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*Copula-based approaches by analyzing non-Gaussian spatial
Data*

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Abstract: Many existing methods for analyzing spatial data rely on the Gaussian assumption, which is violated in many applications such as wind speed, precipitation and COVID mortality data. In this talk, I will discuss several recent developments of copula-based approaches for analyzing non-Gaussian spatial data. First, I will introduce a copula-based spatio-temporal model for analyzing spatio-temporal data and a semiparametric estimator. Second, I will present a copula-based multiple indicator kriging model for the analysis of non-Gaussian spatial data by thresholding the spatial observations at a given set of quantile values. The proposed algorithms are computationally simple, since they model the marginal distribution and the spatio-temporal dependence separately. Instead of assuming a parametric distribution, the approaches model the marginal distributions nonparametrically and thus offer more flexibility. The methods will also provide convenient ways to construct both point and interval predictions based on the estimated conditional quantiles. I will present some numerical results including the analyses of a wind speed and a precipitation data. If time allows, I will also discuss a recent work on copula-based approach for analyzing count spatial data.

Bio: Judy Huixia Wang received her PhD in Statistics from University of Illinois in 2006. She was a faculty member in the Department of Statistics at North Carolina State University from 2006 to 2014. She is currently Professor and Chair in the Department of Statistics at the George Washington University. She received a CAREER award from the National Science Foundation and the Tweedie New Researcher Award from Institute of Mathematical Statistics in 2012. In 2018, she was elected as a Fellow of the American Statistical Association and of the Institute of Mathematical Statistics. She was one of the 2022 IMS Medallion Lecturers. She served as a Program Director in the Division of Mathematical Sciences (DMS) of National Science Foundation from 2018 to 2022, managing the statistics program in DMS as well as a number of interdisciplinary programs that are cross-directorate and cross-agency. Her research interests include quantile regression, semiparametric and nonparametric regression, high dimensional inference, extreme value analysis, spatial analysis, and etc.

