

# Vatsal Sanjay — PhD

Department of Physics, Durham University

PI, Computational Multiphase Physics Lab

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Date of birth: Feb. 5, 1996   Updated: June 1, 2025

## Education

### Physics of Fluids Dept.

*Ph.D. (Appl. Phys.), Graduated cum laude (with distinction)*

**Supervisor:** Prof. Detlef Lohse.

**Thesis:** *Viscous free-surface flows* (OA) [10.3990/1.9789036554077](https://doi.org/10.3990/1.9789036554077).

**Univ. Twente**

2018–2022

### Two-Phase Flow & Instability Lab

*B.Tech (Mech.) & M.Tech (Thermal Eng.), Graduated with distinction (CGPA: 9.1/10)*

**Supervisor:** Prof. Arup Kumar Das,

**Thesis:** *Understanding of mutual interactions between liquid jets* (OA) [10.13140/RG.2.2.22294.04166](https://doi.org/10.13140/RG.2.2.22294.04166).

**IIT Roorkee**

2013–2018

## Professional Experience

### Department of Physics

*Assistant Professor, PI of Computational Multiphase Physics (CoMPhy) Lab*

Leading research on multiphase flows and soft matter dynamics.

**Durham University**

2025–present

### Physics of Fluids Dept.

*Postdoctoral Researcher, Led Computational Multiphase Physics (CoMPhy) Lab*

Worked on non-Newtonian free-surface flows and soft matter singularities.

**Univ. Twente**

2022–2025

### Fluid Mechanics & Acoustics Lab (UMR 5509)

*Research Intern*

Worked on Landau–Levich dip coating.

**Univ. Claude Bernard Lyon 1**

May–July, 2016

## Major Awards & Achievements

### *Ammodo Science Fellowship*

To study mycofluidic transport.

2025

### *J. Fluid Mech. Outstanding Reviewer*

Top 1% of reviewers in 2023.

2024

### *KIVI Hoogendoorn Fluid Mechanics Award*

Best PhD thesis in Netherlands (2022–2023).

2024

### *Young Scientist, nominated by KNAW*

73rd Lindau Nobel Laureate Meeting (one of seven from Netherlands).

2024

### *Doctor cum laude, met lof (with distinction)*

Top 5% of PhD graduates in 2021–2022.

2022

### *Department Gold Medal*

For academic excellence at IIT Roorkee.

2018

### *Summer Undergraduate Research Award*

To study bubble entrainment by impinging liquid jet.

2015

## Service to the Community

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### Seminars & Conferences.....

#### Physics of Fluids weekly seminar

avg. 40 participants, 10+ international speakers/yr, [link](#).

Univ. Twente

2022–2025

#### Symposium on Bubbles & Bubbly Flows

75 participants.

Univ. Twente

May 2025

#### Workshop on (De)Constructing Complex Contact Lines

25 participants, [link](#).

Lorentz Center

Jun 2024

#### 35th Dutch Soft Matter Meeting

100 participants; received NWO Meetings Grant.

Univ. Twente

May 2024

#### Flow for Future conference: 25 years of Physics of Fluids

200 participants.

Univ. Twente

Oct 2023

### Refereeing.....

2018–Now: J. Fluid Mech. (80+), Phys. Rev. (20+), PNAS (3), among others.

## Research Funding

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2025: Ammodo Science Fellowship (€170000) for Mycofluidic transport (embargo until Feb. 2025).

2023: 10 million CPU hours (€150000 equivalent) on Snellius HPC (Co-PI).

## Scientific Outreach

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2020–2025: Social media manager for Physics of Fluids Dept. at [BlueSky](#) & [X](#).

2022–Now: APS-DFD peer mentoring (mentor).

2022–Now: Skype a Scientist (high-school outreach).

2022–2023: Physicist To-Go (APS).

2021: Panel discussion on *Future of Fluid Dynamics*.

2021: Panel discussion on *Research & Higher Education*. [\[Video\]](#).

## Supervision

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### PhD Theses.....







J. Talukdar: Singularities with surfactants (since Jul. 2025).

S. Jana: Soft impacts (since Jun. 2025).








A. Bhargava: Inertial contact lines (since Jan. 2024).

A. Dixit: Non-Newtonian flows (since Jul. 2023).

### Master Theses.....

F. Hoek (UT, ongoing), S. Jana (IIT KGP, '25, ) , J. Talukdar (UT, '25), V. Rosario (UvA, '24, ) , S. van den Heuvel (UT, '23, ) , C.H. Maurits (UvA, '23, ) , T. Appleford (UvA, '22, ) , S. Meuleman (UT, '20, ) .

