



# Numerical Analysis Seminar

## Coupling active sampling and learning with Neural Galerkin schemes for high-dimensional evolution equations

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### Abstract

While machine learning methods have been shown to provide accurate predictions when trained on sufficient data, many of the scientifically most interesting phenomena happen in regimes where there is no data available a priori and where it is even unclear how to collect informative data at all. In this work, we propose the Neural Galerkin methodology that integrates data acquisition into the process of solving partial differential equations with deep learning so that new data samples are collected in a self-informed manner that is guided by the dynamics of the solution itself. Numerical experiments demonstrate that the adaptive data collection of Neural Galerkin is key to providing accurate approximations of solutions in high dimensions, especially if features of the solutions are local such as in interacting particle systems described by kinetic equations and when advecting coherent structures and waves in high dimensions.

Date: March 29, 2023 (Wednesday)

Time: 10:00 – 11:00am

Venue: ZOOM: <https://hku.zoom.us/j/>

Meeting ID: 913 6532 3891

Password: 310656

*All are welcome*