**Tata Institute of Fundamental Research**
Survey No. 36/P, Gopanpally Village, Serilingampally, Ranga Reddy Dist., Hyderabad – 500 046

# Internal Webinar

## Asymmetric Catalysis for the Synthesis of Enantioenriched Heterocycles

## Mamta

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Asymmetric catalysis provides a powerful strategy for the enantioselective synthesis of structurally diverse and biologically relevant molecules. Our research focuses on developing transition-metal-catalysed asymmetric transformations for the construction of functionalised chiral heterocycles and other valuable molecular scaffolds. We have developed Cu(I)/(S,S)-BPE-catalysed asymmetric umpolung (3+2) cycloaddition and Michael addition reactions of iminoesters with α,β-unsaturated 2-acyl imidazoles, providing access to highly functionalised chiral pyrrolidine and 1-pyrroline derivatives. Further expanding this approach, we reported the first Sc(III)-PyBox-catalysed enantioselective vinylogous Mukaiyama–Michael reaction of vinyl ketene silyl acetals with α,β-unsaturated 2-acyl imidazoles, affording enantioenriched 1,7-dioxo compounds. Beyond asymmetric catalysis, the talk will also highlight our efforts towards developing a unified, non-carbohydrate-based platform for oligonucleotide synthesis.

**References:**

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4. Nodwell M.;‡ Caballero-García G.;‡ Mesa-Bruno J. M.;‡ Muilu T.; Wilson D. M.; Arora A.; Brooke A.; Singh B.; Gill M.; Tran H. M.; Silverman S. M.; Campeau L-C.; Damha M. J.; Britton R. *J. Am. Chem. Soc.* **2026**, *148*, 12998

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***14:30 Hrs***