

Vatsal Sanjay

Ph.D.

Fluid Dynamicist
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Education

2018–2022 Ph.D. (Fluid Dynamics)

Physics of Fluids, University of Twente

Thesis *Viscous free-surface flows*, DOI: [10.3990/1.9789036554077](https://doi.org/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, **Research Intern**, *Fluid Mechanics & Acoustics Laboratory - UMR 5509*

2016 with [Prof. Jean-Philippe Matas](#), [Prof. J. John Soundar Jerome](#), & [Prof. Mickaël Bourgoïn](#) at Université Claude Bernard Lyon 1, 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. (40), Phys. Rev. Lett. (4), Phys. Rev. Fluids (1), Phys. Rev. E (2), Droplet (2), among others.

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](#)

Invited Talks

Impact of droplets

- Jan, 2023 ○ Université Claude Bernard Lyon 1, France.
○ Indian Institute of Technology Delhi.
- Dec, 2022 Indian Institute of Technology Bombay.
- 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.
○ Indian Institute of Technology Kharagpur.

Bouncing & Jumping Drops & Bubbles

- Jan, 2023 Indian Institute of Technology Patna.

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 Université Claude Bernard Lyon 1, France.

Physics & Computations

- 2014-2017 MIESS, Indian Institute of Technology Roorkee.

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

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 (2023). DOI: [10.48550/arXiv.2208.05935](#)
- [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 (2023). DOI: [10.48550/arXiv.2206.06298](#)
- [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 Castelvetti, 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”. *AIChE 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](#)

Contributed Conference Presentations

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?” *EFMC* (2022)
- [2] **Sanjay, V.** and Lohse, D. “Drop impact forces”. *Max Planck meeting, Enschede, Netherlands* (2022)
- [3] Sen, U., **Sanjay, V.**, Kant, P., and Lohse, D. “Revisiting Taylor-Culick retractions”. *APS-DFD* (2021)
- [4] Sen, U., **Sanjay, V.**, and Lohse, D. “Viscous dissipation dictates the maximum spreading of an impacting droplet”. *EFMC* (2021)
- [5] **Sanjay, V.**, Sen, U., Kant, P., and Lohse, D. “Viscous dissipation dictates Taylor-Culick type retractions”. *APS-DFD* (2021)
- [6] **Sanjay, V.**, Chantelot, P., and Lohse, D. “When does a viscous drop stop bouncing?” *APS-DFD (Virtual)* (2020)
- [7] **Sanjay, V.**, Jalaal, M., and Lohse, D. “Bursting Bubble in a Viscoplastic medium”. *18th International Congress on Rheology (Virtual)* (2020)
- [8] **Sanjay, V.** and Lohse, D. “Jumping & Bouncing Drops & Bubbles”. *Max Planck meeting, Mainz, Germany* (2020)
- [9] **Sanjay, V.**, Jain, U., Jalaal, M., Meer, D. van der, and Lohse, D. “Droplet Encapsulation”. *APS-DFD, Seattle, US* (2019), B22–001
- [10] **Sanjay, V.**, Jalaal, M., and Lohse, D. “Bursting Bubbles: from Champagne to Mudpots”. *Basilisk/Gerris Users’ meeting, Paris, France* (2019)
- [11] **Sanjay, V.**, Jalaal, M., and Lohse, D. “Bursting Bubbles: from Champagne to Mudpots”. *VPF8 Viscoplastic Fluids: from Theory to Application, Cambridge, UK* (2019)
- [12] **Sanjay, V.**, Ramírez-Soto, O., Lohse, D., Pham, J. T., and Vollmer, D. “Impinging drop lifts a sessile drop”. *Burgers Symposium, Lunteren, the Netherlands* (2019)
- [13] **Sanjay, V.**, Ramírez-Soto, O., Lohse, D., Pham, J. T., and Vollmer, D. “Impinging drop lifts a sessile drop”. *9th 4U Summer School Complex Motion in Fluids, Gilleleje, Denmark* (2019)
- [14] 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”. *Paper ID: 267, Proceedings of CHEMCON*. 2016
- [15] Datta, S., **Sanjay, V.**, Kumar, P., and Das, A. K. “Investigation of jet atomization - a multi-scale approach”. *Paper ID: 218, 6th International and 43rd National Conference on Fluid Mechanics and Fluid Power*. 2016
- [16] **Sanjay, V.** and Das, A. K. “On the gas-liquid entrainment by impingement of liquid jet onto a pool”. *Reference #50, 9th International Conference on Multiphase Flow*. 2016

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