### Ph.D./Post-Doc Openings 2020

**Research areas: Multi-phase Flows, Multi-phase reactor engineering, CFD, Multi-scale simulations, Advanced measurements, Process Intensiﬁcation**

**About the open positions:**

We are looking for highly motivated Ph.D/Post-doc candidates with excellent academic background, interested in pursuing doctoral/post-doctoral research in the broad area of multi-phase reactor engineering involving multi-scale modeling and simulations of multi-phase ﬂows/reactors, development and application of advanced experimental techniques to characterize multi-phase ﬂows, intensiﬁcation of multi-phase reactors, development of micro-reactor systems, and applications of multi-phase reactors in chemical processing, clean coal-based energy generation processes, and metallurgical applications. Ph.D/Post-doc positions in the following areas are open:

- Particle-resolved CFD simulations of packed bed reactors (sponsored by industry*)
- Modeling and simulations of liquid distribution in trickle bed reactors (International collaborative project**)
- Simulations of multi-phase ﬂows in porous media
- PIV and LIF measurements of micro-channel reactors (International collaborative project**)
- Interface-resolved bubbly ﬂows: Measurements and CFD simulations
- Development of intensiﬁed catalytic reactors (International collaborative project**)
- Advanced ﬂow characterization and multi-phase CFD simulations of dense slurry ﬂows (sponsored by industry*)

**Eligibility criteria and other beneﬁts for Ph.D. candidates:**

- M.Tech./M.E. in Chemical/Mechanical Engineering (minimum CGPA of 7.5) OR B. Tech./B.E. in Chemical/Mechanical Engineering (minimum CGPA of 7.5 and a competent GATE Score)
- Students expecting to complete their degree in summer 2020 can also be considered
- * For industry sponsored projects: Opportunities for application to Prime Minister Research Fellowship (PMRF) ([https://pmrf.in/](https://pmrf.in/)) are available (PMRF Fellowship: 1st and 2nd year, Rs. 70,000/-; 3rd year, Rs. 75,000/-; 4th and 5th year, Rs. 85,000/-)
- ** International collaborative projects: Opportunities of 2-3 month-long research visits every year at collaborating institute/university in Germany and France
- Grants for attending conferences in India and abroad.
  - Rs. 20,000/- per year for attending conferences in India
  - Rs. 1,50,000/- once in ﬁve year through RSTA scheme of IIT Delhi
  - Rs. 1,50,000/- once in ﬁve year through RETA scheme of IIT Delhi (for exceptional good students)

**Eligibility criteria and other beneﬁts for Post-doc candidates:**

- Ph.D in aforementioned research areas with first class or equivalent grade in preceding degree
- Doctoral candidates who have submitted their thesis or about to submit it can also be considered
- Consolidated fellowship of Rs.60,000/- per month

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**About the Multiple Phase Research Group at IIT Delhi**

Our research group is working on advanced measurement techniques, multi-scale modeling and simulations of multi-phase ﬂow processes and their applications to energy, oil & gas, chemical processing and metallurgical applications.

**Advanced flow measurements:**

- 2D/stereo/micro Particle Image Velocimetry (PIV)
- Laser Induced Fluorescence (LIF)
- Electrical Capacitance Tomography (ECT)
- Electrical Resistance Tomography (ERT)
- Miniaturized voidage probes
- Miniaturized pressure probes

**Development of CFD models for large-scale multiphase ﬂows:**

- Development of multi-ﬂuid Eulerian models to simulate multiphase ﬂow processes accompanied with heat & mass transfer, chemical reactions, phase change (boiling, precipitation, crystallization)
- Euler-Lagrange, DEM simulations
- OpenFOAM and commercial ﬂow solvers

**Basic research on multi-phase ﬂows:**

- Bubbly ﬂows (PIV measurements, interface-resolved simulations)
- Particle-scale ﬂows (LBM, DEM simulations)
- Particle-resolved simulations of ﬂow, transport processes and reactions
- Multi-phase ﬂows in micro-/milli-channels

**Industrial applications:**

- Design and scale-up, performance optimization, process intensiﬁcation
- Upstream and downstream oil & gas processing, chemical processing, Coal-to-liquid fuels/chemicals, metallurgical applications

**Contact:**

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**Campus accommodation or HRA in lieu of on-campus housing @30% of the fellowship amount**

**Professional Development Allowance of Rs.1.00 lac per financial year for attending national/international conferences**

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