

---

**RONGJIE LAI**, Rensselaer Polytechnic Institute

*Learning Manifold-structured Data using Deep networks: Theory and Algorithms*

Deep neural networks have made tremendous success in many problems in science and engineering. In this talk, I will discuss our recent efforts on learning non-trivial manifold information hidden in data. Inspired by differential geometry, we propose a Chart Auto-Encoder (CAE) for manifold-structured data representation using a multi-chart latent space. CAE admits desirable manifold properties that auto-encoders with a flat latent space fail to obey. Theoretically, we conduct approximation and nonparametric analysis to understand the proposed CAE. We also verify the effectiveness of the proposed CAE on synthetic and real-world data.