



ICTS Fluid Dynamics Seminar

- Title** : Aerodynamics of Endurance: From Transoceanic migratory dragonflies to Micro-Air Vehicles
- Speaker** : Sandeep Saha (IIT Kharagpur, West Bengal)
- Date** : Friday, 29 May 2026
- Time** : 11:30 AM (IST)
- Abstract** : Nature's flyers, exemplified by the dragonfly *Pantala flavescens*, perform record-breaking 18,000 km transoceanic migrations that defy standard low-Reynolds-number aerodynamics. We aim to integrate biological observation with graph-theory-constrained energetic analysis to uncover the mechanisms behind such extreme endurance. By examining wing kinematics and aerodynamic performance via experimental data and computational modeling, we analyze how these insects navigate turbulent flows and utilize drift compensation. To precisely capture complex vortical structures, we employ a novel pseudospectral method to mitigate Gibbs-Wilbraham phenomena in high-order simulations. Furthermore, we investigate "two-fluid" and "thin-film" boundary layer stability to explain high lift-to-drag ratios where conventional airfoil theory fails. Ultimately, these biological insights inform the design of next-generation Micro-Air Vehicles (MAVs). By fusing insect migration data with projectile aerodynamics, we propose innovative paradigms for long-range flight, demonstrating how the synergy between biology and aerospace engineering solves persistent challenges in low-speed aerodynamics.
- Venue** : Emmy Noether Seminar Room
Zoom Link: <https://icts-res-in.zoom.us/j/91391751315?pwd=BPagCzj1YlgoH5DjmkeF05EdlwE6RM.1>
Meeting ID: 913 9175 1315
Passcode: 282829