



## PhD Project

(will be assigned by SIRe)

Project Details	
Project Title	Development of Bio-Fluidic Model to Study the Role of Hemodynamic Forces on Cancer Metastasis
Project Summary	<p>Humanity quest to conquer cancer – a disease-causing abnormal growth of cells with the potential to invade and spread into the body has pushed the boundaries of science over centuries. Despite the core biological nature of cancer, it is now widely believed that the solution to cure cancer may be underlie with interdisciplinary research. As a result, tremendous efforts made around the globe over the years to solve the cancer problem from a wide perspective of cross-interdisciplinary research. Multidisciplinary research establishes the links between cancer biology and biophysics that provide new opportunities to develop new drugs and treatment strategies to prevent cancer invasion. An evolving interdisciplinary field of bio-fluid mechanics is looking into the flow-related process of cancer metastasis to understand multi-facet nature of hematogenous cancer like (i) how does circulating cancer cells survive in the blood flow environment during the metastatic process, (ii) how cancer cells interact with platelets, blood cells, endothelial cells, and evade from blood immune cells underflow, and (iii) what biochemical changes happens in cancer cells under flow and how that influence its survival. Understanding such physiological phenomena and the effect of flow conditions on cancer metastasis may provide critical input on the therapeutic development for metastasis cancer treatment.</p>

PhD Supervisors			
Role	Faculty	Academic Unit in IITD	Email ID
Supervisor 1	Narsing Kumar Jha	Department of Applied mechanics	narsingjha@am.iitd.ac.in
Supervisor 2	Sachin Kumar B.	Centre for Biomedical Engineering	Sachin.kumar@cbme.iitd.ac.in

Project requirements (Student qualifications, experience required, etc)
<ul style="list-style-type: none"> <li>Qualifying degree should be in the area of bio-fluid mechanics like Mechanical Engineering or Aerospace Engineering or Marine engineering or Bioengineering</li> <li>Student with basic knowledge on bio-fluid mechanics and basic of cancer biology (will be an advantage)</li> <li>Student with exposer or hands on training on bio-fluidics or micro-fluidics or lab on chip design/experiments (will be an advantage)</li> </ul>

Source of funding (IRD/FITT Project details, if any)
<p><b>1. Institute funded</b></p>

**Role of Faculty Members involved:**

Narsing Kumar Jha has extensively worked in the area of fluid dynamics like micro-fluidics, polymer laden viscoelastic flows, particle-wall interaction and particle laden flows. He has worked on different kinds of flow states like laminar, transitional and turbulent flows along with flow in different geometries. He has developed various facilities for fluid flow studies and has widely used various measurement techniques like time resolved micro particle image velocimetry (PIV), time-resolved PIV, planar laser induced fluorescence, particle tracking, flow resistance measurement, particle tracking etc.

This project will be performed with Inter-department IIT Delhi collaborations with assistant professor Sachin Kumar B from the Centre for Biomedical Engineering (CBME). His experience in the biological aspect of the proposal is highly needed for successful completion of the project. With his expertise, he will contribute in bio-fabrication, tissue engineering, platelets-cancer cell interaction and data analysis after the experiments.