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### "Learning Spatio-temporal Convection with Deep Generative Models"

**Abstract:**

Convective transport has wide applications in oceanography, weather prediction, and exchange of energy and mass. In this talk, we show that modern deep learning models, such as generative adversarial networks, can be used to learn the convective transport without the knowledge of underlying constitutive equations. We will demonstrate the inference of the coupling between mass, momentum and energy. Steady-state temperature distribution and fluid flow-field are predicted with arbitrary geometric domains and boundary conditions. In contrast to conventional procedure, the deep learning models learn to generate realistic solutions in a data-driven approach and achieve state-of-the-art computational performance, while retaining high accuracy.