

Supreet Singh Bahga

Dept. of Mechanical Engineering *Phone:* +91-11-26591120
Block III, Room 351, IIT Delhi *E-mail:* bahga@mech.iitd.ac.in
Hauz Khas, New Delhi-110016 *WWW:* web.iitd.ac.in/~bahga

EDUCATION

03/09-04/13 **Stanford University**, California, USA
Doctor of Philosophy; *Mechanical Engineering*, GPA: 4.12/4 (MS+PhD)

09/07-03/09 **Stanford University**, California, USA
Master of Science, *Mechanical Engineering*

07/03-06/07 **Indian Institute of Technology Bombay**, Mumbai, India
Bachelor of Technology, *Mechanical Engineering*, GPA: 9.73/10
Ranked 1 in Department of Mechanical Engineering

AWARDS & HONORS

- Teaching Excellence Award, IIT Delhi, 2017-18.
- Kusuma Young Faculty Fellowship, IIT Delhi, 06/13-06/18
- Kodak Fellowship, Stanford University 09/10-04/13
- Institute Silver Medal, IIT Bombay, 2007
- Stanford Graduate Fellowship, Stanford University 06/09-06/11
- School of Engineering Fellowship, Stanford University, 09/07-03/09
- Second Prize, Michigan NNIN/C Simulation & Modeling Contest, 2011
- Institute Academic Awards, IIT Bombay 2004-2007

WORK EXPERIENCE

06/13-present **Assistant Professor of Mechanical Engineering**
Indian Institute of Technology Delhi, New Delhi.

- Research: experimental and computational micro/nano-fluidics, electrokinetics and electrohydrodynamics, paper-microfluidics, lab-on-a-chip devices.
- Teaching: microfluidics, thermodynamics, gas dynamics.

03/09-04/13 **PhD Thesis: High sensitivity electrokinetic assays based on propagation and interaction of ion concentration shock waves**
Prof. Juan G. Santiago, Stanford Microfluidics Laboratory, Stanford, CA.

- Developed and experimentally validated numerical schemes for simulating ion-concentration shock waves in non-linear electrokinetics.
- Invented three microfluidic techniques leveraging electrokinetic shock wave interaction to: (i) couple isotachopheresis (ITP) with capillary electrophoresis (CE), (ii) increase sensitivity of ITP based chemical detection, and (iii) sequence-specific detection of DNA fragments.
- Applied on-chip ITP/CE for detection of nucleic acids, environmental pollutants, and toxins.

09/08-01/09 **Research Assistant: Electro-osmotic Flow Over Superhydrophobic Surfaces**
Prof. Martin Z. Bazant, Stanford, CA.

- Theoretically analyzed electro-osmotic flow (EOF) over patterned surfaces of non-uniform charge and local hydrophobicity.
- Developed guidelines for design of superhydrophobic surfaces for enhancing EOF in microdevices.

09/07-09/08 **Research Assistant: Chemical Mechanisms for Engine Surrogate Fuels**
Prof. Heinz Pitsch, Stanford, CA.

- Developed and validated detailed chemical mechanism to predict high temperature combustion characteristics of components of engine surrogate fuel, including substituted aromatic species.

01/06-05/07 **B.Tech. Thesis: Instability Analysis of Advanced Heavy Water Reactor**
Prof. Jagdeep B. Doshi, IIT Bombay, Mumbai.

- Developed and validated thermal hydraulics code to analyze thermally induced instabilities in boiling water nuclear reactors.

TECHNICAL SKILLS

Programming:: C/C++, Fortran, Matlab, MPI, CUDA, Python, LabView.
Software:: Matlab, Maple, AutoCAD, Visualization Toolkit, COMSOL, L^AT_EX.
Experimental: Epifluorescence Microscopy, Particle Image Velocimetry, Gel and Capillary/Micro Electrophoresis/Isotachopheresis

