

Dr. Kalyani Agarwal

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Dept. of Chemical Engineering (Southern Lab, SL-114), IIT Kanpur, Kanpur, Uttar Pradesh, India - 208016



EDUCATION

Indian Institute of Technology (IIT), Ropar, India <i>Ph.D. in Chemical Engineering</i> <i>Thesis: The Unusual Properties of Nanobubbles</i>	2018 – 2023 CPI – 8.25/10
Harcourt Butler Technical University, Kanpur, UP, India <i>Master of Technology in Chemical Engineering</i> <i>Thesis: Extraction of Essential Oil from Piper Betle using Different Extraction Process</i>	2015 – 2017 Percentage – 74.8/100
MIET, Meerut, UP, India <i>Bachelor of Technology in Chemical Engineering (Hons)</i>	2010 – 2014 Percentage – 82.36/100

WORK EXPERIENCE

National Postdoctoral Fellow (NPDF) <i>Department of Chemical Engineering, IIT Kanpur</i>	March 2024 – March 2026
Institute Postdoctoral Fellow (IPDF) <i>Department of Chemical Engineering, IIT Kanpur</i>	Sep 2023 – March 2024
Project Associate <i>Department of Chemical Engineering, IIT Ropar</i>	March 2023 – July 2023
Industrial Training <i>Birla Tyres, Laksar, Uttarakhand</i> <i>Himachal Polyolefin Limited, Himachal</i>	June – July 2013 June – July 2012

ARTICLES PUBLISHED

- Patel, S., **Agarwal, K.**, Arnipally, S., Miriyala, A., Gopal, G., & Joshi, Y. M. (2026). Gelation in Oleogels: A Rheological Framework for Soft Material Formulation. *Langmuir*.
- Agarwal, K.**, Dutta, N., & Nirmalkar, N. (2025). Mechanistic insights into surface tension reduction: The potential contribution of nanobubbles. *Journal of Molecular Liquids*, 12858.
- Bhavya, K., **Agarwal, K.**, Negi, D., Niveria, K., Singh, Y., Verma, A. K., ... & Pal, D. (2024). Oxygen nanobubbles halt tumor aggression and metastasis by inhibiting hypoxia-induced epithelial-to-mesenchymal transition in lung and mammary adenocarcinoma. *ACS Applied Nano Materials*, 7(21), 25198-25211.
- Agarwal, K.**, Trivedi, M., Ohl, C. D., & Nirmalkar, N. (2023). On nanobubble dynamics under an oscillating pressure field during salting-out effects and its dlvo potential. *Langmuir*, 39(15), 5250-5262.
- Trivedi, M., Sharma, A., **Agarwal, K.**, Chhabra, R. P., & Nirmalkar, N. (2023). On enhancing interfacial mass transport through microextraction in dispersed droplet systems. *International Journal of Heat and Mass Transfer*, 203, 123776.
- Agarwal, K.**, Trivedi, M., & Nirmalkar, N. (2022). Does salting-out effect nucleate nanobubbles in water: Spontaneous nucleation? *Ultrasonic sonochemistry*, 82, 105860.
- Agarwal, K.**, Trivedi, M., & Nirmalkar, N. (2022). Bulk nanobubbles in aqueous salt solution. *Materials Today: Proceedings*, 57, 1789-1792.
- Sharma, A., Trivedi, M., **Agarwal, K.**, & Nirmalkar, N. (2021). Thermal energy storage in a confined cylindrical heat source filled with phase change materials. *International Journal of Heat and Mass Transfer*, 178, 121603.
- Agarwal, K.**, & Gupta, S. K. (2018). An improved microwave extraction method for distillation of essential oil from Piper betle L. *International Journal for Research in Applied Science and Engineering Technology*, 6(1), 01-04.

ARTICLES IN PREPARATION

- Agarwal, K.**, Raut, J. S and Joshi, Y.M., Rheological Perspective of Phase Transitions in Soft Solids.
- Agarwal, K.**, and Nirmalkar, N., On nanobubble dynamics during surfactant adsorption at the gas-liquid interface and its refractive index estimation.

PATENT

- Agarwal, K.**, & Nirmalkar, N. Plate and frame type unit for nanobubble generation, Patent number 536626, Indian Patent, Granted.

TECHNICAL SKILLS

- Instruments: Rheometer (Instruments: ARG2, DHR3), Nanoparticle Tracking Analysis (NTA), Zetasizer (Both Zeta potential and DLS), Tensiometer, Conductivity meter, Polarized Microscope. GC-MS, Atomic Force Microscopy (AFM) and Cryo-TEM (working knowledge).
- Software Packages: Origin and LaTeX (Level – Advanced), and BioRender.

CONFERENCE AND PRESENTATIONS

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| • CompFlu, IISC Bangalore - Poster presentation | Dec 2025 |
| • ISMC, Crete, Greece - Poster presentation | Oct 2025 |
| • CompFlu, IIT Hyderabad, India - Flash talk and Poster presentation | Dec 2024 |
| • GYSS, Singapore - Poster presentation | Jan 2024 |
| • CompFlu, IIT Madras, India - Poster presentation | Dec 2023 |
| • CompFlu, IIT Kharagpur, India - Poster presentation | Dec 2022 |
| • Nanobubble 2022, Magdeburg, Germany – Talk | Sept 2022 |
| • ICheEC-2021, NIT Jalandhar, India – Talk | Sept 2021 |
| • CompFlu, IIT Roorkee, India - Poster presentation | Dec 2018 |
| • Chemcon, Haldia, India - Poster presentation | Dec 2017 |

AWARDS/RECOGNITIONS

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| • ITS, ANRF, Travel Grant | 2025 |
| • National Post-Doctoral Fellowship, IIT Kanpur | 2024-2026 |
| • World Intellectual Property Day (Women and IP), IIT Ropar | 2023 |
| • Technology Day, First Position, IIT Ropar, under the category of Prototype development | 2022 |
| • Covid-19, Grand Challenge Award (Cash Prize), IIT Ropar | 2020 |
| • Ministry of Education Scholarship, IIT Ropar | 2018-2023 |
| • TEQIP Scholarship, HBTU Kanpur | 2016-2017 |

TEACHING ASSISTANTSHIP

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| • Microfluidics (CH503), IIT Ropar | 2020 |
| • Fluid Flow, Heat and Mass Transfer Laboratory (CH231), IIT Ropar | 2019 |
| • Process Simulation Laboratory (CH230), IIT Ropar | 2018 |

PROJECTS

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| • ITC: Rheology of Chocolates, IIT Kanpur | Aug 2023 - April 2025 |
| • Unilever: Soap Rheology, IIT Kanpur | Aug 2023 - July 2024 |
| • Random verification on annual inventory on hazardous waste management, CPCB | 2021-2022 |
| • Setup of research lab: Multiphase Fluid Flow, Department of Chemical Engineering, IIT Ropar | 2019 |
| • Setup of undergraduate lab: Fluid flow, Heat and Mass transfer, Department of Chemical Engineering, IIT Ropar | 2018 |

REFERENCES

- Prof. Yogesh M. Joshi
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- Prof. Neelkanth Nirmalkar
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Indian Institute of Technology Ropar, India
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OTHER INFORMATION

- Google Scholar Profile: <https://scholar.google.com/citations?user=HNv-IAoAAAAJ&hl=en>
- ORCID ID: <https://orcid.org/0000-0003-2439-6719>