Special Guest Lectures

Discontinuous Galerkin Finite Element Methods and Applications to Boltzmann-Poisson Models in Semiconductor Device Simulation

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Abstract:
In modern highly integrated devices, the charge carrier transport can be described by the semiclassical Boltzmann-Poisson (BP) system. While Monte-Carlo method was traditionally used to simulate this system, in recent years, deterministic solvers were proposed because they offer more reliable results without having any statistical noise. This talk will focus on discontinuous Galerkin (DG) finite element methods and their applications to BP models. I will first review the DG methods with an emphasis on my past research in this area. Then we move on to the introduction of the Boltzmann equation and its application in semiconductor device modeling. Some of our recent work on DG methods for solving the full-band BP models will be discussed. Numerical tests are provided to benchmark the scheme with Monte-Carlo and finite difference solvers. I will conclude with ongoing projects on positivity-preserving DG schemes for linear Boltzmann equations.

Speaker's Bio:
Yingda Cheng is currently a postdoctoral fellow at the Institute for Computational Engineering and Sciences and Department of Mathematics at the University of Texas at Austin. She received her B.S. degree from University of Science and Technology of China in 2003 and Ph.D. degree in Applied Mathematics from Brown University in 2007. Her current research interests are scientific computing and numerical analysis, including, deterministic numerical simulations of kinetic transport, Boltzmann-Poisson systems in semiconductor device modeling; the design and analysis of discontinuous Galerkin (DG) finite element methods and computational methods for Hamilton-Jacobi equations with applications in front propagation.

Refreshments will be served.
This lecture has a reception.

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