1. Venu Gopal Agarwal, Rattandeep Singh, Supreet Singh Bahga, and Amit Gupta. Dynamics of droplet formation and flow regime transition in a t-shaped microfluidic device with a shear-thinning continuous phase. *Physical Review Fluids*, 5(4):044203, 2020
2. Sufia Khatoon, Jyoti Phirani, and Supreet Singh Bahga. An analytical solution of the inverse problem of capillary imbibition. *Physics of Fluids*, 32(4):041704, 2020
3. Mohammad Babar, Kaushlendra Dubey, and Supreet Singh Bahga. Effect of surface conduction-induced electromigration on current monitoring method for electroosmotic flow measurement. *Electrophoresis*, 41(7-8):570–577, 2020
4. Rattandeep Singh, Supreet Singh Bahga, and Amit Gupta. Electric field induced droplet deformation and breakup in confined shear flows. *Physical Review Fluids*, 4(3):033701, 2019
5. Nilesh D Pawar, Supreet Singh Bahga, Sunil R Kale, and Sasidhar Kondaraju. Symmetric and asymmetric coalescence of droplets on a solid surface in the inertia-dominated regime. *Physics of Fluids*, 31(9):092106, 2019
6. Manjinder Singh, Nilesh D Pawar, Sasidhar Kondaraju, and Supreet Singh Bahga. Modeling and simulation of dropwise condensation: A review. *Journal of the Indian Institute of Science*, 99(1):157–171, 2019
7. Rattandeep Singh, Supreet Singh Bahga, and Amit Gupta. Electrohydrodynamics in leaky dielectric fluids using lattice boltzmann method. *European Journal of Mechanics-B/Fluids*, 74:167–179, 2019
8. Nilesh D Pawar, Sunil R Kale, Supreet Singh Bahga, Hassan Farhat, and Sasidhar Kondaraju. Study of microdroplet growth on homogeneous and patterned surfaces using lattice boltzmann modeling. *Journal of Heat Transfer*, 141(6):062406, 2019
9. Kaushlendra Dubey, Amit Gupta, and Supreet Singh Bahga. Scaling behavior in on-chip field-amplified sample stacking. *Electrophoresis*, 40(5):730–739, 2019
10. Manjinder Singh, Naresh Varma Datla, Sasidhar Kondaraju, and Supreet Singh Bahga. Enhanced thermal performance of micro heat pipes through optimization of wettability gradient. *Applied Thermal Engineering*, 143:350–357, 2018
11. Manjinder Singh, Sasidhar Kondaraju, and Supreet Singh Bahga. Mathematical model for dropwise condensation on a surface with wettability gradient. *Journal of Heat Transfer*, 140(7):071502, 2018
12. Kaushlendra Dubey, Amit Gupta, and Supreet Singh Bahga. Coherent structures in electrokinetic instability with orthogonal conductivity gradient and electric field. *Physics of Fluids*, 29(9):092007, 2017
13. Rahul Gaur and Supreet Singh Bahga. Electrohydrodynamic instability of ion-concentration shock wave in electrophoresis. *Physical Review E*, 95(6):063109, 2017
14. Roshan Patra, Shivam Agarwal, Sasidhar Kondaraju, and Supreet Singh Bahga. Membraneless variable focus liquid lens with manual actuation. *Optics Communications*, 389:74–78, 2017
15. S Ashraf, G Visavale, SS Bahga, and J Phirani. Spontaneous imbibition in parallel layers of packed beads. *The European Physical Journal E*, 40(4):39, 2017
16. Surabhi Sharan, Prateek Gupta, and Supreet Singh Bahga. Mechanism of electrohydrodynamic instability with collinear conductivity gradient and electric field. *Physical Review E*, 95(2):023103, 2017
17. Manjinder Singh, Sasidhar Kondaraju, and Supreet Singh Bahga. Enhancement of thermal performance of micro heat pipes using wettability gradients. *International Journal of Heat and Mass Transfer*, 104:400–408, 2017
18. Aditya Budaraju, Jyoti Phirani, Sasidhar Kondaraju, and Supreet Singh Bahga. Capillary displacement of viscous liquids in geometries with axial variations. *Langmuir*, 32(41):10513–10521, 2016

