

## 2023 Geodynamics Seminar

# The ecology of coral reef fishes – a brief history and recent results on larval connectivity and food web structure



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**1:30 – 2:30 P.M.**

Clark Lab 507, Quissett Campus, WHOI

Ecological studies of coral reef fishes have a relatively limited history, largely because direct observation of coral reef environments has only been logistically feasible since the advent of SCUBA in the 1940's. Despite its novelty, the field has made significant contributions to the development of unifying concepts in ocean ecology. In this talk I will first briefly review this history before focusing on our work on recruitment and connectivity in coral reef fishes. Connectivity among fish populations on coral reefs is largely determined during a pelagic larval phase. Our lab has been investigating larval dispersal in the orange clownfish (*Amphiprion percula*) and vagabond butterflyfish (*Chaetodon vagabundus*) in Kimbe Bay, Papua New Guinea using DNA parentage analysis to provide empirical estimates of population connectivity. We are combining these estimates with results from a coupled biophysical model to assess the role played by regional circulation and larval behavior in determining connectivity patterns. Effective conservation strategies for coral reefs will require a predictive understanding of connectivity that is largely beyond our current understanding. Finally, we have quantified functional diversity in fish guilds by examining food web architecture using stable C and N isotope analysis of specific amino acids isolated from fish muscle samples from reefs in the central Pacific. Our results question the hypothesis that high diversity within reef fish guilds also implies significant functional redundancy as food webs on reefs appear highly structured. Ultimately, we hope our work will identify ecological processes that play important roles in structure, function and resilience of coral reef ecosystems and suggest ways of mitigating human impacts on reefs in the future.