OIST
OKINAWA INSTITUTE OF SCIENCE AND TECHNOLOGY
沖縄科学技術大学院大学

VISITING PROGRAM

TSVP TALK

Nonlinear Waves and Their Applications: From Oceans to Planets, From Lasers to Quantum Fluids, From Origami to Pandemics

2025 THU. **Dec. 4**

15:00–16:00

HYBRID L4E48, ZOOM

For zoom and other details scan QR code or visit oist.jp/visiting-program

In this talk, I will explore a number of ideas about nonlinear waves and their implications to a diverse array of fields: from mathematics to physics, engineering, computing, biology, and even (a little) art. I will begin with some history from 18th and 19th century fluid waves in channels and oceans, associated engineering observations, and artistic renderings. Next, I will share an intriguing story of (non) equity and inclusion around the first computer in post-atomic-bomb Los Alamos National Lab. The presentation will then pass through some Nobel Prize winning physical ideas related to the laser, quantum fluids, and some of their recent variations pursued experimentally including at Amherst. Finally, we will touch upon how in the past few years such wave phenomena have emerged in exotic materials, such as lattices made of origami elements, and how they have been leveraged toward studying the spread of pandemic infections.

University of Massachusetts

Panayotis Kevrekidis

Professor Kevrekidis studies a variety of systems stemming from the mathematical physics of nonlinear optical systems, of crystalline materials, as well as from the ultracold atomic setting of Bose-Einstein Condensates. The research mainly revolves around the existence, stability and dynamics of localized (solitary wave) structures in such one-, two- and three-dimensional setups, often described by equations of Nonlinear Schrodinger or Klein-Gordon type. Besides this main thrust of research Professor Kevrekidis also maintains a wide variety of additional modeling interests including mathematical biology [especially tumor angiogenesis, nephron dynamics and DNA models], simple cosmological models, the nucleation of liquid droplets, phase transition phenomena, catalytic chemistry and associated reaction-diffusion models, and dynamics and energy landscapes of glassy materials among others.

Kevrekidis is a Fellow of the American Physical Society (APS), of the American Mathematical Society (AMS) and of the Society for Industrial and Applied Mathematics (SIAM). He has been awarded an Honorary Doctorate from the University of Ioannina, Greece (2023), and has been elected in 2024 as a member of the European Academy for Sciences and the Arts (EASA).

https://groups.oist.jp/tsvp

CONTACT Office of the Dean of Research tsvp@oist.jp