19. Esha Sharma, Archana Samanta, Jit Pal, Supreet S Bahga, Bhanu Nandan, and Rajiv K Srivastava. High internal phase emulsion ring-opening polymerization of pentadecanolide: Strategy to obtain porous scaffolds in a single step. *Macromolecular Chemistry and Physics*, 217(15):1752–1758, 2016
20. Supreet Singh Bahga, Romir Moza, and Mayank Khichar. Theory of multi-species electrophoresis in the presence of surface conduction. *Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 472(2186):20150661, 2016
21. Aman Kumar Jha and Supreet Singh Bahga. Uncertainty quantification in modeling of microfluidic t-sensor based diffusion immunoassay. *Biomicrofluidics*, 10(1):014105, 2016
22. Prateek Gupta and Supreet Singh Bahga. Stability of electrophoretic transport of ions. *Physical Review E*, 92(2):022301, 2015
23. Supreet S Bahga and Juan G Santiago. Coupling isotachophoresis and capillary electrophoresis: a review and comparison of methods. *Analyst*, 138(3):735–754, 2013
24. Supreet S Bahga, Crystal M Han, and Juan G Santiago. Integration of rapid dna hybridization and capillary zone electrophoresis using bidirectional isotachophoresis. *Analyst*, 138(1):87–90, 2013
25. Denitsa Milanova, Robert D Chambers, Supreet S Bahga, and Juan G Santiago. Effect of pvp on the electroosmotic mobility of wet-etched glass microchannels. *Electrophoresis*, 33(21):3259–3262, 2012
26. Supreet S Bahga, Moran Bercovici, and Juan G Santiago. Robust and high-resolution simulations of nonlinear electrokinetic processes in variable cross-section channels. *Electrophoresis*, 33(19-20):3036–3051, 2012
27. Giancarlo Garcia-Schwarz, Anita Rogacs, Supreet S Bahga, and Juan G Santiago. On-chip isotachophoresis for separation of ions and purification of nucleic acids. *JoVE (Journal of Visualized Experiments)*, (61):e3890, 2012
28. Supreet S Bahga and Juan G Santiago. Concentration cascade of leading electrolyte using bidirectional isotachophoresis. *Electrophoresis*, 33(6):1048–1059, 2012
29. Viktor Shkolnikov, Supreet S Bahga, and Juan G Santiago. Desalination and hydrogen, chlorine, and sodium hydroxide production via electrophoretic ion exchange and precipitation. *Physical Chemistry Chemical Physics*, 14(32):11534–11545, 2012
30. Denitsa Milanova, Robert D Chambers, Supreet S Bahga, and Juan G Santiago. Electrophoretic mobility measurements of fluorescent dyes using on-chip capillary electrophoresis. *Electrophoresis*, 32(22):3286–3294, 2011
31. Supreet S Bahga, Robert D Chambers, and Juan G Santiago. Coupled isotachophoretic pre-concentration and electrophoretic separation using bidirectional isotachophoresis. *Analytical chemistry*, 83(16):6154–6162, 2011
32. Supreet S Bahga, Govind V Kaigala, Moran Bercovici, and Juan G Santiago. High-sensitivity detection using isotachophoresis with variable cross-section geometry. *Electrophoresis*, 32(5):563–572, 2011
33. Supreet S Bahga, Moran Bercovici, and Juan G Santiago. Ionic strength effects on electrophoretic focusing and separations. *Electrophoresis*, 31(5):910–919, 2010
34. Supreet S Bahga, Olga I Vinogradova, and Martin Z Bazant. Anisotropic electro-osmotic flow over super-hydrophobic surfaces. *Journal of Fluid Mechanics*, 644:245–255, 2010