### Bachelor Theses.....

M. Sent (UT, '25, ) , N. Kuipers (UT, '23, ) , J. Talukdar (UT, '23), T. Heijink (UT, '21, ) , T. Kroeze (UT, '20, ) , C. Verschuur (UT, '20, ) , P.J. Dekker (UT, '19, ) , L. Bruggink (UT, '19, ) .

## Teaching

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### High-Fidelity Simulations Using Basilisk C

*Instructor*

4-day interactive course on computational fluid dynamics. Also available as self-paced course at [comphy-lab.org](https://comphy-lab.org).

### Advanced Fluid Mechanics

*Co-lecturer*

Universidad Carlos III de Madrid, Spain

Mar. 10–13, 2025

Univ. Twente

2018–2025

For complete teaching activities, visit [comphy-lab.org/teaching](https://comphy-lab.org/teaching).

## Peer-Reviewed Publications

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1. Aleksandr Bashkatov, Florian Bürkle, Çayan Demirkır, Wei Ding, **Vatsal Sanjay**, Alexander Babich, Xuegeng Yang, Gerd Mutschke, Jürgen Czarske, Detlef Lohse, Dominik Krug, Lars Büttner, and Kerstin Eckert,  
Electrolyte droplet spraying in H<sub>2</sub> bubbles during water electrolysis under normal and microgravity conditions,  
Nat. Commun., 16, 4580 (2025) [10 pages];  
(OA) DOI: [10.1038/s41467-025-59762-7](https://doi.org/10.1038/s41467-025-59762-7).
2. Ayush K. Dixit, Alexandros T. Oratis, Konstantinos Zinelis, Detlef Lohse, and **Vatsal Sanjay**,  
Viscoelastic Worthington jets and droplets produced by bursting bubbles,  
J. Fluid Mech., 1010, A2 (2025) [32 pages];  
(OA) DOI: [10.1017/jfm.2025.237](https://doi.org/10.1017/jfm.2025.237).
3. **Vatsal Sanjay** and Detlef Lohse,  
Unifying theory of scaling in drop impact: Forces & maximum spreading diameter,  
Phys. Rev. Lett., 134, 104003 (2025) [9 pages];  
(OA) DOI: [10.1103/PhysRevLett.134.104003](https://doi.org/10.1103/PhysRevLett.134.104003).
4. **Vatsal Sanjay**, Bin Zhang, Cunjing Lv, and Detlef Lohse,  
The role of viscosity on drop impact forces on non-wetting surfaces,  
J. Fluid Mech., 1004, A6 (2025) [23 pages];  
(OA) DOI: [10.1017/jfm.2024.982](https://doi.org/10.1017/jfm.2024.982).
5. Lohit Kayal, **Vatsal Sanjay**, Nikhil Yewale, Anil Kumar, and Ratul Dasgupta,  
Focusing of concentric free-surface waves,  
J. Fluid Mech., 1003, A14 (2025) [39 pages];  
(OA) DOI: [10.1017/jfm.2024.1089](https://doi.org/10.1017/jfm.2024.1089).
6. Arivazhagan G. Balasubramanian, **Vatsal Sanjay**, Maziyar Jalaal, Ricardo Vinuesa, and Outi Tammisola,  
Bursting bubble in an elasto-viscoplastic medium,  
J. Fluid Mech., 1001, A9 (2024) [36 pages];  
(OA) DOI: [10.1017/jfm.2024.1073](https://doi.org/10.1017/jfm.2024.1073);  
Cover of that volume of J. Fluid Mech.
7. **Vatsal Sanjay**, Pierre Chantelot, and Detlef Lohse,  
When does an impacting drop stop bouncing?,  
J. Fluid Mech., 958, A26 (2023) [20 pages];  
(OA) DOI: [10.1017/jfm.2023.55](https://doi.org/10.1017/jfm.2023.55).
8. **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];  
(OA) DOI: [10.1017/jfm.2023.13](https://doi.org/10.1017/jfm.2023.13).

