Kaushlendra Dubey, PhD

Assistant Professor,
Department of Mechanical Engineering departments
SRM University Andhra Pradesh, AP, India. · kkdubey359@gmail.com
kkdubey359@gmail.com, · Ph: +91-9636436591
Google scholarhttps://scholar.google.co.uk/citations?user=n5WUVWAAAAAJ&hl=en

SUMMARY

Experienced academic professional with 6+ years of combined experience of industry and academia, including three years in teaching. Specializes in designing and executing experimental studies at microscale, with an interdisciplinary research interest based in Mechanical engineering, Applied Mathematics with focus on biological applications.

Demonstrated excellence in teaching through active learning methodologies such as problem-based learning, and project-based learning. I am particularly enthusiastic about engaging with students from diverse academic backgrounds and being part of an academic environment that supports interdisciplinary teaching and research.

EDUCATION

PhD in Mechanical Engineering — July 2015 – June 2021

Indian Institute of Technology Delhi (IITD), New Delhi, India
Supervisor (s): Dr. Supreet Singh Bahga, Dr. Amit Gupta
Thesis: Electrokinetic instability and non-uniform electroosmotic flows in microfluidic systems with conductivity gradients
Experimentally investigated the dynamics of electric-field driven flows with heterogeneous fluid properties which is of particular interest in various microfluidic applications such as micromixing, electrophoretic techniques such as field-amplified sample stacking and isotachophoresis (ITP). Performed finite element based simulations using COMSOL Multiphysics to investigate the dynamics of non-uniform flow and electrokinetic instability in microchip electrophoresis. Applied on-chip capillary electrophoresis and ITP for DNA purification and detection of nucleic acids, environmental pollutants.

M.Tech in Mechanical Engineering, specialization in Fluids and Thermal Sciences — July 2012 – July 2014

Indian Institute of Technology Kanpur (IITK), Kanpur, U.P., India
Supervisor: Dr. Pradipta Kumar Panigrahi
Thesis: Electro-encapsulation using coaxial electrified jet: Scaling analysis

B.Tech in Mechanical Engineering — August 2005 – June 2009

Government Engineering College Kota, Rajasthan

Experience

Assistant Professor **July 2023 – Till date**

SRM University Andhra Pradesh, AP, India

Senior Research Fellow (Pool scientist scheme) **Nov 2021 – June 2023**

Council of Scientific and Industrial Research (CSIR), New Delhi

Teaching Assistant **July 2015 – December 2020**

Micro and Nano fluidics Lab, IIT Delhi

Guest Faculty **July 2014 – May 2015**

Department of Mechanical Engineering, MNIT Jaipur

Senior Engineer **August 2009 – September 2011**

Larsen and Toubro Ltd, Thermal Power Plant Division, Barmer, Rajasthan

Subjects Taught at SRM-AP

With regard to teaching, due to the interdisciplinary nature of my academic interests, I can teach all core courses in the Mechanical Engineering Curriculum, along with courses that align with my academic background and research. Given some preparation time, I am also open to handling subjects such as Artificial Intelligence and Machine Learning. At SRMAP, I have taught courses both within my core specialization in Thermofluids and subjects beyond my primary expertise, including:

- Numerical Methods (2023- Till date, Odd semester)
  - Apart from lectures, taught MATLAB programming in lab sessions to explain the numerical algorithm
- Measurements and Instrumentation (July 2023 – Till date, Even semester)
  - Revamped the syllabus and developed an Instrumentation lab from scratch, added experiments on 1^{st} and 2^{nd} order instruments, data acquisition system, and optical system-based experiments.
- Engineering Mechanics (July 2023 – Till date, Even semester)
- Fundamentals of Thermo-fluids for Electronics Cooling (Open elective, in conjunction with Electrical and Electronics department) (Jan 25 – June 25)
- Fluid Machinery, (From AY 2023 – Till date,)
- Introduction to Multiphase Flow (AY 2023 – 2024)

- At MNIT Jaipur , as a guest faculty during 2014- 2015, I have taught Fluid Mechanics, Heat Transfer , and Gas Turbine courses. I also handled all workshop sessions for Basic Mechanical Engineering courses and supervised laboratory sessions on Heat Transfer and Fluid Mechanics experiments to undergraduate courses.

  Given the interdisciplinary nature of my research, I would like to develop the following courses/labs at the University

- Experimental Methods for Engineers (VII semester as Open Elective)
- AI/ML for Mechanical Engineers (V semester as Open Elective)
- Introduction to Microfluidics (VI/VII semester UG/PG as Open Elective)
- A laboratory around the fundamental study and application of microfluidics.

