Vatsal Sanjay

B.Tech, M.Tech

Ph.D. student
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On a quest in the world of multi-phase flows

Updated On: August 10, 2019

Research Interests

Fluid
- Liquid - Liquid Encapsulation
- Liquid Jets & their Interactions
- Computational Fluid Dynamics
- Droplets & Bubbles Dynamics
- Molecular Dynamics Simulations
- Liquid Sheets: Formation & Stability
- Interface Reconstruction
- Boiling Heat Transfer

Fire
- Compartmental Fire
- Fire Propagation and Soot Flow

Education

2018–Present **Ph.D. (Fluid Dynamics)**.
Physics of Fluids, University of Twente (Starting in July 2018)

Focus on: Molecular Dynamics Simulations, Liquid - Liquid Encapsulation, Three Fluid Numerical Simulations

2013–2018 **B.Tech (Mechanical Engineering) & M.Tech (Thermal Engineering)**.
Two-Phase Flow & Instability Lab, Indian Institute of Technology Roorkee.

Focus on: Liquid Jet Dynamics, Formation & Stability of Liquid Chain, Multiscale Numerical Simulations, Heat Transfer in VOF, Flame Dynamics

Graduated: First Division with Distinction (CGPA: *9.10/10*)

2013 **AISSCE**, *High School*, Graduated with *96.4%* marks.

2011 **AISSE**, *Secondary School*, Graduated with CGPA of *10/10*.

Dissertation (B.Tech & M.Tech)

Title **Understanding of mutual interactions between liquid jets: Entrainment and sheet formation**

Supervisor **Prof. Arup Kumar Das**

I have worked on two major problems: Formation of liquid chain by collision of liquid jets & Air entainment by plunging liquid jet. These interactions are investigated using detailed numerical simulations and in-house experiments. Full text is available at: https://goo.gl/kws3Nf

Professional Positions

May–July, 2016 **Research Intern**, *Fluid Mechanics & Acoustics Laboratory - UMR 5509*.
Université Claude Bernard Lyon1, France

Advisors: **Prof. Jean-Philippe Matas**, **Prof. J. John Soundar Jerome**, **Prof. Mickaël Bourgoin**

2014–2018 **Research Assistant**, *Two-Phase Flow & Instability Lab*.
Indian Institute of Technology Roorkee

Advisor: **Prof. Arup Kumar Das**

Manuscripts in Preparation or Under Review

To access the full-texts, please visit **my web page**.

[1] Jain, A., **Sanjay, V**, and Das, A. K. "Consequences of inclined and dual jet impingement in stagnant liquid and stratified layers". In: *Chemical Engineering Science* (2018).

[2] Rathia, S. K., **Sanjay, V**, and Das, A. K. "Investigation of the fire propagation across the patterned obstructions with single and two point ignitions". In: *Fire Technology Journal* (2018).

Research Publications

To access the full-texts, please visit **my web page**.

[1] **Sanjay, V** and Das, A. K. "Numerical Assessment of Hazard in Compartmental Fire Having Steady Heat Release Rate from the Source". In: *Building Simulation* 11.3 (2018), pp. 613–624. DOI: 10.1007/s12273-017-0411-y.

[2] **Sanjay, V** and Das, A. K. "Formation of Liquid Chain by Collision of Two Laminar Jets". In: *Physics of Fluids* 29.11 (2017), p. 112101. DOI: 10.1063/1.4998288.

[3] **Sanjay, V** and Das, A. K. "On air entrainment in a water pool by impingement of a jet". In: *AIChE J.* 63.11 (2017), pp. 5169–5181. ISSN: 1547-5905. DOI: 10.1002/aic.15828.

[4] Soni, A., **Sanjay, V**, and Das, A. K. "Formation of fluid structures due to jet-jet and jet-sheet interactions". In: *Chemical Engineering Science* (). DOI: 10.1016/j.ces.2018.06.055.

Scholastic Awards and Achievements

2017 **All India Rank 2988**, *Graduate Aptitute Test in Engineering*, among 190648 candidates..

2015 **Summer Undergraduate Research Award**, *Indian Institute of Technology Roorkee*..

Awarded summer fellowship for two months long research project.

2013 **All India Rank 1512**, *JEE Advanced, India*, in top 1% of the total appearing students..

2013 **All India Rank 765**, *JEE Mains, India*, Percentile score of 99.8%..

Technical Skills

CFD: Gerris, Basilisk C, LAMMPS-SPH & MD, PARIS Simulator, Fire Dynamics Simulator, OpenFOAM, ANSYS-Fluent

Lab based: LabView: Voltage & current module, Conductivity & optical probes, High speed camera imaging & image processing

Languages: C, C++, MATLAB, Python, LaTeX

Others: Octave, SolidWorks, AutoCAD

Invited Presentations

Interactions of Liquid Jets

Jan, 2018 ○ Understanding of Mutual Interactions between Liquid Jets: Sheet Formation
- Physics of Fluids, University of Twente, Enschede, the Netherlands.

Mar, 2017 ○ On interaction between interfaces: Dynamic–Dynamic & Dynamic–Static
- Cognizance Technical Festival, Indian Institute of Technology Roorkee.

Jul, 2016 ○ On the air entrainment in a water pool by impingement of jet
- Fluid Mechanics and Acoustics Laboratory, Lyon, France

MATLAB

2014-2016 ○ Importance of MATLAB in Engineering Applications
- MIESS, Indian Institute of Technology Roorkee.

2015–2017 ○ A lecture on Image Analysis Using MATLAB
- MIESS, Indian Institute of Technology Roorkee.

Contributed Conference Presentations

To access the full-texts, please visit my web page.

[1] Aggarwal, A., **Sanjay, V**, Kumar, P., and Das, A. K. "Generation of a liquid sheet by an oblique impingement of interacting jets: a numerical investigation". In: *Paper ID: 267, Proceedings of CHEMCON*. 2016.

[2] Datta, S., **Sanjay, V**, Kumar, P., and Das, A. K. "Investigation of jet atomization - a multi-scale approach". In: *Paper ID: 218, 6th International and 43rd National Conference on Fluid Mechanics and Fluid Power*. 2016.

[3] **Sanjay, V** and Das, A. K. "On the gas-liquid entrainment by impingement of liquid jet onto a pool". In: *Reference #50, 9th International Conference on Multiphase Flow*. 2016.

[4] **Sanjay, V** and Das, A. K. "Building fire safety: numerical simulation and evacuation planning". In: *Proceedings of 14th International Conference of the International Building Performance Simulation Association*. 2015, pp. 897–904.