

# NCTS

# Derivation, Analysis and Applications of Water-Wave Models

## Speakers

## Introduction & Purposes

This is a lecture series consisting of six 90-min talks to introduce the modelling of the water waves and the mathematical theory on water wave equations. In particular, the lectures will focus on the existence and application of conservation laws and existence and properties of solitary waves.

## Outline & Descriptions

In this set of lectures, we will briefly indicate how water-wave models arise from more complete descriptions of wave motion. We then pass to some particular models such as the Korteweg-de Vries equation, Boussinesq systems and the like. We will study the mathematical properties of these waves, including existence and application of conservation laws and existence and properties of solitary waves. These studies of particular models suggest a range of questions that would arise in more general settings. These include questions of long-term stability which are tied to issues of global well-posedness. Some of these issues will occupy us for the remainder of the course.

## Prerequisites

Undergraduate level PDE course



**Jerry L. Bona**  
University of Illinois Chicago



**Hongqiu Chen**  
University of Memphis

## Organizers

**Chun-Hsiung Hsia**  
National Taiwan University

**Juan-Ming Yuan**  
Providence University



Registration

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Time

2026

6/4

6/10

6/12

10:30-12:00 and 13:30-15:00

Venue

Room 505, Cosmology Building, NTU