

**Centennial Honors College Thomas E. Helm Undergraduate
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ABSTRACT

Major: Mathematics

Podium

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Shark attacks and the story they reveal

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In many cases, we only have access to presence-only data that captures the occurrence of an event but provides no information about instances where the event did not occur. This data type presents a fascinating mathematical challenge: how can we extract meaningful insights from an incomplete picture? In this talk, we explore a shark attack dataset, which includes details about attack events and the victims' activities—such as swimming or diving—before the incident. Shark attacks are exceedingly rare, and datasets like this do not reflect actual risk levels for various activities in affected areas. So, what can we uncover from such limited data?

We examine methods for modeling the joint distribution of data and expectations, identifying activities that influence the marine ecosystem, and understanding the circumstances under which attacks lead to major or fatal injuries. Join me as I uncover the hidden narrative within the numbers—through the lens of mathematics.