MMM SEMINAR SERIES

Machine Learning for Mesoscale Closures in Ocean Models

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Climate simulations remain our best tools to predict global and regional climate change. Climate projection uncertainty stem, in part, from the poor or lacking representation of processes, such as ocean turbulence and mixing which impact the uptake and transport of heat and carbon. The representation of these unresolved processes has been one of the bottlenecks in improving climate projections.

The explosion of climate data and the power of machine learning algorithms are suddenly offering new opportunities. Can data-driven machine learning methods help us deepen our understanding of these unresolved processes and simultaneously improve their representation in climate models to reduce climate projections uncertainty?

In this talk, I will present some of our recent work in which we leverage tools from machine learning to learn representations of unresolved ocean mesoscale processes, and subsequently implement these closures into ocean models. I will contrast equation-discovery and convolutional neural network approaches and discuss advantages and pitfalls of both. Our work suggests that machine learning could open the door to discovering new physics from data and enhance climate predictions. Yet, many questions remain unanswered, making the next decade exciting and challenging for hybrid climate modeling.

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For Zoom information, please contact
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Seminar will also be live webcast
https://operations.ucar.edu/live-mmm