数学与系统科学研究院

计算数学所学术报告

报告人： **Dr. Wenjing Liao**

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报告题目：

Exploring low-dimensional structures in data science

邀请人： 许志强 研究员

报告时间：2019 年 8 月 12 日（周一）

上午 **10:00-11:00**

报告地点： 数学院南楼七层

702 教室

Abstract：

Many data sets in image analysis and signal processing are in a high-dimensional space but exhibit a low-dimensional structure. For example, data can be modeled as point clouds in a high-dimensional space but concentrated on a low-dimensional manifold. I will present two ways of building efficient representations of data or functions on data. The first one gives a multiscale low-dimensional empirical approximation to the manifold. We prove that the mean squared error for the approximation of the manifold converges as the training samples increases with a rate depending on the intrinsic dimension of the manifold instead of the ambient dimension of the space. Moreover, our approximations can adapt to the regularity even when this varies at different scales or locations. The second part of my talk is about efficient approximations of deep ReLU networks for functions supported on low-dimensional manifolds. We constructed a ReLU network for such function approximation where the size of the network grows exponentially with respect to the intrinsic dimension of the manifold. These works are joint with Mauro Maggioni (Johns Hopkins University), Stefano Vigogna (University of Genova), and Minshuo Chen, Haoming Jiang, Tuo Zhao (Georgia Institute of Technology).

欢迎大家参加！