CRUNCH Seminars at Brown, Division of Applied Mathematics

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**Incorporating Physical Principles into Deep Dynamics
Models**

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**While deep learning has shown tremendous success in many domains, it remains a
grand challenge to incorporate physical principles into such models for applications in
physical sciences. In this talk, I will discuss (1) Turbulent-Flow Net: a hybrid approach
for predicting turbulent flow by marrying well-established computational fluid dynamics
techniques with deep learning (2) Equivariant Net: a systematic approach to improve
generalization of spatiotemporal models by incorporating symmetries into deep neural
networks. I will demonstrate the advantage of our approaches to a variety of physical
systems including fluid and traffic dynamics.**