

## ICTS Synopsis Seminar

**Title** : Shallow-water wave models and ocean-depth measurement

**Speaker** : Manisha Goyal, (ICTS-TIFR, Bengaluru)

**Date** : Thursday, 05<sup>th</sup> October 2023

**Time** : 10:30 AM (IST)

**Abstract** : We present an algorithm to address the practical challenge of mapping the ocean-basin topography. Specifically, we estimate the impermeable bottom boundary for an inviscid, incompressible, irrotational fluid, from measurements of surface deviation within the context of dispersive shallow-water wave models. The shallow-water regime is vital due to the problem's inherent ill-posed nature. Given an initial bottom boundary estimate, our reconstruction algorithm accurately retrieves fluid velocities and the bottom boundary profile. Our simulations show that a relatively inaccurate initial guess for the bottom boundary suffices. The algorithm consists of two separate inverse problems: one reconstructs the bottom boundary from velocities and surface deviation, the other recovers velocities from surface deviation, and an estimated bottom boundary using the observer framework. In combination, under suitable conditions, these two inverse problems permit accurate recovery of the bottom-boundary profile from the surface deviation measurements alone.

**Venue** : Chern Lecture Hall & Online

Zoom link: <https://icts-res-in.zoom.us/j/89044324069?pwd=tSbftKOx9iYMBD0m7iKPW0ve0A1DIS.1>

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