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DSICCR Tuesday Seminar Series

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Use of Ordinary Differential Equation (ODE) Models to Empower Deep Learning Predictions

Hulin Wu, Ph.D.

The Betty Wheless Trotter Professor & Chair
Department of Biostatistics & Data Science
School of Public Health
The University of Texas Health Science Center at Houston

Differential equations are widely used to describe dynamic processes and systems in many scientific fields such as engineering, physics, chemistry, social sciences, economy, biology and biomedical sciences. However, both model structures and model parameters need to be determined based on experimental data and mechanisms of the dynamic systems. It is very challenging to solve the inverse problems of differential equation models by rigorously using experimental data and statistical methods. In this talk, I will go over statistical methodologies for parameter estimation of ordinary differential equation (ODE) models that have been developed in the past decades by our group and other colleagues. Recent development for connections between the ODE models and deep learning algorithms attracts a great attention from data scientists. The ODE modeling approach may empower the deep learning predictions and provide interpretability of the black-box algorithms. I will discuss some of the progress in this area and the results from our research team.

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Contact: Xiaohong.Bi@uth.tmc.edu