Vatsal Sanjay

Ph.D.

Physics of Fluids Group
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VatsalSy

Date of birth Feb. 5th, 1996
Updated on November 25, 2023

Education

2018–2022 **Ph.D. (Fluid Dynamics)**
Physics of Fluids Group, University of Twente
Supervisor Prof. Dr. Detlef Lohse
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
Supervisor Prof. Arup Kumar Das
Graduated First Division with distinction (CGPA: *9.10/10*).

2013 **High School (AISSCE)**
Graduated First Division with *96.4%* marks.

Professional Experience

Now **Postdoctoral researcher**, *Physics of Fluids Group*
at University of Twente, Enschede, the Netherlands.

May – July, 2016 **Research Intern**, *Fluid Mechanics & Acoustics Laboratory - UMR 5509*
at Université Claude Bernard Lyon 1, France.

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

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*, top 1% of the 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.

Service to the community

Referee for J. Fluid Mech. (54), Phys. Rev. Lett. (4), Phys. Rev. Fluids (2), Phys. Rev. E (4), Droplet (2), among others.

Organizer of Physics of Fluids Group seminar from 2022 on.

Co-organizer of conference PoF25 (October 2023, about 200 participants).

Scientific Outreach

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

2022-Present Skype a Scientist: interact with high-school students.

2022-Present Physicist To-Go (APS): interact with high-school students.

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

Supervision & Teaching

Theses Supervised

Masters Tom Appleford, Steven Meuleman

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

Teaching Assistant

2018-Now Advanced Fluid Mechanics, University of Twente.

2017-2018 Two Phase Flow and Heat Transfer, Indian Institute of Technology Roorkee.

Research Interests

- Multiphase flows
- Drops
- Liquid jets & their interactions
- Capillary flows
- Non-Newtonian flows
- Bubbles
- Liquid sheets: formation & stability
- Computational multi-fluid dynamics

Peer-Reviewed Publications

1. **Vatsal Sanjay**, Pierre Chantelot, and Detlef Lohse,
When does an impacting drop stop bouncing?,
J. Fluid Mech., 958, A26 (2023) [20 pages];
DOI:10.1017/jfm.2023.55.

2. **Vatsal Sanjay**, Srinath Lakshman, Pierre Chantelot, Jacco H. Snoeijer, and Detlef Lohse,
Drop impact on viscous liquid films,
J. Fluid Mech., 958, A25 (2023) [28 pages];

DOI:10.1017/jfm.2023.13.

3. Bin Zhang, **Vatsal Sanjay**, Songlin Shi, Yinggang Zhao, Cunjing Lv, Xi-Qiao Feng, and Detlef Lohse,
   Impact forces of water drops falling on superhydrophobic surfaces,
   Phys. Rev. Lett. 129, 104501 (2022) [7 pages],
   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)
4. **Vatsal Sanjay**, Uddalok Sen, Pallav Kant, and Detlef Lohse,
   Taylor-Culick retractions and the influence of the surroundings,
   J. Fluid Mech. 948, A14 (2022) [37 pages];
   DOI: 10.1017/jfm.2022.671.
5. **Vatsal Sanjay**, Detlef Lohse, and Maziyar Jalaal,
   Bursting bubble in a viscoplastic medium,
   J. Fluid Mech. 922, A22 (2021) [24 pages];
   DOI: 10.1017/jfm.2021.489.
6. Olinka Ramirez-Soto, **Vatsal Sanjay**, Detlef Lohse, Jonathan T. Pham, and Doris Vollmer,
   Lifting a sessile oil drop with an impacting one,
   Sci. Adv. 6, eaba4330 (2020) [11 pages];
   DOI: 10.1126/sciadv.aba4330.
7. Abhinav Jain, **Vatsal Sanjay**, and Arup Kumar Das,
   Consequences of inclined and dual jet impingement in stagnant liquid and stratified layers,
   AlChE J. 65(1), 372-384 (2019) [12 pages],
   DOI: 10.1002/aic.16373.
8. Anurag Soni, **Vatsal Sanjay**, and Arup Kumar Das,
   Formation of fluid structures due to jet-jet and jet-sheet interactions,
   Chem. Eng. Sci. 191, 67-77 (2018) [11 pages],
   DOI: 10.1016/j.ces.2018.06.055.
9. **Vatsal Sanjay** and Arup Kumar Das,
   Numerical assessment of hazard in compartmental fire having steady heat release rate from the source,
   Build. Simul. 11(3), 613-624 (2018) [12 pages],
   DOI: 10.1007/s12273-017-0411-y.
10. **Vatsal Sanjay** and Arup Kumar Das,
    On air entrainment in a water pool by impingement of a jet,
    AIChE J. 63(11), 5169–5181 (2017) [23 pages],
    DOI: 10.1002/aic.15828.

