National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Thermal and Hemodynamic Characterization of Intracranial Aneurysm on Chip: A Numerical Investigation
Speaker	: Dr. Sumit Kumar
Supervisor	: HOD, ME
Venue	: ME-001: ME Dept Semainar Hall
Date and Time	: 23 Aug 2024 (11:00 AM)
Abstract	: Intracranial aneurysms (IAs) are localized dilations along the blood vessels of the cerebral artery. The rupture of these IAs leads to subarachnoid hemorrhage, which has a very high mortality rate. So, it is essential to understand the flow behavior and rupture mechanism of IAs to improve the existing treatment techniques and develop novel treatment techniques. Aneurysm-on-chip is a microfluidic chip that simulates typical aneurysm mechanics and physiological responses. For hyperthermia and hypothermia patients, the body temperature can vary from 41 °C to 32 °C, above and below which patients need medical emergency. However, a few researchers have investigated the effect of the temperature-dependent viscosity on the flow behavior in IAs. The effect of temperature-dependent viscosity is considered in the present study for a better understanding of the flow behavior in IAs. This problem is simulated using Ansys Fluent 18.1 software. The effect of blood inlet and surface temperatures on the various hemodynamic parameters, such as wall shear stress (WSS) and oscillatory shear index (OSI), have been investigated. It is found that higher WSS and OSI are observed for the lower value of blood inlet and surface temperatures. Thus, Hypothermia patients should be given more care having IAs.