UCMERCED
UNIVERSITY OF CALIFORNIA
School of Natural Sciences

APPLIED MATHEMATICS SEMINAR 291

Dispersive hydrodynamics: the mathematics and physics of nonlinear waves in dispersive media

Mark Hoefer
Department of Applied Mathematics
University of Colorado, Boulder

Date: **10/12/18**
Time: **3:00 PM**
Location: **COB1 265**

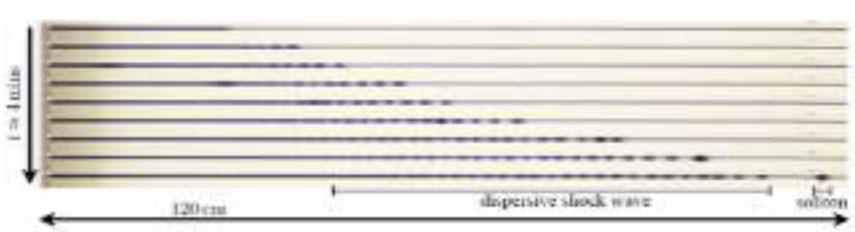
For more information contact:
Boaz Ilan
bilan@ucmerced.edu

ABSTRACT

Dispersive hydrodynamics—modeled by hyperbolic conservation laws with dispersive perturbation—has emerged as a unified mathematical framework for the description of multiscale nonlinear wave phenomena in dispersive media and accurately describes a plethora of physical systems. This talk will be a tour through some recent mathematical and experimental results in this growing field of research. Parallels and analogies to classical hydrodynamics will be presented such as the generation of shock waves subject to appropriate regularization and their description in terms of characteristics. In contrast, from the existence of expansion shocks to the generation of dissipative shock waves in a conservative medium, dispersive regularization also leads to a number of counterintuitive, perhaps bizarre, effects, which will also be described. To hopefully keep you entertained, this tour will include lots of video and animations of in-house experiments and simulations.

BIO:

Mark Hoefer is an Associate Professor in the Department of Applied Mathematics at the University of Colorado, Boulder. His research focuses on the mathematics of nonlinear wave phenomena in dispersive media, both generally and with application to fluid dynamics, magnetic materials, superfluids, and nonlinear optics. He is the director of the Dispersive Hydrodynamics Laboratory at CU Boulder where experiments are developed to inform and manifest some of the nonlinear wave mathematics studied by his group and others.



Dispersive hydrodynamic interaction of nonlinear waves along a diluted corn syrup fluid conduit. Images rotated 90° clockwise. CU Dispersive Hydrodynamics Lab