

Vatsal Sanjay

Ph.D.

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On a quest in the world of multi-phase flows

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Research Interests

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|--------------|------------------------------------|--|
| Fluid | ○ Drop Impact | ○ Encapsulation |
| | ○ Bubbles Dynamics | ○ Plastocapillarity |
| | ○ Liquid Jets & their Interactions | ○ Liquid Sheets: Formation & Stability |
| | ○ Computational Fluid Dynamics | ○ Interface Reconstruction |
| Fire | ○ Compartmental Fire | ○ Fire Propagation and Soot Flow |

Experience

- 2022 – **Postdoctoral researcher**, *Physics of Fluids group*
Present University of Twente, Enschede, the Netherlands
- 2018 – 2022 **Researcher (Ph.D. Candidate)**, *Physics of Fluids group*
University of Twente, Enschede, the Netherlands
- Advisor:** **Prof. Detlef Lohse**
- May – July, **Research Intern**, *Fluid Mechanics & Acoustics Laboratory - UMR 5509*
2016 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, India
- Advisor:** **Prof. Arup Kumar Das**

Education

- 2018–2022 **Ph.D. (Fluid Dynamics)**
Physics of Fluids, University of Twente
- 2013–2018 **B.Tech (Mechanical Engineering) & M.Tech (Thermal Engineering)**
Two-Phase Flow & Instability Lab, Indian Institute of Technology Roorkee.
- Graduated: First Division with Distinction (CGPA: *9.10/10*)
- 2013 **AISSCE**, *High School*, Graduated with *96.4%* marks

Theses

Ph.D. **Viscous free-surface flows**

DOI: [10.3990/1.9789036554077](https://doi.org/10.3990/1.9789036554077)

B.Tech & **Understanding of mutual interactions between liquid jets: Entrainment and sheet formation**

M.Tech

<https://goo.gl/kws3Nf>

Theses Supervised

Masters [Tom Appleford](#), [Steven Meuleman](#)

Bachelors [Twan Heijink](#), [Thijmen Kroeze](#), [Coen Verschuur](#), [Pim Dekker](#), [Laurence Bruggink](#)

Manuscripts in Preparation or Under Review

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?” *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”. *arXiv preprint arXiv:2206.06298* (2022)

Research Publications

To access the full-texts, please visit [my web page](#).

- [1] **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](https://doi.org/10.1017/jfm.2022.671)
- [2] 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.* 129.10 (2022), p. 104501. DOI: [10.1103/PhysRevLett.129.104501](https://doi.org/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](https://doi.org/10.1038/d41586-022-02302-w) (29/8/2022)
- [3] **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](https://doi.org/10.1017/jfm.2021.489)
- [4] 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
- [5] 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
- [6] 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](https://doi.org/10.1016/j.ces.2018.06.055)

- [7] **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](https://doi.org/10.1007/s12273-017-0411-y)
- [8] **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](https://doi.org/10.1063/1.4998288)
- [9] **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. ISSN: 1547-5905. DOI: [10.1002/aic.15828](https://doi.org/10.1002/aic.15828)

Invited Presentations

Drop Impact Forces

Oct, 2022 University of Akron

[Complex Fluids and Soft Matter \(CFSM\) Seminar Series](#)

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

MATLAB

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%

Scientific Outreach

2022-Present Skype a Scientist

2022-Present Physicist To-Go

2021 Panel discussion on [Future of fluid dynamics](#)

2021 Panel discussion on [Research & higher education](#)

2020-Present Twitter account for Physics of Fluids group

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