

## How does beak morphology influence birdsong in sunbirds and spiderhunters (Aves: Nectariniidae)?

We are looking for a motivated student with an interest in avian vocalization and morphology. This desktop study includes the construction of multiple datasets derived from already existing vocalization recordings and literature, data analysis, and scientific writing, with the potential for publication.

### Background

Bird vocalizations can be influenced by different factors. For example, the 'morphological constraint' hypothesis predicts a negative correlation between body size and song frequency, while the 'acoustic adaptation' hypothesis predicts that organisms in dense habitats sing lower frequency songs compared to organisms inhabiting more open areas (Hay et al. 2024).

Sunbirds and spiderhunters (Aves: Nectariniidae) is an avian family that are also known as the Old-World hummingbird family as their main diet also consists of nectar. The family comprises 151 species with distribution ranges in Africa, Asia and Australia. Within the Nectariniidae, morphological differences are striking, with the smallest birds weighing only 4 grams, whereas the biggest species can weigh up to 38 grams (Tobias et al. 2022). Moreover, the beak morphology within the family is remarkable, with a large variation in beak length and curvature. Given the large variation in morphology and geographic distribution, the Nectariniidae family makes an excellent family to study the 'morphological constraints' and 'acoustic adaptation' hypothesis.



**Fig. 1** Black-throated sunbird (*Aethopyga saturata*)

### Methods

In this thesis, we will explore how birdsong is affected by beak morphology, body size and environmental factors. To do so, the student will acquire morphological and environmental information from the literature and use already recorded vocalizations from the Nectariniidae family to obtain a set of vocalization characteristics. With these datasets, we can perform interesting statistical analyses to broaden our understanding of bird vocalization.

Projects on other avian families (e.g. Bucerotidae) and other hypotheses including, for example, the correlation between speciation rate and area range size are also possible (see for example Hay et al. 2022). In addition, the link between vocalization and different mating systems will also make an interesting thesis topic. Ultimately, students are more than welcome to come up with own research ideas.

### Supervisors

This project will be supervised by Prof. Terje Lislevand and PhD candidate Arjen van der Kamp. If this opportunity interests you, please contact Arjen van der Kamp ([arjen.kamp@uib.no](mailto:arjen.kamp@uib.no)).

### References

- Hay EM, McGee MD, White CR, & Chown SL (2024). Body size shapes song in honeyeaters. *Proceedings of the Royal Society B*, 291(2021), 20240339.
- Tobias JA, Sheard C, Pigot AL, Devenish AJ, Yang J, Sayol F, et al. (2022). AVONET: morphological, ecological and geographical data for all birds. *Ecology letters*, 25(3), 581-597.
- Hay EM, McGee MD, & Chown SL (2022). Geographic range size and speciation in honeyeaters. *BMC Ecology and Evolution*, 22(1), 86.