

Coastal Environmental Research

Positioning HUJI as a Leader in Marine Preserve Area

A research topic of great interest to me addresses ways to characterize complex marine bodies using the state-of-the-art Finite-Volume primitive equation Community Ocean Model (FVCOM) models to explore ways to protect marine environments.

The marine environment of the Israeli Mediterranean, which harbors a diverse wealth of marine flora and fauna, is a highly valuable asset from environmental, economic and social aspects. Yet, this asset is under growing threat due to anthropogenic stress such as petroleum or gas activities, desalination plants, commercial fishing, and invasive species from the Suez Canal. Networks of Marine Protected Areas (MPAs) are effective tools in protecting marine environments and conserving their biodiversity. The commonly used approach for demographic connectivity analysis is biophysical modeling which computes virtual larval dispersal trajectories combining currents data with biological species-specific traits.

The challenge in this modelling is that the MPAs lie close to the coastline, which is characterized by a curvy topography, exhibiting a complex bathymetry, and therefore requiring precise modeling.

I have extensive experience in applying modeling to a variety of disciplines, ranging from meteorology to oceanography, relying on open source code and algorithms that I am continually developing and refining with my students.

The unique contribution that I can bring to this research is my deep knowledge and experience in modeling, applied to the study of the coastal marine area.

The value of this research for Hebrew University is that it positions HUJI as a leader in the field of complex models applied to biological processes and unstructured grids at both high spatial resolutions ($\ll 1$ meter) and high temporal resolution ($\ll 1$ minutes). This research will be done on the Mediterranean Sea but has practical applications for other bodies of water. Clearly, this has value from an ecological model perspective, presenting ways to overcome environmental challenges.