1. Nilesh D. Pawar, Sunil R. Kale, Supreet Singh Bahga, Sasidhar Kondaraju, "Study of inertial coalescence of droplets on a solid substrate using lattice boltzmann modelling ", CSME-CFDSC Congress 2019, June 2–5, 2019, Western University, London, Ontario, Canada.
2. Kaushlendra Dubey, Amit Gupta, and Supreet Singh Bahga. Electrokinetic dispersion in field amplified sample stacking. In *ASME 2018 16th International Conference on Nanochannels, Microchannels, and Minichannels*, pages V001T08A001–V001T08A001. American Society of Mechanical Engineers, 2018
3. Rattandeep Singh, Supreet Singh Bahga, and Amit Gupta. Droplet deformation and breakup due to shear flow and electric field in a confined geometry. In *ASME 2018 16th International Conference on Nanochannels, Microchannels, and Minichannels*, pages V001T02A003–V001T02A003. American Society of Mechanical Engineers, 2018
4. Manjinder Singh, Naresh Varma Datla, Supreet Singh Bahga, and Sasidhar Kondaraju. Optimization of wettability gradient for enhancement of thermal performance of micro heat pipes. In *ASME 2018 16th International Conference on Nanochannels, Microchannels, and Minichannels*, pages V001T02A007–V001T02A007. American Society of Mechanical Engineers, 2018
5. Kaushlendra Dubey, , Vidushi, Amit Gupta, and Supreet Singh Bahga. Dynamic mode decomposition of unstable micro-flows. In *Proceedings of the 24th National and 2nd International ISHMT-ASTFE Heat and Mass Transfer Conference (IHMTTC-2017), December 27-30, 2017, BITS-Pilani, Hyderabad, India.*
6. Mayank Khichar, Romir Moza, and Supreet Singh Bahga. Effect of surface conduction on propagation of ion-concentration shock waves in isotachophoresis. In *ASME 2015 13th International Conference on Nanochannels, Microchannels, and Minichannels*, pages V001T04A011–V001T04A011. American Society of Mechanical Engineers, 2015
7. Prateek Gupta and Supreet Singh Bahga. Stability analysis of oscillating electrolytes. In *ASME 2015 13th International Conference on Nanochannels, Microchannels, and Minichannels*, pages V001T04A010–V001T04A010. American Society of Mechanical Engineers, 2015
8. Zeeshan Ahmad, Rattandeep Singh, Supreet Singh Bahga, and Amit Gupta. Droplet formation in a t-junction microfluidic device in the presence of an electric field. In *ASME 2015 13th International Conference on Nanochannels, Microchannels, and Minichannels*, pages V001T04A005–V001T04A005. American Society of Mechanical Engineers, 2015
9. Nilesh D. Pawar, Sunil R. Kale, Supreet Singh Bahga, Sasidhar Kondaraju, A three-dimensional lattice Boltzmann modeling for single and multiple droplet growth dynamics during condensation, *10th International Conference on Boiling and Condensation Heat Transfer* March 12–15, 2018, Nagasaki, Japan
10. S. S. Bahga, C. M. Han, J. G. Santiago, "Rapid Southern Blot-Type Assay Using Bidirectional Isotachophoresis", *MicroTAS*, Oct 28–Nov 1, 2012, Okinawa, Japan.
11. S. S. Bahga, G. V. Kaigala, M. Bercovici, J. G. Santiago, "Strongly Convergent Channels for High Sensitivity Label-Free Chemical Detection Using Isotachophoresis", *MicroTAS*, Oct 3–7, 2010, Groningen, The Netherlands.
12. K. Narayanaswamy, S. S. Bahga, G. Blanquart, H. Pitsch, "A Consistent Chemical Mechanism for Oxidation of Substituted Aromatic Species", *6th US National Combustion Meeting*, May 17–20, 2009, Ann Arbor, Michigan.
13. SS Bahga and JB Doshi. Non-linear analysis of out-of-phase instabilities in advanced heavy water reactor. In *ASME 2007 International Mechanical Engineering Congress and Exposition*, pages 1745–1754. American Society of Mechanical Engineers, 2007
14. SS Bahga, A Bhattacharya, and Roop L Mahajan. Numerical modeling of buoyancy induced convection in finned heat sinks in presence of unheated and heated shrouds. In *ASME 2005 International Mechanical Engineering Congress and Exposition*, pages 725–731. American Society of Mechanical Engineers, 2005

