

Electrokinetically Driven Flow: Fundamentals, Theories and Applications

OVERVIEW

The ion and fluid transport phenomena through microfluidic systems draws a great attention to the world wide researches due to its versatile applications ranging from the industries of pharmaceutical and biomedicine, chemical engineering, energy conversion processes, environmental sciences, to name a few. Generally the transport of fluid through microfluidic devices can be generated through the application of an external voltage drop or pressure drop. Among them, the electrokinetically driven flow is the most convenient mechanism for transporting fluid through microfluidic devices. In order to design the microfluidics-based devices for practical applications, it is essential to have state-of-the-art knowledge on both theoretical and applied aspect of underlying flow physics and interfacial phenomena at small scales. The basic understanding of the flow characteristics at microscale level will be covered by the proposed course through a computational modeling and theoretical analysis. Practical applications of flow phenomena in microfluidic system will also be discussed in a great details.

The course will be delivered by an internationally acclaimed academic, researcher and practitioner with proven knowledge, experience, and demonstrable ability in teaching, consultancy, research, and training in the field of Microfluidics and Nanofluidics.

OBJECTIVES

The primary objectives of the course are as follows:

- Providing the basic knowledge on the underlying physics of electrokinetically driven flow at microscale level.
- Exposing participants to analytical and numerical solution method for solving the governing equations.
- Examples and case studies will be presented to demonstrate several features of electrokinetically driven flow.
- Enhancing the participants' expertise by hands-on experience through laboratory sessions.
- Future collaborative research with the interested participants.

Modules	A: Duration : August 27th - 31st, 2018 (Total 16 hours lectures and tutorials) B: Venue : Department of Mathematics, NIT Patna Number of participants for the course will be limited to fifty (50).
You Should Attend If...	This course is intended for <ul style="list-style-type: none"> • Undergraduate, Masters, Doctoral and Postdoctoral students as well as confirmed researchers in the fields of micro-nano fluidic modeling. • Faculty from reputed academic institutions • Researchers from government organizations including R&D laboratories.
Fees	The participation fees for taking the course is as follows: Participants from abroad : US \$500 Industry/ Research Organizations: Rs. 5000/- Academic Institutions: ` Faculty Member : Rs. 3,000/- Students : Rs. 1,000/- The above fee include all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges, 24 hr free internet facility. The participants will be provided with accommodation on payment basis.

The Faculty

Prof. Sushanta K. Mitra is the Executive Director of the Waterloo Institute for Nanotechnology and a Professor in Mechanical and Mechatronics Engineering at the University of Waterloo. Before joining UW, he was the Associate Vice-President Research and Kaneff Professor in Micro & Nanotechnology for Social Innovation at the York University. His research interests are in the fundamental understanding of fluid transport in micro and nano-scale confinements with applications in energy, water, and bio-systems. He has authored and co-authored more than 130 peer-reviewed journal papers,



which includes publications in *Nature Publishing Group*, *American Physical Society*, *Royal Society of Chemistry*, *American Chemical Society* and *Elsevier* journals. His research has been featured by number of media outlets including Maclean's, Vancouver Sun, Edmonton Journal, Times of India. He has delivered over 100 invited lectures across the world including the 2012 Lester Pearson Lecture.

He was the Associate Scientific Director for the Canada India Research Centre of Excellence, IC-IMPACTS, the first bi-national Network Centers of Excellence created by the federal government of Canada. Among many other responsibilities, he is currently the President of the Canadian Society for Mechanical Engineering and is a member of the Committee on International Scientific Affairs, American Physical Society. For his contributions in engineering and sciences, he is elected as the Fellow of the American Society of Mechanical Engineers (ASME), the Canadian Society for Mechanical engineering (CSME), the Engineering Institute of Canada (EIC), the Canadian Academy for Engineering (CAE), the Royal Society of Chemistry (RSC, UK), the Indian National Academy of Engineering (INAE – Foreign Fellow), the American Physical Society (APS), and the American Association for the Advancement of Science (AAAS). He is also a Fellow of the National Institute for nanotechnology (NINT) and the recipient of 2015 Engineering Excellence Medal from the Ontario Society of Professional Engineers. More Information at Laboratory website: uwaterloo.ca/mntl

Google scholar: <http://bit.ly/2ix0jT1>

COURSE COORDINATORS

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