

# Indian Statistical Institute

## Applied Statistics Unit

### SEMINAR NOTICE

**Speaker:** Surya T Tokdar, Duke University

**Title:** Not Your Average Statistical Analysis!

**Date:** 11 July, 2023

**Time:** 16:15 PM

**Venue:** ASU Seminar Room

**Online Platform:** Google Meet ([meet.google.com/fbf-uncy-brz](https://meet.google.com/fbf-uncy-brz))

**Abstract:** Statistical analyses of heavy tailed data bring in a unique set of questions. Often the scientific focus shifts to the tails of the distribution, e.g., to forecasting the 100-year daily precipitation or to identifying predictors which influence extreme low birthweight. Parametric models, whose fit is largely dictated by the central bulk of the data, may not do justice to capturing tail structures. At the same time, purely nonparametric approaches may prove futile in effectively smoothing information from sparse observations across an elongated tail. Toward more effective statistical analyses of heavy tailed data, I will introduce a class of semiparametric Bayesian methods for density estimation and quantile regression. With a carefully chosen nonparametric prior distribution, the density estimation method will be shown to simultaneously guarantee accurate estimation of the density function and its tail index, both at near optimal minimax rate. The related quantile regression methodology will be shown to offer a powerful and yet interpretable generalization of standard linear regression to what one might call a Quantile Linear Model. The QLM, complete with an identification of residual noise, gives a model-based idealization of quantile regression retaining the ability to quantify differential predictor influence on the tails while simultaneously adjusting for noise correlation. I will discuss how QLM leads to a comprehensive inferential framework with the added qualities of model fit assessment and model selection.

**All are invited to attend.**