AND GAS INDUSTRY <i>Dr. Kaustubh Mujumdar, Toyo Engineering India Pvt. Ltd., Mumbai</i>

Day 2: 04 October 2018 (Thursday)

08.30-09.00AM	Registration (Dogra hall foyer)
09.00-09.45 AM	Plenary Lecture-4 DYNAMICS OF VAPOR BUBBLES IN FILM AND NUCLEATE BOILING <i>Prof. Gautam Biswas, IIT Guwahati</i>
	Bubbles and Drops
09.45-10.15 AM	FLUID DYNAMICS OF A BUBBLE/DROPLET <i>Prof. Kirti Chandra Sahu, Dept. of Chem. Eng., IIT Hyderabad</i>
10.15-10.45 AM	COUPLED LEVEL SET AND VOLUME OF FLUID METHOD FOR THE DIRECT NUMERICAL SIMULATION OF TWO-PHASE FLOWS <i>Prof. B. Premachandran, Dept. of Mech. Eng., IIT Delhi</i>
10.45-11.15 AM	Tea break (Dogra hall foyer)
11.15-11.45 AM	DIFFERENT REGIMES OF DROP IMPACT ON LIQUID: A NUMERICAL JOURNEY <i>Prof. Bahni Ray, Dept. of Mech. Eng., IIT Delhi</i>
	Discrete Particle Methods
11.45-12.15 PM	UNIQUENESS OF SMOOTHED PARTICLE HYDRODYNAMICS TECHNIQUE WHILE HANDLING BREAKING AND MAKING INTERFACES <i>Prof. Arup Kumar Das, Dept. of Mech. Eng., IIT Roorkee</i>
12.15-12.45 PM	LATTICE BOLTZMANN SIMULATIONS OF FLOW REGIME TRANSITION IN T-JUNCTION MICROFLUIDIC DEVICES <i>Prof. Amit Gupta, Dept. of Mech. Eng., IIT Delhi</i>
12.45-01.45 PM	Lunch break (Dogra hall foyer)
01:45-02.30 PM	Plenary Lecture-5 FULLY RESOLVED SIMULATION OF SUSPENSIONS – POTENTIAL AND LIMITATIONS <i>Prof. Dr. U. Ruede, Institute of System Simulation, FAU Erlangen, Germany</i>
02.30-03.15 PM	Plenary Lecture-6 COLLECTIVE BEHAVIOR AND SELF-ORGANIZATION OF ACTIVE GRANULAR PARTICLES <i>Prof. Dr. Thorsten Poeschel, Institute of Multiscale Simulation, FAU Erlangen, Germany</i>
03.15-03.45 PM	CHARACTERIZATION OF PACKED BEDS SIMULATED USING SEQUENTIAL BALLISTIC DEPOSITION <i>Dr. Prapanch Nair, Institute of Multiscale Simulation, FAU Erlangen, Germany</i>
03.45-04.15 PM	Tea break (Dogra hall foyer)
04.15-04.30 PM	Group photograph (Photo-point, next to the Security Control Room)

Industrial Applications

04.30-05.00 PM CFD MODEL OF A SLURRY BUBBLE COLUMN REACTOR (SBCR) FOR HYDROCRACKING OF HEAVY HYDROCARBONS
*Dr. Ganesh Samdani, Honeywell India Technology centre (HITC)
Honeywell UOP, Gurgaon*

05.00-05.30 PM GAS-SOLID AND LIQUID-SOLID FLOWS: THEORY AND INDUSTRIAL APPLICATIONS
Dr. Prashant Gunjal, Reliance Industries Ltd., Navi Mumbai

Day 3: 05 October 2018 (Friday)

08.30-09.00 AM Registration (Dogra hall foyer)

Micro-Fluidics and Micro-Reactors

09.00-09.45 AM **Plenary Lecture-6**
MULTIPHASE MICROFLUIDICS
Prof. Suman Chakraborty, Dept. of Mech. Eng., IIT Kharagpur

09.45-10.15 AM MASSIVELY PARALLEL SIMULATIONS OF PARTICULATE ELECTROKINETIC MICRO-FLUID FLOWS
Dr. Dominik Bartuschat, Institute of System Simulation, FAU Erlangen, Germany

10.15-10.45 AM FLOW DISTRIBUTION IN NETWORK OF MICROCHANNELS
Dr. Amol Kulkarni, Chemical Engineering Division, NCL Pune

