

OMKAR HEGDE

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SUMMARY

Research Interest Droplets, Colloids and Interfaces, Soft Matter, Microfluidics

EDUCATION

2016–2021	Doctor of Philosophy Indian Institute Science (IISc), Bangalore, INDIA Department of Mechanical Engineering Thesis title: Vapor Mediated Interactions in Droplets (Thesis submitted for review, yet to defend).
2014–2016	Master of Technology National Institute of Technology, Jamshedpur INDIA Department of Mechanical Engineering (Thermal and Fluids Engineering) Thesis title: CFD Analysis of Natural Convection in Evacuated Tube Solar Water Heater. GPA: 9.28/10
2010–2014	Bachelor of Engineering Basaveshwar Engineering College, Bagalkot, INDIA Department of Mechanical Engineering GPA: 9.23/10
2008–2010	Senior Secondary (12 th) (Pre-University college) Karnataka Pre-University Education Board Alvas PU College (Major: Physics, Chemistry, Mathematics, Biology) 88.33%
2006–2008	Karnataka Secondary Education Examination Board Don Bosco, Sirsi 88%

RESEARCH AND ACADEMIC EXPERIENCE

[1] Expertise in Micro/Nano Characterization. Hands-on experience in Scanning Electron Microscopy (SEM), Electron Dispersive Spectroscopy (EDS), Transmission Electron Microscopy (TEM), Optical Profilometry, Atomic Force Microscopy (AFM), Zeta Sizing, and Dynamic light scattering (DLS), Confocal Microscopy, Fluorescence Microscopy, Raman Spectroscopy, Rheometer.

[2] Experience in experimental techniques like Micro-Particle Image Velocimetry (μ -PIV), Flow Visualization Techniques, Live Cell Imaging, Fluorescence Imaging, High-speed imaging, Fabrication of engineered surfaces using spin/spray coating, soft lithographic and dry etching techniques. Have worked in the cleanroom of class 100 and 1000 at National Nano-Fabrication Center in Center for Nanoscience and Engineering (CENSE), IISc.

[3] Attended Indo-US workshop on Soft Matter (IUWSM-2018). Attended course on "Interfacial and Colloidal Phenomena" by Prof. Sanjeev Gupta, and "Transport processes" by Prof. Kumaran in the Department of Chemical Engineering at IISc. Several Workshops and Courses in IISc and international center for theoretical sciences, ICTS, Bangalore have laid foundations in transport, interfacial and colloidal Phenomena.

[4] Software knowledge in MATLAB, ANSYS FLUENT, PYTHON. Basics of deep learning algorithm in python. Used deep learning algorithm for medical diagnostics of bio-fluid dried droplets.

[5] Teaching assistantship in "Convective Heat Transfer" Course conducted by Prof. S. Basu at IISc.

[6] Summer Internship at IIT Madras (2 months) (2015) on a project titled "Turbulence modeling of Stator Rotor Interaction (RSI)".

PUBLICATIONS IN PEER-REVIEWED JOURNALS

- [1] Spatio-temporal modulation of self-assembled central aggregates of buoyant colloids in sessile droplets using vapor mediated interactions, **O Hegde**, S Basu, *Journal of Colloid and Interface Science*, 2021, 598, 136-146.
- [2] Universal spatio-topological control of crystallization in sessile droplets using non-intrusive vapor mediation, **O Hegde**, A Chattopadhyay, S Basu, *Physics of Fluids*, 2021, 33 (1), 012101.
- [3] Enhancement of mixing in a viscous, non-volatile droplet using a contact-free vapor-mediated interaction. **O Hegde**, P Kabi, S Basu, *Physical Chemistry Chemical Physics*, 2020, 22 (26), 14570-14578.
- [4] Controlling self-assembly and buckling in nanofluid droplets through vapor mediated interaction of adjacent droplets, **O Hegde**, P Kabi, S Agarwal, S Basu, *Journal of colloid and interface science*, 2019, 541, 348-355.
- [5] Vapor-mediated control of microscale flow in sessile droplets. **O Hegde**, S Chakraborty, P Kabi, S Basu, *Physics of Fluids*, 2018, 30 (12), 122103.
- Scholar Profile:** <https://scholar.google.com/citations?user=t8Vxg9AAAAAJ&hl=en>
- [6] Vapor Mediation as a tool to control micro-nano scale dendritic crystallization and preferential bacterial distribution in drying respiratory droplets. **O Hegde**, Ritika Chatterjee, Abdur Rasheed, Dipshikha Chakravorty, Saptarshi Basu. doi: <https://doi.org/10.1101/2021.06.18.448992> **(Under Review)**

Patent

- [1] Provisional patent (2020) (Application No. 202141014327) filed on the invention "Rapid and low-cost point-of-care diagnostics of the bacterial infection in the blood using artificial intelligence."

AWARDS AND RECOGNITION

- [1] AWSAR-Department of Science and Technology (DST) Award (Government of India) for popular science article titled "Tiny droplets bring big benefits" (2020).
- [2] ACS Award for best poster in 12th International Conference on Complex Fluids and Soft Matter (COMPFLU-2018).
- [3] 3rd prize for video competition held in the department symposium 2019 in Mechanical Engineering, IISc Bangalore.
- [4] Best Thesis award in master's for the Thesis titled "CFD Analysis of Natural Convection in Evacuated Tube Solar Water Heater" (2016) under the guidance of Prof. R.V. Sharma in Mechanical Engineering, NIT Jamshedpur.
- [5] Best outgoing student award in Bachelor of Engineering (2014).
- [6] Awarded Rank two in academics in Master of Technology by National Institute of Technology, Jamshedpur, (2016).
- [7] The Bachelor of Engineering project (main) titled "Cycle Pedal Pump" was funded by the prestigious Karnataka State Council for Science and Technology.
- [8] Awarded Rank fourth in academics by Department of Mechanical Engineering, Basaveshwar Engineering College, Bagalkot (2014).
- [9] Qualified National level exam GATE in Mechanical Engineering with a percentile of 98.3, Where the number of participants was ~ 200000. I have received a fully funded fellowship for the Ph.D. program by the Ministry of Education, Government of India, as a result of the qualification of the GATE exam.
- [10] Completed MOOC courses in NPTEL platform (conducted by prestigious institutions like IITs and IISc) on MATLAB, Programming in C and Python, Conduction and Convection, with distinction and secured within top 20 national level ranks (2014-2016).

CONFERENCES AND MEETINGS

- [1] Virtual ACS Spring Meeting (2021), Dispersing μ -particle agglomerates through vapor

mediation induced Marangoni flow (Oral).

[2] Nano-Ge Spring Meeting (NSM 21), Self-Assembly and dis-assembly in evaporating functional droplets: Make it or Break it! (Poster).

[3] Fluids Day (ICTS) -2020, Enhancement μ -scale flows in droplets through vapor mediated interactions (Oral).

[4] DROPLETS-2019 (Durham University), Vapour mediated control of self-assembly in droplets (Poster).

[5] COMPFLU-2018, Enhancement of Mixing in μ -liter Sessile Droplets through Vapor Mediated Interactions (Poster).

“ REFERENCES

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