

## Seminar Talks of the SIAM Student Chapter CUHK

May 26 (9:30 AM)

An educational introduction to computational multi-scale method and scientific machine learning

Dr. Simon Pun

Abstract: In this talk, I will introduce some recent advances of computational multiscale methods. Recently, tools from scientific machine learning have been used to develop more efficient simulation methods to solve scientific problems such as forward and inverse problems. We will discuss some issues related to the application of heterogeneous problems with multiple scale features.

:Least-Squares Method for Recovering Multiple Medium Parameters

Dr. Ying Liang

Abstract: We present a two-stage least-squares method for inverse medium problems of reconstructing multiple unknown coefficients simultaneously from noisy data. A direct sampling method is applied to detect the location of the inhomogeneity in the first stage, while a total least-squares method with a mixed regularization is used to recover the medium profile in the second stage. The total least-squares method is designed to minimize the residual of the model equation and the data fitting, along with an appropriate regularization, in an attempt to significantly improve the accuracy of the approximation obtained from the first stage. We shall also present an analysis on the well-posedness and convergence of this algorithm. Numerical experiments are carried out to verify the accuracies and robustness of this novel two-stage least-squares algorithm, with high tolerance of noise in the data.

Zoom Link:

<https://cuhk.zoom.us/j/98159013793?pwd=Z25FYWNFK0VFRmJBRUhqSHNRMmVrdz09>