11. **Vatsal Sanjay** and Arup Kumar Das,
Formation of liquid chain by collision of two laminar jets,
Phys. Fluids 29, 112101 (2017) [12 pages];
DOI: 10.1063/1.4998288.

Invited & Contributed Talks

1. 21.11.2023,
A unifying approach to account for droplet impact forces,
contributed talk at APS-DFD in Washington, DC, USA.

2. 20.1.2023,
Impact of droplets,
invited talk at Université Claude Bernard Lyon 1, France.

3. 10.1.2023,
Impact of droplets,
invited talk at the IIT-Delhi, India.

4. 4.1.2023,
Impact of droplets,
invited talk at the IIT-Patna, India.

5. 26.12.2022,
Taylor-Culick retractions,
invited talk at the IIT-Kharagpur, India.

6. 16.12.2022,
Jumping & Bouncing Drops & Bubbles,
contributed talk at the Annual Meeting of the Indian Fluid Dynamics Society,
FMFP-2022, at IIT-Roorkee, India.

7. 12.12.2022
Taylor-Culick retractions,
invited talk at the IIT-Roorkee, India.

8. 7.12.2022
Drop impact forces,
invited talk at the IIT-Bombay, India.

9. 21.11.2022,
Impact forces of water drops falling on superhydrophobic surfaces,
contributed talk at APS-DFD in Indianapolis, Indiana, USA.

10. 26.10.2022,
Drop impact forces,
invited talk at the Complex Fluids and Soft Matter (CFSM) Seminar Series,
Virtual.

11. 12.10.2022,
Drop impact forces,
invited talk at the Virtual University of Arkon.

12. 14.9.2022,
    When does an impacting drop stop bouncing?,
    contributed talk at EFMC14, Athens, Greece.

13. 14.3.2022,
    Drop impact forces,
    contributed talk at Max Planck meeting, Enschede, the Netherlands.

14. 21.11.2021,
    Viscous dissipation dictates Taylor-Culick type retractions,
    contributed talk at APS-DFD in Phoenix, Arizona, USA.

15. 22.11.2020,
    When does a viscous drop stop bouncing?,
    contributed talk at APS-DFD in virtual Chicago.

16. 10.2.2020,
    Jumping & Bouncing Drops & Bubbles,
    contributed talk at Max Planck meeting, Mainz, Germany.

17. 23.11.2019,
    Droplet Encapsulation,
    contributed talk at APS-DFD in Seattle, Washington, USA.

18. 18.9.2019,
    Bursting Bubbles: from Champagne to Mudpots,
    contributed talk at VPF8 Viscoplastic Fluids: from Theory to Application, Cambridge, UK.

19. 23.8.2019,
    Impinging drop lifts a sessile drop,
    contributed talk at 9th 4U Summer School Complex Motion in Fluids, Gilleleje, Denmark.

20. 17.6.2019,
    Bursting Bubbles: from Champagne to Mudpots,
    contributed talk at Basilisk/Gerris Users' Meeting 2019, Paris, France.

21. 21.5.2019,
    Impinging drop lifts a sessile drop,
    contributed talk at Burgers Symposium, Lunteren, the Netherlands.

22. 8.1.2018,
    Formation of liquid chain by collision of two laminar jets,
    invited talk at the Physics of Fluids Group, University of Twente, the Netherlands.

23. 27.3.2017,
    Understanding of mutual interactions between liquid jets: Entrainment and sheet formation,
    invited talk at the Cognizance technical festival at IIT-Roorkee, India.

24. 28.12.2016,
    Generation of a liquid sheet by an oblique impingement of interacting jets: a numerical investigation,
    contributed talk at CHEMCON2016, 69th annual session of the Indian Institute of Chemical Engineers, Chennai, India.

25. 16.12.2016,
    Investigation of jet atomization - a multi-scale approach,
    contributed talk at the 6th International and 43rd National Conference on Fluid Mechanics and Fluid Power, Allahabad, India.

26. 24.5.2016,
    On the gas-liquid entrainment by impingement of liquid jet onto a pool,
    contributed talk at the 9th International Conference on Multiphase Flow, Florence, Italy.

27. 8.12.2015,
    Building fire safety: numerical simulation and evacuation planning,
    contributed talk at the 14th International Conference of the International Building Performance Simulation Association at Hyderabad, India.

Summary of key numbers (November 25, 2023)

- Researcher ID: K-1856-2019
- Orcid: 0000-0002-4293-6099
- Hirsch-index: H = 8 (Google Scholar), 5 (Web of Science)
- i10-index 6 (Google Scholar)
- Research Interest Score (ResearchGate) ≈ 622