1. Khatoon, S., Jain, A., Bahga, S. S., Phirani J., Bayesian inference approach for solving inverse fluid flow problems in petroleum engineering, INCAM 2019, July 3-5, 2019, IISc Bangalore, India,.
2. Rattandeeep Singh, Venu Agarwal, Supreet Singh Bahga, Amit Gupta, "Electric control of droplet generation in a T-shaped microfluidic device", Physics and Chemistry of Microfluidics (Gordon Research Conference), June 16-21, 2019, Hong Kong, CN.
3. Abhishek Kumar Singh, Ajmera Sanketh Kumar, Rajiv Kumar Srivastava, and Supreet Singh Bahga, "Customised electrohydrodynamic jet printing with polymeric inks" (2nd Prize), Young researchers symposium on emerging trends in textile, fiber and polymer research, May 15-17, 2019, IIT Delhi, New Delhi, India.
4. Abhishek Kumar Singh, Ajmera Sanketh Kumar and Supreet Singh Bahga, "Study of transient electrokinetic flows" (Oral Presentation), 12th International Conference on Complex Fluids and Soft Matter, December 6 – 9, 2018. IIT Roorkee, Roorkee, India.
5. Abhishek Kumar Singh, Ajmera Sanketh Kumar, Rajiv Kumar Srivastava and Supreet Singh Bahga, "Customised electrohydrodynamic jet printing with polymeric inks" (Best Poster Award), 12th International Conference on Complex Fluids and Soft Matter, December 6 – 9, 2018. IIT Roorkee, Roorkee, India.
6. Ajmera Sanketh Kumar, Archit Agarwal, Rattandeeep Singh and Supreet Singh Bahga, "A novel co-flow microfluidic device to generate polyHIPEs" (Oral Presentation), 12th International Conference on Complex Fluids and Soft Matter, December 6 – 9, 2018. IIT Roorkee, Roorkee, India.
7. Ajmera Sanketh Kumar, Rajiv Kumar Srivastava, and Supreet Singh Bahga, "Creating Poly-HIPEs through HIPE generation in a novel Co-flow device." (Poster), Advances in Polymer Science & Technology (APA-2018) November 1-3, 2018, Kathmandu, Nepal.
8. Khatoon, S., Jain, A., Bahga, S. S., Phirani J., "Uncertainty quantification in petroleum reservoir simulations", Workshop by ONGC & Pan-IIT Consortium on Energy Resources: Advances in Technology and Future Outlook, IIT Kharagpur, India, November 23 – 24, 2018.
9. Khatoon, S., Bahga, S. S., Phirani J., "Stochastic simulation in petroleum reservoirs", InterPore Symposium: Flow and Transport in Porous Media, IIT Delhi, India, December 14, 2017.
10. Singh, R., Bahga, S.S. and Gupta, A., "A lattice Boltzmann model for electrohydrodynamics in leaky dielectric fluids", InterPore Symposium: Flow and Transport in Porous Media, IIT Delhi, India, December 14, 2017.
11. Supreet Singh Bahga, Kaushalendra Dubey, "Chaotic Micro-Mixing in Microchannels using Electrokinetic Instability" (Invited Talk), Microfluidics, Liquid Handling and Lab on a Chip Conference, Jan 18-19 2017, Mumbai.
12. Modelling of non-linear electrophoresis in micro- and nano-fluidic devices, EMN Meeting on Microfluidics and Nanofluidics, April 05-08, 2016, Dubai, UAE.
13. Bahga, S.S., Chambers, R.D. and Santiago, J.G., Interaction of ion-concentration in shock waves in microfluidics," *64th Annual Meeting of the American Physical Society/Division of Fluid Dynamics (APS/DFD)*, Baltimore, MD, November 20-22, 2011.
14. Bahga, S.S., R.D. Chambers, J.G. Santiago, "Coupled isotachophoretic preconcentration and electrophoretic separation using bidirectional isotachophoresis", *The Thermal and Fluid Sciences Affiliates and Sponsors Conference (TFSA 2011)*, Stanford, CA, February 2-4, 2011.
15. Bahga, S.S., Bercovici, M., Kaigala, G.V., Santiago, J.G., "Rapid chemical detection and identification in a hand held device", *The International Chemical Congress of Pacific Basin Societies 2010 (Pacifichem 2010)*, Honolulu, HI, USA, December 15-20, 2010.

