

## Departments of Physics and Math Colloquium

### High Order Numerical Methods for Convection Dominated Problems

Prof. Chi-Wang Shu

Brown University

Friday, April 10, 2015

1:30 – 2:30 PM

Venue: AHC3-214

Refreshments will be served at 1:15 PM



**Abstract:** Convection dominated partial differential equations are used extensively in applications including fluid dynamics, astrophysics, electro-magnetism, semiconductor devices, and biological sciences. High order accurate numerical methods are efficient for solving such partial differential equations, however they are difficult to design because solutions may contain discontinuities and other singularities or sharp gradient regions. In this talk we will survey several types of high order numerical methods for such problems, including weighted essentially non-oscillatory (WENO) finite difference methods, WENO finite volume methods, discontinuous Galerkin finite element methods, and spectral methods. We will discuss essential ingredients, properties and relative advantages of each method, and comparisons among these methods. Recent development and applications of these methods will also be discussed.

**Biography:** Professor Chi-Wang Shu received his Ph.D. degree in Mathematics from UCLA with Professor Stanley Osher as his advisor in 1986. He started his academic career in 1987 as an Assistant Professor in the Division of Applied Mathematics at Brown University. He has been an Associate Professor during 1992-96 and became Full Professor in 1996. He is currently the Theodore B. Stowell University Professor. His research activities are concentrated on the design, analysis, implementation and application of high order nonlinearly stable numerical schemes for solving convection dominated partial differential equations.

*The event is free and open to the public.*

Future seminars can be found at <http://physics.fiu.edu/seminars/>