9. 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](https://doi.org/10.1103/PhysRevLett.129.104501), OA: [10.48550/arXiv.2202.02437](https://arxiv.org/abs/10.48550/arXiv.2202.02437); see also
  - As of March/April 2024, this *highly cited paper* received enough citations to place it in the top 1% of the academic field of Physics based on a highly cited threshold for the field and publication year. Source: Web of Science.
  - 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)
10. **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]; (OA) DOI: [10.1017/jfm.2022.671](https://doi.org/10.1017/jfm.2022.671).
11. **Vatsal Sanjay**, Detlef Lohse, and Maziyar Jalaal, Bursting bubble in a viscoplastic medium, J. Fluid Mech. 922, A22 (2021) [24 pages]; (OA) DOI: [10.1017/jfm.2021.489](https://doi.org/10.1017/jfm.2021.489).
12. 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]; (OA) DOI: [10.1126/sciadv.aba4330](https://doi.org/10.1126/sciadv.aba4330).
13. Abhinav Jain, **Vatsal Sanjay**, and Arup Kumar Das, Consequences of inclined and dual jet impingement in stagnant liquid and stratified layers, AIChE J. 65(1), 372-384 (2019) [12 pages], DOI: [10.1002/aic.16373](https://doi.org/10.1002/aic.16373), OA: [archived pdf](#).
14. 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](https://doi.org/10.1016/j.ces.2018.06.055), OA: [archived pdf](#).
15. **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](https://doi.org/10.1007/s12273-017-0411-y), OA: [archived pdf](#).
16. **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](https://doi.org/10.1002/aic.15828), OA: [archived pdf](#).
17. **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](https://doi.org/10.1063/1.4998288), OA: [archived pdf](#).

## Works Under Review / In Preparation

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1. Çayan Demirkır, Rui Yang, Aleksandr Bashkatov, **Vatsal Sanjay**, Detlef Lohse, and Dominik Krug, To jump or not to jump: Adhesion and viscous dissipation dictate the detachment of coalescing wall-attached bubbles, submitted to Phys. Rev. Lett., (OA) DOI: [10.48550/arXiv.2501.05532](https://doi.org/10.48550/arXiv.2501.05532).
2. Josephine Mclauchlan, Jessica S. Walker, **Vatsal Sanjay**, Maziyar Jalaal, Jonathan P. Reid, Adam M. Squires, and Anton Souslov, Bouncing microdroplets on hydrophobic surfaces, arXiv preprint, (OA) DOI: [10.48550/arXiv.2503.22527](https://doi.org/10.48550/arXiv.2503.22527).
3. **Vatsal Sanjay**, Aleksandr Bashkatov, Çayan Demirkır, Kerstin Eckert, Dominik Krug, and Detlef Lohse, Worthington jet injects droplets during coalescence of asymmetric bubbles, to be submitted to J. Fluid Mech., [click here for results](#).
4. Vincent Bertin, **Vatsal Sanjay**, Charu Datt, Alexandros T. Oratis, Jacco H. Snoeijer, Elastic Taylor-Culick retraction, to be submitted to Phys. Rev. Lett., [click here for results](#).
5. Jnandeep Talukdar, Uddalok Sen, Christian Diddens, Detlef Lohse, **Vatsal Sanjay**, Sliding drops on dry & wet substrates, to be submitted to Phys. Rev. Fluids, [click here for results](#).
6. Saumili Jana, John Kolinski, Detlef Lohse, and **Vatsal Sanjay**, Impacting spheres: from liquid drops to elastic beads, to be submitted to Soft Matter, [click here for results](#).

## Invited & Contributed Talks

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### Invited Talks.....

- (Apr. 1, 25) *Hydrodynamic singularities in soft matter flows*  
Wageningen University & Research (WUR), Netherlands.
- (Mar. 20, 25) *Can polymeric flows be the Drosophila of continuum mechanics?*  
Condensed Matter Physics Seminar Series, Durham University, UK.
- (Jan. 30, 25) *Can polymeric flows be the Drosophila of unsteady continuum mechanics?*  
University of Illinois at Urbana-Champaign, US (Virtual).
- (Jan. 20, 25) *Hydrodynamic singularities in soft matter flows*  
DAMTP, University of Cambridge, UK.
- (Jan. 6, 25) *Can polymeric flows be the Drosophila of unsteady continuum mechanics?*  
Chaotic Flows in Polymer Solutions workshop, Univ. of Edinburgh, UK.
- (Oct. 9, 24) *Hydrodynamic singularities in soft matter flows*  
Univ. of Warwick, UK.
- (May 30, 24) *Viscous free-surface flows*  
Burgers Symposium (NL).
- (Apr. 12, 24) *Soft matter singularities*  
Univ. of Edinburgh, Scotland.