1. "Propagation and Interaction of Ion-Concentration Shock Waves in Microfluidics, Invited Talk, IIT Bombay, Dec, 2011, Mumbai.
2. "Desalination using ion-concentration shock waves" at Indo-US Workshop on Recent Advances in Micro/Nanoscale Heat Transfer and Applications in Clean Energy Technologies during Dec 21-22, 2013 at IIT Ropar.
3. Two lectures on lab-on-a-chip technologies and microfluidic MEMS in Workshop on MEMS Design Technology and Application held at ITM University Gurgaon, Lecture March 1-3, 2015.
4. "Shock waves in electrokinetics", Seminar at Kyoto University, Japan, October 22, 2015.
5. "Microfluidics: Physics and Applications", Living Science Foundation, July 23, 2016. (available on youtube.com)
6. "Electric field driven instability in microscale flows", ME Seminar Series, IIT Delhi, September 21, 2016
7. Electrohydrodynamic instabilities in microflows, Mechanical Engineering Seminar Series, IISc Bangalore, Speaker Feb 17, 2017
8. "Microfluidic MEMS", Futuristic Trends of Nano-Electronics, MEMS and NEMS(18th-19th September, 2018)
9. "Electrohydrodynamics in Microsystems", Pravartana 2019, IIT Kanpur, April 1, 2019.
10. "Electrohydrodynamic instabilities in microchip electrophoresis", Indo-French workshop on recent advances in electrohydrodynamics (EHD)-applications in microfluidics, Nov 27-29, 2019.

PATENTS

1. Santiago, Juan G., Robert D. Chambers, and Supreet Singh Bahga. "Isotachophoresis having interacting anionic and cationic shock waves." U.S. Patent No. 8,986,529. 24 Mar. 2015.
2. Bahga, S.S., Srivastava, R.K., Singh, R., Yadav, Anilkumar L., Ajmera, S., Agarwal, A., Pradhan A., A microfluidic device and a method for fabricating a three-dimensional (3D) poly-high internal phase emulsions, Indian Patent Application, 201811021521, 2018.
3. Bahga, S.S., Kondaraju, S., Agarwal, S., Patra, R., Gupta, P, Ankur, "A membrane-less variable focus liquid lens and an imaging device", Indian Patent Application, 201611017565, 2016.
4. Srivastava, R.K., Nandan, B., Bahga, S.S., Archana, P., Sharma, E., Pal, J. "A process for preparation of multidimensional porous scaffold", Indian Patent Application, 4302/DEL/2015, 2015.

SPONSORED RESEARCH PROJECTS (EXTERNAL FUNDING)

| S. No. | Project Title | PI/co-PI | Funding Agency | Budget (in Lakh Rs.) | Status |
|--------|---|----------|------------------------------|----------------------|-----------|
| 1 | Investigation of Electrohydrodynamic Instabilities in Microscale Electrophoretic Processes | PI | DST-SERB | 22.80 | Completed |
| 2 | Uncertainty Quantification in Petroleum Reservoir Simulations | PI | ONGC | 27.84 | Completed |
| 3 | Development of a submicrometer resolution electrohydrodynamic jet printer for printing customized polymeric structures | PI | MHRD-SERB (IMPRINT-2 Scheme) | 75.37 | Ongoing |
| 4 | Condition monitoring and prediction of thermal runaway through experiments, numerical modeling and estimation of state-of-charge in Lithium-ion cells | co-PI | DST | 90.48 | Ongoing |
| 5 | Microfluidic Digital Holographic Microscopy Platform for Live Cell Imaging and Diagnostics | co-PI | DST | 57.82 | Completed |
| 6 | To Initiate Boeing University Relationship Programme at the Institute and as a part of the Aerospace and Aeromodelling Activities among Students | co-PI | Boeing | 83.6 | Ongoing |

SPONSORED RESEARCH PROJECTS (INTERNAL FUNDING)

| S. No. | Project Title | PI/co-PI | Funding Scheme | Budget (in Lakh Rs.) | Status |
|--------|--|----------|------------------------|----------------------|-----------|
| 1 | High-fidelity Simulations of Microscale Electrokinetic Flows | PI | IRD, New Faculty Grant | 1.0 | Completed |
| 2 | UAVs for high altitude and high wind operations | PI | (IRD DL-1234 2018) | 2.0 | Ongoing |
| 3 | High-resolution electro-hydrodynamic jet printing for fabrication of customized polymeric structures | PI | FIRP 2018 | 10.0 | Ongoing |

CONSULTANCY PROJECTS

1. Review of automotive heat exchangers basics and design methods (as PI), funded by Halla-Visteon Climate Systems India Ltd. Budget: Rs. 3,37,080, Status: Completed.

