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Department of Marine Sciences  
Presents a Seminar by

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## **Development of otolith-bound nitrogen isotopes as a new tool for reconstructing past marine food web structure**

Stomach content analysis and stable isotope analysis in fish tissues have served as the primary tools in trophic ecology for decades but provide only a limited temporal window into the dietary history of fish. In contrast, otoliths accrue over the entire life history of the fish and can be measured in contexts where tissue is not available, for example, in otolith archives and sedimentary deposits. Using persulfate-oxidation of otolith-bound organic matter followed by bacterial conversion to N<sub>2</sub>O, we find that the nitrogen isotopic composition ( $\delta^{15}\text{N}$ ) of otolith organic matter is a robust indicator of fish diet. Using paired otolith and tissue samples from both hatchery reared and wild fish, we provide validation of the otolith method. We also present first trophic level data obtained from fossil and subfossil fish otoliths retained in the coral reef matrix of Holocene Caribbean coral reefs. Representative taxa from Atherinidae and Gobidae families, two groups of low trophic level reef-associated fish, show decreases in trophic level regardless of their size. This indicates alterations to food web structure and energy flow in modern compared to Holocene food webs. The application of this new otolith-bound proxy for trophic level holds promise for reconstructing pristine food webs of the past and in so doing, creating benchmarks for informing conservation.

**Host:** Julie Granger

**Time & Date:** 11:00 am, Friday, October 9, 2020

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