- (Mar. 4, 24) *Deformable soft matter*  
Dynamics of Interfaces, Univ. of Augsburg, Germany.
- (Jan. 20, 23) *Impact of droplets*  
Univ. Claude Bernard Lyon 1, France.
- (Jan. 10, 23) *Impact of droplets*  
IIT Delhi, India.
- (Jan. 4, 23) *Impact of droplets*  
IIT Patna, India.
- (Dec. 26, 22) *Taylor-Culick retractions*  
IIT Kharagpur, India.
- (Dec. 12, 22) *Taylor-Culick retractions*  
IIT Roorkee, India.
- (Dec. 7, 22) *Drop impact forces*  
IIT Bombay, India.
- (Oct. 26, 22) *Drop impact forces*  
CFSM Seminar Series (Virtual). [\[Video\]](#).
- (Oct. 12, 22) *Drop impact forces*  
Virtual Univ. of Arkon.
- (Jul. 10, 22) *Precursor films help simulate three-phase flows*  
Physics of Fluids Soft Matter Seminar, Univ. of Twente. [\[Video\]](#).
- (Jan. 8, 18) *Formation of liquid chain by collision of two laminar jets*  
Univ. of Twente.
- (Mar. 27, 17) *Understanding of mutual interactions between liquid jets...*  
Cognizance Fest, IIT Roorkee.

### **Selected Contributed Talks**.....

- (Nov. 24) *Dissipative anomaly in sliding drops*, APS-DFD, Salt Lake City, USA.
- (Sep. 24) *Drop Impact Forces*, 12th Liquid Matter Conf., Mainz, Germany.
- (Sep. 24) *A unifying approach for drop impact dynamics on rigid surfaces*, 1st EFDC, Aachen.
- (Apr. 24) *Bursting bubbles in a viscoelastic medium*, European Rheology Conf., Leeds, UK.
- (Nov. 23) *A unifying approach for droplet impact forces*, APS-DFD, Washington, DC, USA. [\[Video\]](#).
- (Nov. 22) *Impact forces of water drops.*, APS-DFD, Indianapolis, USA. [\[Video\]](#).
- (Jul. 23) *Viscous free-surface flows*, Basilisk/Gerris Meeting, Paris, France.
- (Sep. 22) *When does an impacting drop stop bouncing?*, EFMC14, Athens, Greece.
- (Jan. 22) *How much force is required to play ping-pong with water droplets?*, Physics@Veldhoven. [\[Video\]](#).
- (Nov. 21) *Viscous dissipation dictates Taylor-Culick type retractions*, APS-DFD, Phoenix. [\[Video\]](#).
- (Dec. 20) *Bursting Bubble in a Viscoplastic medium*, International Congress on Rheology (virtual). [\[Video\]](#).

- (Nov. 20) *When does a viscous drop stop bouncing?*, APS-DFD (virtual). [\[Video\]](#).
- (Feb. 20) *Jumping & Bouncing Drops & Bubbles*, Max Planck meeting, Mainz.
- (Nov. 19) *Droplet Encapsulation*, APS-DFD, Seattle.
- (Sep. 19) *Bursting Bubbles: from Champagne to Mudpots*, VPF8, Cambridge, UK.
- (Aug. 19) *Impinging drop lifts a sessile drop*, 9th 4U Summer School, Denmark.
- (May 16) *On gas-liquid entrainment by impinging jet*, ICMF9, Florence, Italy.

## Summary of Key Numbers (as of June 1, 2025)

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- **Researcher ID:** [K-1856-2019](#)
- **Orcid:** [0000-0002-4293-6099](#)
- **Hirsch-index:**  $H = 9$  ([Google Scholar](#)), 7 ([Web of Science](#))
- **i10-index:** 8 ([Google Scholar](#))
- **Research Interest Score:** 1000+ (top 2% among [ResearchGate](#) members who first published in 2015.)