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Non-Equilibrium Dynamics, Conditioned on Data

- (Bayesian) data assimilation (blending data and models and their uncertainties)
- Stochastic Parametrization (data-driven multiscale physics).
- Dimension Reduction (dynamic emulators).
- Sensitivity Analysis (for parameter estimation).
- Adaptive Time Series Analysis (for multi-scale data/observations).

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NSF National Science Foundation WHERE DISCOVERIES BEGIN

Some Applications

- Climate Science: rare and extreme events.
- Ocean Dynamics: stochastic parametrization of wave breaking and dissipation.
- Tsunami/Flooding: improved data assimilation for landfall predictions.
- Power grids: optimal placement of sensors.
- Ocean Pollution: the development of a HPC ocean pollution model.
- Adaptive Resilience: reducing risk and cost of rebuilding.
- Data-driven multi scale modeling in ocean/climate
- Fidelity Computing: coupling multi-physics models/data.