Our laboratory focuses on coastal and ocean research to improve our understanding of the physics of wind-driven waves and ocean-structure-seabed interactions. The research activities revolve around a large scale experimental wave flume facility and numerical model developments. One of the objectives is to develop sustainable approaches to control coastal erosion caused by climate change.
The research activities are based on large scale experiments and development of free-surface numerical models to study the physics of complex fluid mixing and structural response as coupled interactions.

RESEARCH THEMES

Fluid Dynamics
- Physics of fluids
- Fluid mixing
- Multiphase flows
- Numerical methods

Coastal Processes
- Coastal erosion, scour & beach nourishment
- Nearshore hydrodynamics
- Storm surge and flooding
- Sediment transport
- Runup and overtopping

Ocean & Atmospheric Sciences
- Air-sea interactions
- Wind-driven waves, tides and coastal processes
- Storm predictions

Marine structures
- Force and impact on marine structures
- Debris flow (e.g., river jams of ice)
- Special structures (e.g., underwater vehicles)
- Structural dynamics, elasticity & vibration control

Renewable wind, wave, tidal and offshore solar energy

LARGE SCALE FLUME

The flume is 120 m long and has a 5 x 5 m cross section. The flume is designed for modeling the interactions of waves, tides, currents, and sediment transport. The wavemaker is a piston type with a maximum stroke length of 4 m and a maximum velocity of 4 m/s. It is also equipped with an active wave absorber. Various initial conditions can be set-up including regular and irregular waves and a host of user-defined functions, e.g. landslide and earthquake-generated tsunami. Large amplitude waves can be generated reaching the top of the flume walls with water depth ranging from 2.5-3.5 m with wave period of 3-10 s.

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ABOUT US

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