Vatsal Sanjay

Ph.D.

Fluid Dynamicist
Physics of Fluids
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Updated On: December 9, 2022

Research Interests

Fluid
- Multiphase flows
- Non-Newtonian flows
- Drops
- Bubbles
- Liquid Jets & their Interactions
- Liquid sheets: formation & stability
- Computational multi-fluid dynamics
- Interface reconstruction

Fire
- Compartmental fire
- Fire propagation and soot flow

Education

2018–2022 **Ph.D. (Fluid Dynamics)**
Physics of Fluids, University of Twente

Thesis *Viscous free-surface flows*, DOI: 10.3990/1.9789036554077

Graduated Doctor cum laude (met Lof): with distinction.

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

Thesis *Understanding of mutual interactions between liquid jets: Entrainment and sheet formation*, https://goo.gl/kws3Nf

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

2013 **AISSCE (High School)**, graduated with *96.4%* marks.

Professional Experience

Now **Postdoctoral researcher**, *Physics of Fluids group*
with Prof. Detlef Lohse at University of Twente, Enschede, the Netherlands.

May – July, 2016 **Research Intern**, *Fluid Mechanics & Acoustics Laboratory - UMR 5509*
with Prof. Jean-Philippe Matas, Prof. J. John Soundar Jerome, & Prof. Mickaël Bourgoin at Université Claude Bernard Lyon1, France.

2014 – 2018 **Research Assistant**, *Two-Phase Flow & Instability Lab*
with Prof. Arup Kumar Das at Indian Institute of Technology Roorkee, India.

Theses Supervised

Masters Tom Appleford, Steven Meuleman

Bachelors Twan Heijink, Thijmen Kroeze, Coen Verschuur, Pim Dekker, Laurence Bruggink

Peer Review Contributions

Referee for J. Fluid Mech. (39), Phys. Rev. Lett. (4), Phys. Rev. Fluids (1), Phys. Rev. E (1), Droplet (1), among others.

Invited Talks

Drop Impact Forces

Dec, 2022
- Indian Institute of Technology Bombay.
- Indian Institute of Technology Kharagpur.

Oct, 2022
- University of Akron (Virtual).
- Complex Fluids and Soft Matter (CFSM) Seminar Series (Virtual).

Taylor-Culick Retractions

Dec, 2022 Indian Institute of Technology Roorkee.

Interactions of Liquid Jets

Jan, 2018 Physics of Fluids, University of Twente, Enschede, the Netherlands.

Mar, 2017 Cognizance Technical Festival, Indian Institute of Technology Roorkee.

Jul, 2016 Fluid Mechanics and Acoustics Laboratory, Lyon, France.

Physics & Computations

2014-2017 MIESS, Indian Institute of Technology Roorkee.

Awards & Achievements

2022 **Doctor cum laude**, *met Lof (with distinction)*, University of Twente.

2018 **Department gold medal**, Indian Institute of Technology Roorkee.

2017 **All India Rank 2988**, *GATE*, among 190648 candidates.

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

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%.

2013 **City Rank 1**, *AISSCE (High School)*, highest score in the district of Darbhanga.

Scientific Outreach

2020-Present Twitter account for Physics of Fluids group, @poftwente.

2020-Present Physics of fluids group seminar organizer.

2022-Present Skype a Scientist.

2022-Present Physicist To-Go.

2022-Present APS-DFD peer mentoring program (as a mentor).

2021 Panel discussion on Future of fluid dynamics

2021 Panel discussion on Research & higher education

Publications

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

[1] **Sanjay, V.**, Chantelot, P., and Lohse, D. "When does an impacting drop stop bouncing?" *J. Fluid Mech., to be published, arXiv preprint arXiv:2208.05935* (2022)

[2] **Sanjay, V.**, Lakshman, S., Chantelot, P., Snoeijer, J. H., and Lohse, D. "Drop impact on viscous liquid films". *J. Fluid Mech., to be published, arXiv preprint arXiv:2206.06298* (2022)

[3] **Sanjay, V.**, Sen, U., Kant, P., and Lohse, D. "Taylor-Culick retractions and the influence of the surroundings". *J. Fluid Mech.* 948 (2022), A14. DOI: 10.1017/jfm.2022.671

[4] Zhang, B., **Sanjay, V.**, Shi, S., Zhao, Y., Lv, C., and Lohse, D. "Impact forces of water drops falling on superhydrophobic surfaces". *Phys. Rev. Lett.* 129 (2022), p. 104501. DOI: 10.1103/PhysRevLett.129.104501. See also:
- Editor's Suggestion of that issue.
- Davide Castelvecchi, Research Highlight: "The physics of a bouncing droplet's impact" , Nature, article: d41586-022-02302-w (29/8/2022)

[5] **Sanjay, V.**, Lohse, D., and Jalaal, M. "Bursting bubble in a viscoplastic medium". *J. Fluid Mech.* 922 (2021), A2. DOI: 10.1017/jfm.2021.489

[6] Ramírez-Soto, O., **Sanjay, V**, Lohse, D., Pham, J. T., and Vollmer, D. "Lifting a sessile oil drop from a superamphiphobic surface with an impacting one". *Sci. Adv.* 6.34 (2020), eaba4330. DOI: 10.1126/sciadv.aba4330

[7] Jain, A., **Sanjay, V**, and Das, A. K. "Consequences of inclined and dual jet impingement in stagnant liquid and stratified layers". *AlChE J.* 65.1 (2019), pp. 372–384. DOI: 10.1002/aic.16373

[8] Soni, A., **Sanjay, V**, and Das, A. K. "Formation of fluid structures due to jet-jet and jet-sheet interactions". *Chem. Eng. Sci.* 191 (2018), pp. 67–77. DOI: 10.1016/j.ces.2018.06.055

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

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

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