THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學

DEPARTMENT OF APPLIED MATHEMATICS
應 用 數 學 系

# The Hong Kong Polytechnic University
# Department of Applied Mathematics

# Colloquium

## High Order Numerical Methods for Shallow Water Wave Simulation

**by**

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## Abstract

Shallow water equations with a non-flat bottom topography have been widely used to model flows in rivers and coastal areas. The positivity-preserving well-balanced discontinuous Galerkin (DG) method can maintain the positivity-preserving property, well-balanced property, high order accuracy, and good resolution for smooth and discontinuous solutions. We improved the entropy stable well-balanced schemes to general discontinuous Galerkin (DG) methods for the shallow water equations with non-flat bottom topography, which can maintain conservative, high order accuracy and well-balanced property. If time allows, I would also briefly present a numerical framework of the high order well-balanced characteristic-based finite difference schemes based on alternative WENO scheme. In order to capture the strong discontinuities and large gradients, the fifth-order upwind weighted nonlinear interpolations together with a sixth order cell-centered compact scheme for the second and fourth derivatives of the flux are used to construct alternative WENO schemes.  We will show that the new framework via the special splitting technique for the source term and the reconstruct methods for the conservative variables maintains the exact C-property while the solution maintaining essentially non-oscillatory and high resolution.

**Date :**    **6 December 2018 (Thursday)**
**Time :**    **2:00pm – 3:00pm**
**Venue :**    **TU801, The Hong Kong Polytechnic University**

\* \* \*    **ALL ARE WELCOME**    \* \* \*