



# AMS/AWM Joint Seminar



Speaker: Yingda Cheng  
Date: Tuesday, October 19th, 10 am EDT  
Title: Computational Methods for  
Kinetic Transport Equations

**Abstract:** Kinetic equations are mesoscale description of the transport of particles such as neutrons, photons, electrons, molecules as well as their interaction with a background medium or among themselves, and they have wide applications in many areas of mathematical physics, such as nuclear engineering, fusion device, optical tomography, rarefied gas dynamics, semiconductor device design, traffic network, swarming, etc. Because the equations are posed in the phase space (physical space plus velocity space), any grid-based method will run into computational bottleneck in real applications that are 3D in physical space and 3D in velocity space.

This talk will survey three numerical solvers that we developed aiming at efficient computations of kinetic equations: the adaptive sparse grid discontinuous Galerkin method, the reduced basis method and the machine learning moment closure method. They aim at effective reduced order computations of such high dimensional equations. Benchmark numerical examples will be presented.

Finally, I will introduce WINASc: Women in Numerical Analysis and Scientific Computing, which is part of the AWM advance network.

Zoom link: <https://msu.zoom.us/j/93612717291>

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