

Overview

Course Overview

In engineering and environmental fluid flows, the presence of multiple interacting phases is ubiquitous. One phase can be dispersed into another (e.g., solid grains in gas or liquid), or both phases can be continuous, separated by a phase interface (e.g., liquid-gas flow). In both cases, the resulting flow is often turbulent, spans many characteristics length and time scales, and exhibits complex non-linear dynamics such as particle clustering, interfacial instabilities, and droplet break-up and coalescence.

Objectives: This course will enable engineers and research specialists with knowledge of fluid mechanics and scientific computing to develop a comprehensive understanding of numerical modeling of multiphase flows. The course will cover both Eulerian and Lagrangian particle-laden flow modeling techniques, and techniques for two-phase flows with a deforming interface. Multiple examples of multiphase turbulence in real engineering systems will be explored.

International Faculty



Prof. Olivier Desjardins is the associate editor for the *Journal Atomization and Sprays* and a professor at School of Mechanical and Aerospace Engineering, Cornell University. His research interests include modelling of turbulent atomization using LES and DNS approaches, development of numerical methods and models to investigate the multi-scale and multi-physics problems such as triple phase flows, spray evaporation and combustion etc.

Course Coordinator

Dr. Santanu De
Assistant Professor, Mechanical Engineering
Indian Institute of Technology Kanpur
Phone: 0512 259 6478,
E-mail: santanu80@gmail.com

Course website: home.iitk.ac.in/~sde/short_courses

Course Information

Eligibility

Executives, engineers and researchers from academia, industry and government organizations including R&D laboratories with a background in aerospace, automotive, mechanical, and chemical engineering. Postgraduate students (MSc/MTech/PhD) and faculty from reputed academic institutions.

Pre-requisite: Prior knowledge in Fluid Mechanics, Computational Fluid Dynamics is needed. Understanding/knowledge of Multiphase Flows and Turbulence is desirable.

Accommodation

Accommodation will be arranged at the IITK visitors hostel and students' hostels based on single/twin sharing basis depending on availability. The candidates will have to bear the boarding, food and other miscellaneous expenses.

How to apply

The candidates have to apply through the GIAN portal (www.gian.iitkgp.ac.in/GREGN/index) by paying a one-time registration fee of Rs. 500/- (non-refundable). Candidates will be selected based on their application at the GIAN portal and an offer letter will be issued by email only. Only the selected candidates are required to send the course fee by DD or online money transfer.

Course Fee

Participants from abroad: US \$800
Industry/ Research Organizations: ₹ 40,000
Academic Institutions: ₹ 10,000

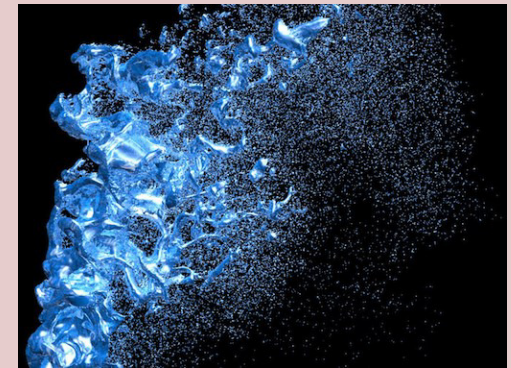
The above fee includes all instructional materials, computer use for tutorials, 24 hr free internet facility. The course fee needs to be sent separately as a crossed demand draft in favor of "Registrar, IIT Kanpur" payable at Kanpur. Payment can also be made through ECS/Wire Transfer/Online Fund Transfer. Please see the bank account details [here](#). Please send the filled application form along with the payment details to the course coordinator by post or email on or before **Oct 20, 2017**.

Sponsored by:



A short course
on
**Numerical Modeling of
Multiphase Flows**

Oct 30 – Nov 10, 2017



International Faculty:

Prof. Olivier Desjardins

Associate Editor and Board Member,
Atomization and Sprays

Organized by:



