

# Vatsal Sanjay — PhD

Department of Physics, Durham University  
PI, Computational Multiphase Physics Lab

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Date of birth: Feb. 5, 1996 Updated: December 9, 2025

## Education

### Physics of Fluids Dept.

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

**Univ. Twente**

2018–2022

**Supervisor:** Prof. Detlef Lohse.

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

### Two-Phase Flow & Instability Lab

*B.Tech (Mech.) & M.Tech (Thermal Eng.), Graduated with distinction (Dept. Gold Medal)*

**IIT Roorkee**

2013–2018

**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).

## Professional Experience

### Department of Physics

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

**Durham University**

2025–present

Leading research on multiphase flows and soft matter dynamics.

### Physics of Fluids Dept.

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

**Univ. Twente**

2022–2025

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

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

**Univ. Claude Bernard Lyon 1**

May–July, 2016

#### Research Intern

Worked on Landau–Levich dip coating.

## Major Awards & Achievements

### Ammodo Science Fellowship

2025

To study mycofluidic transport.

### J. Fluid Mech. Outstanding Reviewer

2024

Top 1% of reviewers in 2023.

### KIVI Hoogendoorn Fluid Mechanics Award

2024

Best PhD thesis in Netherlands (2022–2023).

### Young Scientist, nominated by KNAW

2024

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

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

2022

Top 5% of PhD graduates in 2021–2022.

### Department Gold Medal

2018

For academic excellence at IIT Roorkee.

### Summer Undergraduate Research Award

2015

To study bubble entrainment by impinging liquid jet.

## Service to the Community

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❖ Seminars & Conferences		
<b>Physics of Fluids weekly seminar</b> avg. 40 participants, 10+ international speakers/yr, <a href="#">link</a> .	<b>Univ. Twente</b>	2022–2025
<b>Symposium on Bubbles &amp; Bubbly Flows</b> 75 participants.	<b>Univ. Twente</b>	May 2025
<b>Workshop on (De)Constructing Complex Contact Lines</b> 25 participants, <a href="#">link</a> .	<b>Lorentz Center</b>	Jun 2024
<b>35th Dutch Soft Matter Meeting</b> 100 participants; received NWO Meetings Grant.	<b>Univ. Twente</b>	May 2024
<b>Flow for Future conference: 25 years of Physics of Fluids</b> 200 participants.	<b>Univ. Twente</b>	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*. 🎬

## 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. Kroese (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).

**Universidad Carlos III de Madrid, Spain**

*Mar. 10–13, 2025*

**Advanced Fluid Mechanics**

*Co-lecturer*

**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 Demirkir, 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];  
DOI: [10.1038/s41467-025-59762-7](https://doi.org/10.1038/s41467-025-59762-7);  
Repository.
- [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];  
DOI: [10.1017/jfm.2025.237](https://doi.org/10.1017/jfm.2025.237);  
Repository.
- [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];  
DOI: [10.1103/PhysRevLett.134.104003](https://doi.org/10.1103/PhysRevLett.134.104003);  
Repository.
- [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];  
DOI: [10.1017/jfm.2024.982](https://doi.org/10.1017/jfm.2024.982);  
★ Cover of that volume of *J. Fluid Mech.*;  
Repository.
- [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];  
DOI: [10.1017/jfm.2024.1089](https://doi.org/10.1017/jfm.2024.1089);  
Repository.
- [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];  
DOI: [10.1017/jfm.2024.1073](https://doi.org/10.1017/jfm.2024.1073);  
★ Cover of that volume of *J. Fluid Mech.*;  
Repository.
- [7] **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](https://doi.org/10.1017/jfm.2023.55);

 Repository.

- [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];  
 DOI: [10.1017/jfm.2023.13](https://doi.org/10.1017/jfm.2023.13);  
 Repository.
- [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/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 Castelvecchi, 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)
  -  Repository.
- [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];  
 DOI: [10.1017/jfm.2022.671](https://doi.org/10.1017/jfm.2022.671);  
 Repository.
- [11] **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](https://doi.org/10.1017/jfm.2021.489);  
 Repository.
- [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];  
 DOI: [10.1126/sciadv.aba4330](https://doi.org/10.1126/sciadv.aba4330);  
 Repository.
- [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](#);  
[Repository](#).

## Works Under Review / In Preparation

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- [1] Mandeep Saini, **Vatsal Sanjay**, Youssef Saade, Detlef Lohse, and Stephane Popinet,  
Implementation of integral surface tension formulations in a volume of fluid framework and their  
applications to Marangoni flows,  
submitted to *J. Comput. Phys.*,  
DOI: [10.48550/arXiv.2502.02712](https://doi.org/10.48550/arXiv.2502.02712);  
[Repository](#).
- [2] Çayan Demirkir, 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.*,  
DOI: [10.48550/arXiv.2501.05532](https://doi.org/10.48550/arXiv.2501.05532);  
[Repository](#).
- [3] Josephine McLauchlan, Jessica S. Walker, **Vatsal Sanjay**, Maziyar Jalaal, Jonathan P. Reid, Adam M. Squires, and Anton Soskov,  
Bouncing microdroplets on hydrophobic surfaces,  
arXiv preprint,  
DOI: [10.48550/arXiv.2503.22527](https://doi.org/10.48550/arXiv.2503.22527).
- [4] Tom Appleford, **Vatsal Sanjay**, and Maziyar Jalaal,  
On the Rheology of Two-Dimensional Dilute Emulsions,  
arXiv preprint,  
DOI: [10.48550/arXiv.2508.13022](https://doi.org/10.48550/arXiv.2508.13022);  
[Repository](#).
- [5] **Vatsal Sanjay**, Aleksandr Bashkatov, Çayan Demirkir, 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](#);  
[Repository](#).
- [6] 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](#).
- [7] Jnandeept 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](#).

- [8] 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](#);  [Repository](#).

## 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*  
Bugers 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). 
- (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. 
- (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

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- (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. 
- (Nov. 22) *Impact forces of water drops.*, APS-DFD, Indianapolis, USA. 
- (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. 
- (Nov. 21) *Viscous dissipation dictates Taylor-Culick type retractions*, APS-DFD, Phoenix. 
- (Dec. 20) *Bursting Bubble in a Viscoplastic medium*, International Congress on Rheology (virtual). 
- (Nov. 20) *When does a viscous drop stop bouncing?*, APS-DFD (virtual). 
- (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 December 9, 2025)

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-  **Researcher ID:** K-1856-2019
-  **Orcid:** 0000-0002-4293-6099
-  **Hirsch-index:** H = 10 ([Google Scholar](#)), 8 ([Web of Science](#))
-  **i10-index:** 8 ([Google Scholar](#))
-  **Research Interest Score:** 1000+ (top 2% among [ResearchGate](#) members who first published in 2015.)