SUPERVISED THESIS (COMPLETED)

PhD

| S. No. | Student | Title | Year | Status/ Remarks |
|--------|------------------|--|------|-----------------|
| 1 | Manjinder Singh | Modelling of miniature heat pipes based on wettability gradient | 2019 | Defended |
| 2 | Nilesh D. Pawar | Growth dynamics of droplets on a solid surface during dropwise condensation (co-supervised with Profs. S.R. Kale and S. Kondaraju) | 2019 | Defended |
| 3 | Rattandeep Singh | Electrohydrodynamics of droplets in a microchannel (co-supervised with Prof. A. Gupta) | 2019 | Defended |

MS(R)

| S. No. | Student | Title | Year | Status/ Remarks |
|--------|---------|---|------|-----------------|
| 1 | Surabhi | Electrohydrodynamic instability with collinear electric field and conductivity gradient | 2017 | Defended |

M.Tech.

| S. No. | Student | Title | Year |
|--------|-----------------------|---|------|
| 1 | Arun Yadav | Thermal analysis and design of microheat pipe | 2015 |
| 2 | Aditya Budaraju | Lattice Boltzmann simulation of imbibition in capillaries (co-supervised with Prof. S. Kondaraju) | 2016 |
| 3 | Rohit Mehta | Uncertainty quantification in modelling of micro-scale ion transport | 2017 |
| 4 | Vidushi | Lattice Boltzmann simulation of imbibition in capillaries | 2017 |
| 5 | Lt. Col. Vivek Bandal | Extreme weather clothing for the armed forces | 2018 |
| 6 | Mohit Pathak | Simulations of electrohydrodynamic instability in microchannel flow | 2019 |
| 7 | Sridhar Palani | Design and development of precision hot embossing machine (co-supervised with Prof. J. Khatait) | 2019 |

B.Tech.

| S. No. | Student(s) | Title | Year |
|--------|--------------------------------|--|------|
| 1 | Prateek Gupta | Stability analysis of electrophoretic systems | 2015 |
| 2 | Romir Moza, Mayank Khichar | Non-linear wave in nanochannel electrophoresis | 2015 |
| 3 | Aman Kumar Jha | Uncertainty quantification of microscale transport processes | 2015 |
| 4 | Piyush Gupta, Ankur Ankur | Design and fabrication of fluidic lens | 2015 |
| 5 | Rahul Gaur | Electrohydrodynamic instability of electrophoretic shock waves | 2016 |
| 6 | Sanketh Ajmera, Shivam Agarwal | Droplet microfluidic approach for fabricating porous polymeric constructs | 2017 |
| 7 | Prerit Mathur, Roshan Patra | Development of particle counting microfluidic device | 2017 |
| 8 | Apoorva Pradhan, Anant Sharma | Microfluidic digital holographic microscopy platform for cell counting | 2018 |
| 9 | Mohd. Babar | Non-linear waves in current monitoring method for measurement of electroosmotic flow | 2019 |

Ph.D.

1. Yogesh Patel, Microfluidic devices for cell analysis.
2. Anupam Choubey, Experimental investigation of electrohydrodynamic jetting.
3. Kaushalendra Dubey, Electrohydrodynamic instabilities in microchip electrophoresis (co-supervisor Prof. A. Gupta).
4. Abhishek Kumar Singh, Electrohydrodynamic jet printing (co-supervisor Prof. R. Srivastava).
5. Wasim Akram, Chaos in electrophoretic systems (co-supervisor Prof. A. Gupta).
6. Sufia Khatoon, Uncertainty quantification in petroleum reservoir simulations (co-supervisor Prof. J. Phirani).
7. Amit Jha, Mini and micro-channel liquid cooling based Thermal Management of High Power Laser Sources (co-supervisor Prof. Prabal Talukdar).
8. Raghendra Gupta, Battery management system based on physics-based model of lithium-ion batteries (co-supervisor Prof. A. Gupta).

M.S.(R)

1. Sanketh Ajmera, Numerical simulations of electrohydrodynamic instabilities.

M.Tech.

1. Vivek Mohan, Numerical simulation electrospray thruster (co-supervisor Prof. A. Gupta).
2. Lt. Col. Subhasis Sarkar, Micro-UAV for military applications (co-supervisor Prof. A. Gupta).

