Special Guest Lectures

Modeling of Shallow Water Flows: Applications of DG methods in Coastal and Hydraulic Engineering

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Abstract:
There are many examples of water flows where the characteristic length scale is large compared to the vertical scale. The resulting depth-integrated shallow water equations (SWE) is a model equation of great importance since it is used in hydraulic and coastal engineering to model river flooding as well as storm surges and tsunamis. For many instances in coastal engineering, however, the non-dispersive nature of the SWE is too restrictive. Over the last decade there has been great success in extending the range of validity of essentially long-wave equations into deeper waters, resulting in so-called Boussinesq-type equations. As always, there is a price to pay and modeling of dispersive water waves is a computationally much more demanding problem due to the presence of higher-order derivatives. In the presentation I will look into applications of discontinuous Galerkin (DG) methods to SWE and Boussinsq-type equations. I will illustrate that DG methods do provide us with flexible and efficient models to simulate shallow water flows.

Speaker's Bio:
Claes Eskilsson is a Visiting Assistant Professor at the Department of Civil and Environmental Engineering, LSU, where he is working within the Coastal Modeling Infrastructure (COMI) project. Claes received his PhD in Engineering Hydraulics in 2005 from Chalmers University of Technology, Sweden, where he then held an Assistant Professor position before joining LSU in January 2008. Claes main research interest lies within Computational Hydraulics and he has over the last years worked on introducing spectral/hp element methods, especially high-order discontinuous Galerkin methods, to the coastal engineering community.

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