



Statistics Seminar

Comparative analysis of six correlation metrics on DNA co-methylation

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Abstract: DNA methylation is an epigenetic event, which plays a key role in regulating gene expression level in both normal and cancerous cells. Many genes or sites' methylation signals are highly correlated genome wide. This correlation pattern is often called co-methylation. It is important to study co-methylation to understand genes' complex interactions and relationships. Currently two correlation metrics, Pearson's correlation and Spearman's rank correlation are often used. There are other different correlation metrics, such as Kendall's tau coefficient, Hoeffding's D statistic, distance correlation, and maximal information coefficient (MIC). It is not clear what correlation metrics are suitable to study the complex co-methylation patterns and how these metrics perform. It is also not clear the impact of missing data, outliers, sample size, and low variance on these different correlation metrics. Researchers also wonder which type of the two different methylation signals (Beta and M-value) should be used. Therefore, we have conducted comprehensive analyses to compare the above six correlation metrics on identifying DNA co-methylation patterns. In this talk, we will show some key findings of our research work.

Bio: Mayla Ward is a third-year undergraduate student studying Mathematics and Data Science at Western Washington University. She is currently conducting statistics research with Dr. Shuying Sun at Texas State University and probability research with Dr. Kimihiro Noguchi at Western Washington University.

Neo Eloff is a third-year undergraduate student studying Finance and Mathematics at Texas State. He is working with Dr. Sun on a research project. Neo is currently pursuing a career in actuarial science, and his interests lie in financial modeling and risk analysis.

Dr. Shuying Sun is currently an associate professor in the Department of Mathematics, Texas State University. Dr. Sun has interests in statistical genetics and bioinformatics and has published more than 30 peer-reviewed research articles in these fields. Dr. Sun's research focuses on addressing challenging genetic and epigenetic questions using statistical and computational methods. She has been mentoring more than 40 research students of different levels (ranging from high school students to doctoral students) for the last 10+ years.