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TATA INSTITUTE OF FUNDAMENTAL RESEARCH

ICTS Biophysics Seminar

Title : Predicting the architecture of ecological networks and beyond

Speaker : Gaurav Baruah (CES, IISc)

Date : Monday, 28 September 2026

Time : 11:30 AM (IST)

Abstract : Ecological networks are shaped by both environmental conditions and the eco-evolutionary dynamics of the species embedded within them. Yet, predicting how network architecture emerges, and how this architecture subsequently influences responses to environmental change, remains a major challenge. Here in this talk, I combine trait-based eco-evolutionary models with empirical plant–pollinator networks to examine how temperature, individual trait variation, and adaptive rewiring jointly shape mutualistic network structure and resilience. The models predict that increasing temperature drives systematic reorganization of interactions, increasing connectance and nestedness while reducing network-level specialization and modularity, predictions that are broadly supported by a global dataset of 165 plant–pollinator networks. Extending beyond network architecture, I show that these structural changes interact with evolutionary dynamics to determine network stability and the occurrence of critical transitions. Heritable trait variation can enhance the ability of communities to track environmental change, increase local stability, and delay temperature-driven collapse, while also altering the likelihood and magnitude of abrupt transitions. Together, these results demonstrate how integrating individual variation, evolution, and network topology can improve our ability to predict both the architecture and resilience of ecological networks under environmental change.

Venue : Chern Lecture Hall

Zoom

Meeting: <https://icts-res-in.zoom.us/j/96338765268?pwd=Kpl0AgtpVcUHjURDXaHOblbn9OxWFg.1>

Meeting ID: 963 3876 5268

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