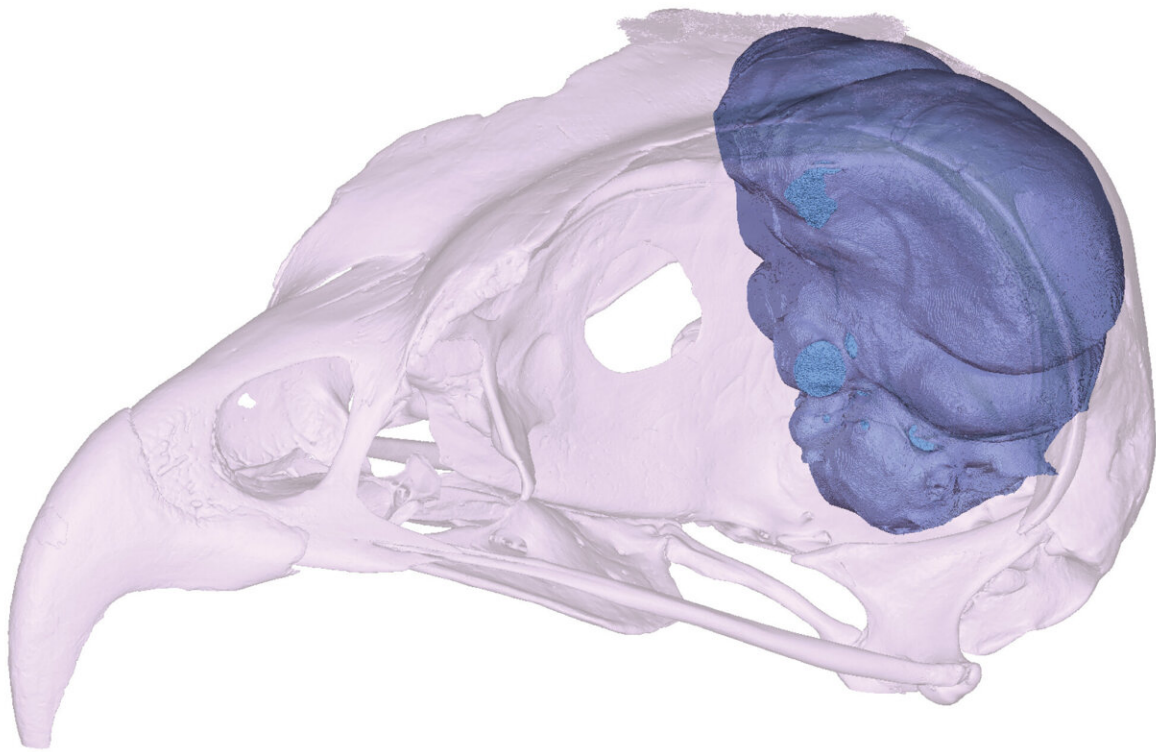


# Hawks' eyes may not help the world's only nocturnal hawk hunt at night

May 25 2022

---



Three-dimensional reconstruction of the skull of a Letter-winged Kite, with the brain reconstructed in purple. Credit: Dr Vera Weisbecker, Flinders University.

Australia's Letter-winged kite may not be any better at seeing in the dark than its closest, day-hunting relatives.

An international study led by Flinders University's Weisbecker Lab has revealed that the rarely-observed kite's visual system is no different to that of its close relatives that are active during the day, challenging many decades of speculation that the Letter-winged Kite might be becoming more like an owl than a hawk.

"Letter-winged kites hunt at night and must be able to navigate obstacles in the dark while tracking down their favorite prey, the Long-tailed Rat," says Assoc. Prof. Vera Weisbecker.

"It has therefore long been speculated that their visual system shows adaptations for seeing in the dark, and particularly that they are similar to owls in having larger eyes than other hawks, and larger image processing centers in the brain. However, we found that this wasn't the case."

Dr. Karine Mardon, from The National Imaging Facility at The University of Queensland Centre for Advanced Imaging, scanned the skull of most of the birds of prey included in the study, using computed tomography (CT scanning).

First author and Ph.D. student in the Weisbecker lab, Aubrey Keirnan, then compared 3D reconstructions of the Letter-winged Kite's skull and brain with that other birds of prey.

"Contrary to many anecdotal reports, the dimensions of the eye of letter-winged kites were no different to two closely related kites from the same genus—the black-shouldered and the black-winged kites."

"But there was a twist in the story: We realized that all three kite species had larger orbits relative to their optic foramen, the hole in the back of orbit that the [optic nerve](#) passes through. This is often seen in [nocturnal birds](#), where a small number of nerves relay a lot of input from

the eye into a high-contrast, low-resolution image."



A Letter-winged kite flying at daylight. Credit: Michael Jury

"This suggests all Elanus kites may be pretty good at seeing in the dark and not too good at seeing in daylight—but for some reason, only the letter-winged kite has made the move into a nocturnal lifestyle."

Dr. Weisbecker says this might also explain many reports that the Letter-winged kite is particularly active during moonlit nights.

"It might not actually be very good at flying in the total dark, unlike many owls."

Dr. Andrew Iwaniuk, from the University of Lethbridge (Canada), who-co-led the study, says the use of anatomical observations to infer the species' behavior was an innovative approach to understand a bird that is notoriously difficult to observe in the wild.

"The species lives in remote arid Australia, avoids human settlements and is highly elusive. Population estimates vary between 670 and 6700 individuals according to the IUCN, and it is currently listed as near-threatened. To conserve the species, it is critical that we understand its behavioral needs and capabilities, but they are extremely difficult to observe."

"We are extremely lucky to have Australia's amazing museum collections at our disposal to help us understand this bird without the need to find and disturb the species. For example, the letter-winged-kite, and its relatives, might be impacted differently by artificial light sources than other hawks."

Dr. Jeroen Smaers, from Stony Brook University (US), notes that "this study perfectly exemplifies how studying variation across many species enlightens our understanding of individual [species](#); an approach that is starting to show its contributions to animal conservation."

Ms Keirnan adds that their "work on the letter-winged [kite](#) is really just the beginning. Our measurements showed that many other [birds of prey](#) are quite unique in one aspect or other of their visual system. I am excited to spend my Ph.D. on delving further into how measurement of the visual system can help in the understanding and management of other birds."

The research was published in *Royal Society Open Science*.

**More information:** Aubrey Keirnan et al, Not like night and day: the

nocturnal letter-winged kite does not differ from diurnal congeners in orbit or endocast morphology, *Royal Society Open Science* (2022). [DOI: 10.1098/rsos.220135](https://doi.org/10.1098/rsos.220135)

Provided by Flinders University

Citation: Hawks' eyes may not help the world's only nocturnal hawk hunt at night (2022, May 25) retrieved 26 April 2024 from <https://phys.org/news/2022-05-hawks-eyes-world-nocturnal-hawk.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.