

It's the eye of the tiger (shark)! Animal-borne cameras reveal how tiger sharks spot and track prey

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[Tiger shark](#), Bahamas. Credit: Albert kok/Wikipedia, [CC BY-SA 3.0](#)

Animal borne cameras now give scientists unprecedented access into the visual world of animals, including the life and death struggles of hunters and their prey.

For the first time, new research, published in the *Journal of Experimental Marine Biology and Ecology*, has combined knowledge on the structure of the eyes of [tiger sharks](#) with images of prey and habitat from small cameras deployed on these animals. This enabled the development of a virtual visual system for the shark, allowing researchers to analyze videos of hunting behavior through the eyes of this top-order predator.

Small video camera tags were attached to [tiger](#) sharks at Ningaloo Reef, in Western Australia by an international team of scientists from Macquarie University, the Australian Institute of Marine Science, University of Western Australia, Murdoch University, Stanford University and Oregon State University. A virtual visual system for the sharks was used to process the videos from the tags to understand how these predators visually experience interactions with [sea turtles](#), a common prey item.

The video tags also contained [movement sensors](#) to track fine-scale movements of the sharks, allowing swimming behavior and the shark's reaction to turtles to be monitored.

This is the first study to look at animal borne camera footage through the visual capabilities of the animal they are mounted on, allowing researchers to gain a truer representation of life through a tiger shark's eyes.

"When watching the raw [camera](#) footage of tiger sharks approaching sea turtles it seemed strange that often tiger sharks swam directly over a turtle sitting on the reef, a potentially easy meal," says lead author Dr.

Laura Ryan from the School of Natural Sciences at Macquarie University.

"However, when we look at the visual cues through the visual system of the tiger shark it is in fact extremely difficult to detect the turtle, and particularly when they remain motionless, blending into the background can allow them to camouflage themselves from attack."

"Tiger sharks have much lower visual acuity than humans and the [video cameras](#). This means the sharks must rely on any form of movement from the sea turtles to be able to identify them. For sea turtles, their best form of defence from attack may be to simply remain still in the presence of the predator," says Dr. Ryan.

The researchers tracked the fine-scale movements of the sharks, which allowed their swimming behavior to be monitored, discovering that the apex predators thoroughly investigated those turtles which visually stood out.

The visual detection of a turtle was accompanied by a change in tiger shark behavior, showing that despite low acuity, vision is still a key sensory system for these animals. Once a sea turtle was spotted, sharks slowed down and performed a lot of turns, suggesting they had entered a search mode for their prey.

"The picture that emerges through the eyes of the shark is one of almost slow-motion pursuit of a slow-moving prey, rather than a high velocity ambush that we tend to think of when we see other big predators in action, such as white sharks," says co-author Dr. Samantha Andrzejczek from the Hopkins Marine Station at Stanford University.

"This probably reflects the fact that these sharks inhabit environments that are generally nutrient poor, and these predators have to be careful

not to expend too much energy in chasing prey to make a meal."

The study provides greater insights into the use of [visual cues](#) in [prey](#) identification by tiger sharks and the camouflage strategies used by sea turtles to avoid predation. The team now want to apply the approach to other species.

"The animal borne cameras are now commonplace in the field of ecology, but few researchers have taken the next step to really consider the videos they provide in terms of what the subject animals can actually see. This is the next frontier in this form of tagging," says co-author Dr. Mark Meekan from the Australian Institute of Marine Science.

More information: Laura A. Ryan et al, Prey interactions in tiger sharks: Accounting for visual perception in animal-borne cameras, *Journal of Experimental Marine Biology and Ecology* (2022). [DOI: 10.1016/j.jembe.2022.151764](#)

Provided by Macquarie University

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