**Department of Mechanical Engineering,
Indian Institute of Technology Kanpur**

Course Modules

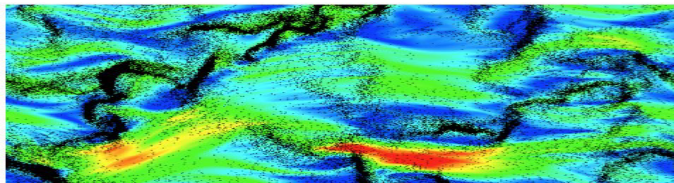
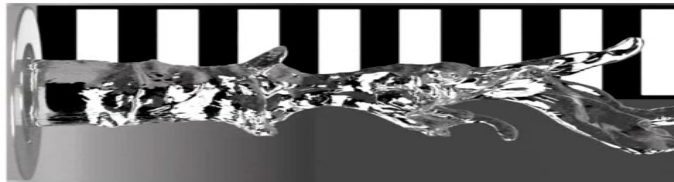
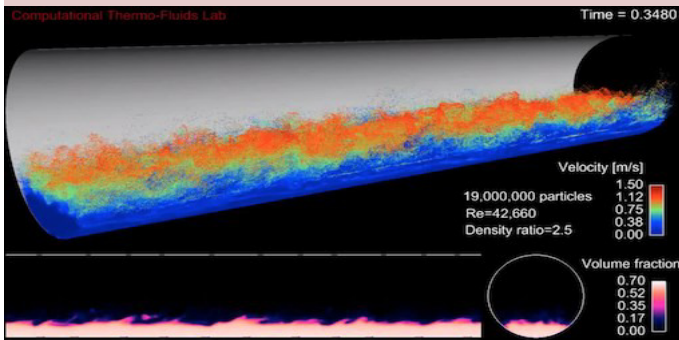
Four lectures of 1 hour will be conducted everyday. The lectures will be conducted by:

1. **Prof. Olivier Desjardins** (44 hours Lectures + 8 hours tutorials)

2. **Prof. Santanu De** (4 hours Lectures)

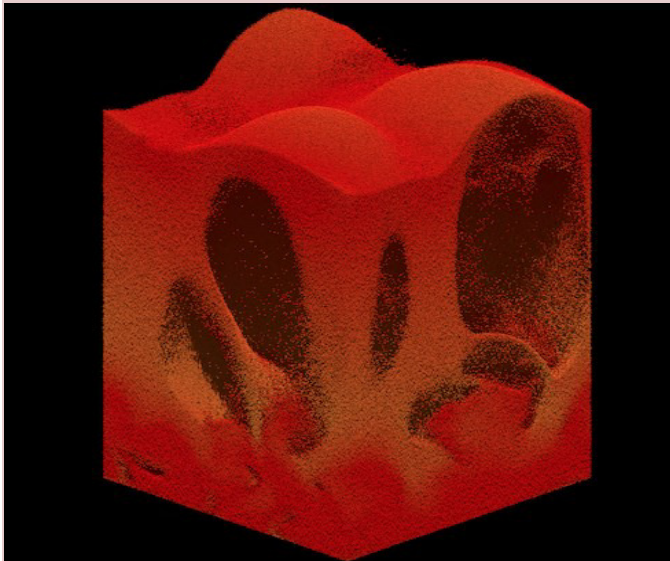
The schedule for the lectures is as follows:

- * Introduction to Multiphase Flow Modelling (6 lectures)
- * Fundamentals of Particle-Laden Flow Simulations (12 lectures)
- * Fundamentals of Liquid-Gas Flow Simulations (12 lectures)
- * Computational Studies of Multiphase Turbulence (8 lectures)
- * Special Topics in Multiphase Flows (6 lectures)



Course Coordinator

Dr. Santanu De is an assistant professor of Mechanical Engineering at Indian Institute of Technology, Kanpur. His research interests are numerical simulations of spray atomization and combustion, CFD of reactive flows, advanced turbulent combustion modeling , Coal gasification and combustion, Combustion/emission in I.C. engines and gas turbines etc.



Application Form

A short course on
Numerical Modelling of Multiphase Flows
(Oct 10 – Nov, 2017)

Name _____

Date of Birth _____ Designation _____

Organization _____

Address for Correspondence _____

Phone _____ Fax _____

E-Mail _____

Accommodation: Yes / No Gender: M / F

Educational qualifications (reverse chronological order)

Research Interests _____

Degree (with specialization)	Year	University

Payment Details: DD No: _____

Amount: _____ Drawn on: _____

The information furnished above is true to best of my knowledge. Kindly register my name for the short course on "Numerical Modelling of Multiphase Flows" to be held at IIT Kanpur.

Place: _____

Date: _____

Signature of the Applicant