10.45-11.15 AM Tea break (Dogra hall foyer)

11.15-11.45 AM MULTISCALE MODEL FOR HETEROGENEOUS CATALYSIS IN OPEN-CELL METAL FOAM STRUCTURES
Mr. Sebastian Mühlbauer, Institute of Multiscale Simulation, FAU Erlangen, Germany

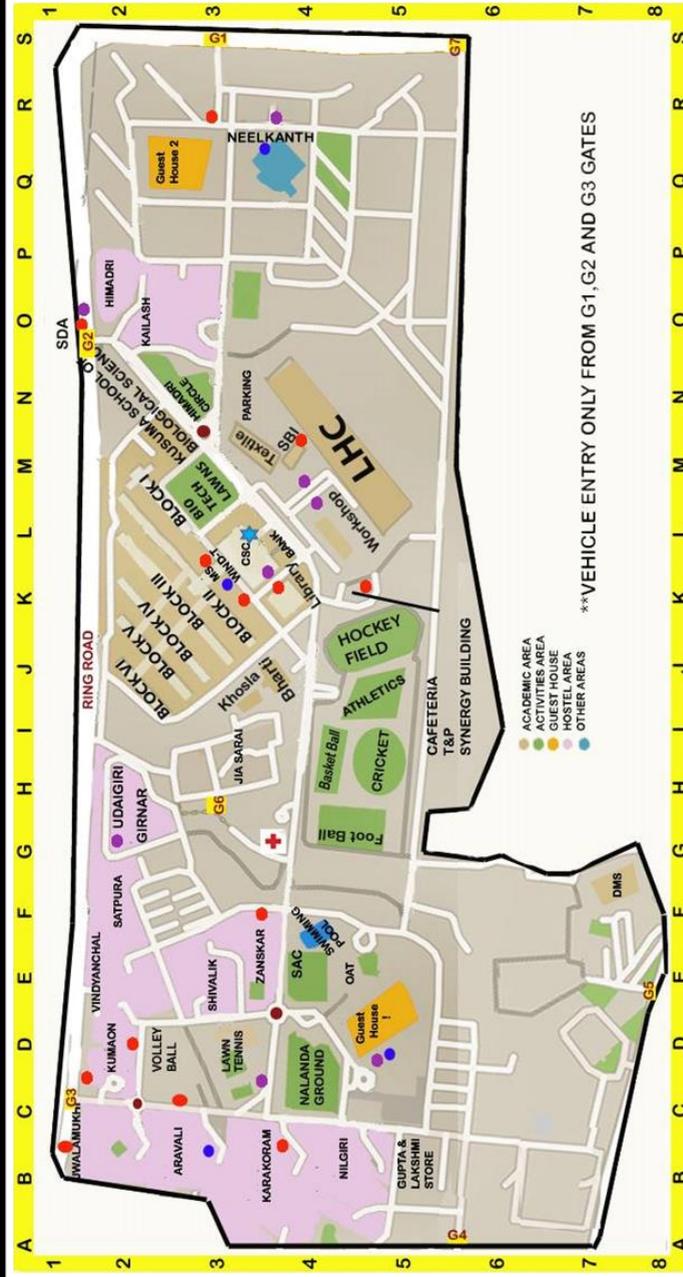
Industrial Applications

11.45-12.15 PM ADVANCEMENTS IN CFD MULTIPHASE MODELING APPROACHES IN PREDICTING SPRAYS AND SPRAY WALL INTERACTIONS
Dr. Sreenivas Viyyuri, Ansys India Pvt. Ltd., Pune

12.15-12.45 PM AN INSIGHT INTO PACKED BED REACTOR PERFORMANCE USING PARTICLE-RESOLVED CFD SIMULATIONS
Mr. G. M. Karthik, Haldor-Topsoe India Pvt. Ltd., New Delhi

12.45-01.00 PM Closing function

01.00-02.00 PM Lunch (Dogra hall foyer)



**VEHICLE ENTRY ONLY FROM G1,G2 AND G3 GATES

Location	Grid	Legend
Senate Hall	K3	★
Faculty Guest House	D5	★
Main Guest House	Q2.5	★
IITD Main Gate	O1.5	★
Himadri circle	M3	●
SAC circle	D3.5	●

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