Interfacial Instability with Industrial Applications

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Overview

Interfacial regions between fluids such as liquids and gases, liquids and liquids or between fluids and solids are locations of important transport processes. These transport processes include mass, heat and momentum transfer each with varying time and length scales. As a result, competing phenomena are present and this competition often leads to patterns and instabilities. Patterns that arise from competition find application in evaporation during the processing of functional materials, during electrodeposition, in solidification as in crystal growth, in microgravity processing, in thin film deposition and in oil recovery amongst others. In short, pattern generation is associated with nonlinear dynamics and instability and are central to our understanding of dynamical processes where surfaces are involved. This course will deal with interfacial instability and pattern formation with application to industrial processes of relevance.

The main objectives are to explain, calculate, and predict instability and pattern formation and apply our understanding to problems of industry relevance. Other objectives are to give attendees a grasp of the fundamental ideas that are needed to critically understand pattern formation phenomena and the mathematical tools needed to predict such phenomena.

Duration	**July 11-24, 2022**
Modules	**A: Instability of Jets, Drops and Liquid Bridges** **B: Saffman-Taylor, Rayleigh-Taylor, Faraday, Marangoni instabilities and long-wave methods** **C: Solidification and Electrodeposition Instability. Technological Applications**
You Should Attend If…	• **You are engineers and researchers from manufacturing, industry and government organizations including R&D laboratories.** • **You are student at the levels (MSc/MTech/PhD).** • **You are faculty from academic institutions and technical institutes.**
Fees	The participation fees for taking the course is as follows: **Academic Institutions: Rs 6000 (Faculty) and Rs 3000 (Student)** **Industry/ Research Organizations: Rs 10000** **Participants from abroad: US $500** The above fee includes all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges. The participants will be provided with accommodation on payment basis (subject to the availability in the hostels/guest house at IIT Ropar)

The Faculty

Prof. R. Narayanan is Distinguished Professor and the William P. and Tracy Cirioli Term Professor of the Department of Chemical Engineering, University of Florida, Gainesville, USA. His research interests are in hydrodynamic instabilities with microgravity, industry and technological relevance. He has published about 110 papers in highly regarded archival journals and has delivered more than 200 conference presentations. He is a recipient of several awards and is an elected fellow of the APS, AIChE, AAAS, IMA (Oxford. In addition he has been an A. v. Humboldt Senior fellow, a JSPS senior fellows and a Fulbright Distinguished Professor. He has served on the Editorial board member of several journal and is currently the Associate Editor of J. Eng. Math and the ASME J. Heat Transfer.

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Prof. Manoranjan Mishra is a Professor of Indian Institute of Technology, Ropar. His research interest is Hydrodynamic instabilities, porous media flows, scientific computing. He has published about 65 papers in highly reputed Journals and more than 60 conference papers. He is an elected fellow of the National Academy of Science, India (NASI). In addition he has been an A. v. Humboldt fellow, Germany, a JSPS Invitation fellows, JAPAN.

Course Co-ordinator

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