TEACHING EXPERIENCE

2013-2019

Assistant Professor, Indian Institute of Technology Delhi

1. *Course coordinator of the following courses:*

- i. MEL341: Gas Dynamics and Propulsion, Semester II, 2013-14
- ii. MEL441 Modelling and Experiments in Heat Transfer, Semester I, 2014-15
- iii. MEL341 Gas Dynamics and Propulsion, Semester II, 2014-15
- iv. MEL715 Gas Dynamics, Semester I, 2015-16
- v. MCQ302 Seminar Course – II, Semester II, 2015-16
- vi. MCL701 Advanced Thermodynamics, Semester I, 2016-17, 2017-18, 2018-19
- vii. MCL826 Introduction to Microfluidics, Semester II, 2016-17, 2017-18, 2018-19
- viii. NIN100 Introduction to Engineering, Semester I, 2019-20

2. *Assisted in delivering lectures and/or conducting laboratory sessions of the following courses:*

- i. MEL705 Experimental Methods in Thermal Engineering. I, 2013-14
- ii. MEL715 Gas Dynamics, Semester I, 2013-14
- iii. NIN100 Introduction to Engineering, Semester I, 2014-15, 2015-16, 2016-17
- iv. MCP301 Mechanical Engineering Lab – I, Semester II, 2015-16, 2016-17
- v. MCP401 Mechanical Engineering Laboratory – II, Semester II, 2016-17, 2017-18, 2018-19
- vi. MCL705 Experimental Methods, Semester II, 2018-19

3. *Co-Instructor of VLM107 Micro and Nano Fabrication in the Visionary Leadership for Manufacturing (VLFM) Programme in Semester II, 2017-18 and 2018-19*

2009-2012

Teaching Assistant, Stanford University, USA

1. ME354 Experimental Fluid Mechanics, Autumn 2009-2012, with Prof. Juan G. Santiago
2. ME457 Fluid Flow in Microdevices, Winter 2010-2011, with Prof. Juan G. Santiago

ADMINISTRATIVE EXPERIENCE

Department Level, Dept. of Mechanical Engineering, IIT Delhi

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|---------------------|--|
| <i>2019-present</i> | Secretary of Department Research Committee (DRC) |
| <i>2016-present</i> | Lab-in-charge of Micro and Nanofluidics Lab (II-372) |
| <i>2016-2018</i> | Secretary of Faculty Search Committee |
| <i>2016-2017</i> | Member of committee for shortlisting and Stage I seminar of faculty applicants of IIT Jammu. |
| <i>2015-2016</i> | Member of Faculty Search Committee |
| <i>2015-2016</i> | Member of M.Tech. Project Review Committee |
| <i>2015-2016</i> | Lab-in-charge of Heat Transfer Lab (II-372) |
| <i>2015-2016</i> | Faculty Coordinator of Mechanical Engineering Society |
| <i>2014-2015</i> | Member of Department Research Committee (DRC) |
| <i>2014-2015</i> | Member of B.Tech. Project Review Committee |
| <i>2013-2014</i> | Member of Mini Project Review Committee |

Institute Level, IIT Delhi

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|---------------------|---|
| <i>2018-present</i> | Faculty Coordinator of Aeromodelling Club of IIT Delhi |
| <i>2013-2018</i> | Member of proctorial team to assist incoming UG students |
| <i>2015-19</i> | Institute representative for Graduate Aptitude Test in Engineering (GATE) |
| <i>2016-18</i> | Institute representative for Joint Entrance Examination (JEE) |

ACADEMIC SERVICE

1. Reviewed articles for the following archived journals:

- Physics of Fluids
- Applied Physics Letters
- Journal of Heat Transfer
- Analytical Chemistry
- Applied Mathematical Modelling
- European Journal of Mechanics -B/Fluids
- Electrophoresis
- Journal of Chromatography A
- Nature Scientific Reports
- Soft Matter
- Advanced Powder Technology
- Chemical Engineering Communications
- Advances in Mechanical Engineering

2. Reviewed research proposals submitted to ECR scheme of DST, ISRO-IISc Space Technology Cell, and Wadhvani Research Center for Bioengineering, IIT Bombay.

3. Session Chair, COMPFLU-2018 (12th International Conference on Complex Fluids and Soft Matter), December 6 – 9, 2018, IIT Roorkee, Roorkee, India

4. Track Chair, 5th National and 3rd International ISHMT-ASTFE Heat and Mass Transfer Conference, December 28 – 31, 2019, IIT Roorkee, Roorkee, India