National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Towards Smart Tribological Systems: AI-Based Analysis of Bio-Inspired Gas Foil Bearings
Speaker	: Srusti Priyadarshini (522me6009)
Supervisor	: Prof. S Datta (PIC, Departmental Seminar)
Venue	: Seminar Hall (Department of Mechanical Engineering)
Date and Time	: 10 Jul 2025 (05:00 PM)
Abstract	: Gas Foil Bearings (GFBs) are vital for high-speed, oil-free rotating machinery in aerospace, microturbines, and sustainable energy systems due to their low friction, thermal resilience, and self-adaptive nature. However, their dynamic performance is highly sensitive to wear, thermal loading, and disturbances such as rotor imbalances. This work presents a conceptual and AI-integrated approach to the design and analysis of bio-inspired GFBs, aiming to enhance performance prediction, and optimization. A hybrid framework combining numerical simulations with Artificial Neural Networks (ANN) and Adaptive Neuro-Fuzzy Inference Systems (ANFIS) is developed to estimate key metrics like load carrying capacity, frictional torque, power loss, stiffness and damping. This study outlines the technological potential of GFBs and identifies future research directions to advance next-generation, smart tribological systems.