Colloquium - John A. Lynch Lecture

University of Notre Dame
Department of Mathematics

Speaker: Peter Constantin

Princeton University

Will give a lecture entitled
Global regularity for critical SQG in bounded domains

Date: Wednesday, March 6, 2024
Time: 4:00 PM
Location: 129 Hayes-Healy Bldg

Departmental Tea: Tea in Room 257 (lounge in Hurley Hall) at 3:30 p.m.

Zoom URL: https://notredame.zoom.us/j/99986867672?pwd=Z2NJRlZwL0dTR0Nxbk50NElHK0dNdz09

Abstract:

The critical surface quasi-geostrophic equations (SQG) are atmoshperic science equations which are widely studied as concise two dimensional models of rapid formation of small scales in incompressible fluids. When considered in the whole space or on the torus, the equations have been proved to have global smooth solutions more than fifteen years ago by Caffarelli-Vasseur and, independently, by Kiselev-Nazarov-Volberg. The problem of existence and uniqueness of global smooth solutions in bounded domains remained open until now. After giving some background, I will present a proof of global regularity obtained recently with Ignatova and Q-H. Nguyen. We introduce a new methodology of transforming the single nonlocal nonlinear evolution equation in a bounded domain into an interacting system of extended nonlocal nonlinear evolution equations in the whole space. The proof then uses the method of the nonlinear maximum principle for nonlocal operators in the extended system.

Peter Constantin - Princeton University