Academic Responsibilities

At the Mechanical department level I handle the following administrative responsibilities

- MOOCS coordinator (2023 – Till date)
- Internship coordinator (2025 – Till date.
- Purchase coordinator for All Labs (2023 - Till Date)
- Member of Board of Studies (2023– Till date)
- Placement mentor (2024- Till date)
- Mentoring students of various departments under the University's Mentor-Mentee program (AY 2024 onwards)

Academic achievements

- Received MHRD Graduate fellowship for PHD at IIT Delhi
- Awarded MTech scholarship from MHRD, Government of India
- Received Research Excellence Travel Grant Award (RETA) at IIT Delhi
- Secured AIR-365 in Graduate Aptitude Test for engineering GATE-2012

Research

I have supervised one B.Tech student and one M.Tech student for their final year projects. The details of the projects are

UG project: Viscosity Measurement of Bioink using Falling Ball Viscometer

PG project: Viscoelastic effects on various flow regimes in co-flow configuration of droplet microfluidics

Project Proposal Submitted to Various Agencies

- Experimental investigation of effects of Temperature and Humidity variations in Electrohydrodynamic Jet based Printing method ANRF-PM ECRG-2024
- Development of Electroosmotic pump for space applications ISRO RESPOND SCHEME24

Research interests

- Experimental Microfluidics, EHD-jet printing
- Electric-field driven flows at microscale
- Multiphase Flows, Droplet Dynamics, Particle Image Velocimetry
- Flow Instability and other Nonlinear flows, Non-invasive measurement techniques

Patent

While working at CSIR, I developed a low-cost and rapid microfabrication technique using electrohydrodynamic jet printing. This approach enabled the creation of low-cost non-sacrificial templates for PDMS microfluidic devices through replica molding, making the fabrication process more accessible and efficient. The following patent was filed from this work

Bahga, S.S., Choubey, A., Dubey, K., Singh A.K., Srivastava, R., "A method and system for producing master mold for microfluidic devices", Indian Patent Application, 202211056031. Status: Published

Publications

Journal publications — In descending order

5. Anupam Choubey, Kaushlendra Dubey, and Supreet Singh Bahga. Rapid prototyping of polydimethylsiloxane (pdms) microchips using electrohydrodynamic jet printing: Application to electrokinetic assays. *Electrophoresis*, 44(7-8):725–732, 2023
4. Kaushlendra Dubey, Sanjeev Sanghi, Amit Gupta, and Supreet Singh Bahga. Electrokinetic instability due to streamwise conductivity gradients in microchip electrophoresis. *Journal of Fluid Mechanics*, 925:A14, 2021
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
2. Kaushlendra Dubey, Amit Gupta, and Supreet Singh Bahga. Scaling behavior in on-chip field-amplified sample stacking. *Electrophoresis*, 40(5):730–739, 2019
1. 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), 2017

Conference publications **In descending order**

6. Mohammad Babar, Kaushlendra Dubey, and Supreet Singh Bahga. Nonlinear concentration waves in current monitoring method for measurement of electroosmotic flow. In *APS Division of Fluid Dynamics Meeting Abstracts*, pages G36–006, 2019

5. Singh Abhishek, Kaushlendra Dubey, Rajiv Srivastava, and Supreet Singh Bahga. Scaling behavior in electrohydrodynamic jetting of polymeric solutions. In *ASME International Mechanical Engineering Congress and Exposition*, page V010T12A018, 2019

4. 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*, page V001T08A001. American Society of Mechanical Engineers Digital Collection, 2018

3. Kaushlendra Dubey, Vidushi, Amit Gupta, Supreet Singh Bahga, et al. Dynamic mode decomposition of unstable microflows. In *Proc. 24th Nat.and 2nd Internat. ISHMT-ASTFE Heat Mass Tran. Conf. (IHMTC-2017)*, pages 669–676. Begel House Inc., 2017

2. Kaushlendra Dubey, Amit Gupta, and Supreet Singh Bahga. Coherent structures of electrokinetic instability in microflows. In *APS Division of Fluid Dynamics Meeting Abstracts*, pages A11–009, 2016

1. Kaushlendra Dubey and P.K. Panigrahi. Instability modes and dimensional analysis of micro/nano electro-encapsulation process. In *Fluid Mechanics and Fluid Power 2014, IIT Kanpur*, pages 1555–1563, 2014

REFERENCES

- Supreet Singh Bahga,
  Associate Professor, Department of Mechanical Engineering,
  IIT Delhi
  bahga@mech.iitd.ac.inPh: (+91)-11-2659-1120

- Dr. Amit Gupta,
  Professor, Department of Mechanical Engineering,
  IIT Delhi, New Delhi, India
  agupta@mech.iitd.ac.in

- Dr. Rattandeep Singh,
  Scientific Developer, Liebherr werk Nenzing,
  Austria
  rattandeep20@gmail.com Ph: (+43)-6886410-4595