

## STATEMENT OF GRANT PURPOSE

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The Effect of Climate Change on Responses to Predatory Cues in Small Passerine Birds

I am proposing to examine how climate change affects anti-predatory adaptations of common passerine species (a perching bird that can be recognized by the arrangement of their toes) in Europe [1]. Anti-predatory adaptations are constantly arising as species evolve and acquire more information about their predators. The recognition of a predator's cues plays an important role in a prey's evolution of successful detection and escaping abilities. These can range from alarming cues, such as vocalizations, to something more subtle, like the body size or plumage of a predator. Individuals who can assess the risk of predation and make a trade-off against foraging for safety, maximize their fitness [2,3]. However, using this information has costs if the animal makes a mistake. These costs are predicted to vary according to extrinsic and intrinsic variables such as foraging opportunities, basal metabolic rate, and maintaining physiological processes. The variation in winter temperatures due to climate change could influence and alter the response thresholds (the point that must be exceeded to begin producing an effect) of potential prey to these predator cues. I will investigate this concept in passerines, for example, the Great Tit (*Parus major*), and predict that an increase in temperature will make it easier for prey to pay attention to predator cues (reducing their response threshold), whereas extreme cold temperature fluctuations would make mistakes costlier and increase their response threshold. By understanding these responses and the role temperature plays in them, we can predict how the species, and those similar to it, will survive in the future when temperatures become more extreme.

In pursuit of my research goals, I plan to work under the guidance of Dr. [REDACTED] in the Department of Ecology and Evolutionary Biology (EEB) at the University of Helsinki, Finland. Dr. [REDACTED] leads research seeking to understand how animals acquire and use information to influence their fitness and adjust to their environment. This information may be personal (an individual learning something on its own), or social (an individual learning something by observing others) [4]. The way one uses this information has implications, not just for the individual, but also for the community, providing social information for others [5]. This can have either positive or negative impacts depending on its quality and reliability [6]. Under Dr. [REDACTED] I will continue my study of the core concepts behind how animals process information and apply it directly to passerine species. I will also work alongside Dr. [REDACTED] collaborator at [REDACTED], Dr. [REDACTED]. Through Dr. [REDACTED] can access the collection of specimen the museum holds to conduct my experiments investigating behavioral responses to predatory cues. Dr. [REDACTED] expertise in the field of climate change and ornithology is invaluable, and his assistance throughout the project will help develop my interests and skills. The core information I would gain from this project and the information I will gather from working alongside Dr. [REDACTED] and Dr. [REDACTED] may be applied to different avian fauna across the world.

In preparation for my arrival, I am in regular discussion with Dr. [REDACTED] and Dr. [REDACTED] about my project along with reading literature pertaining to small passerines. This will ensure that my project at its best and most feasible upon arrival in Finland. Once in Helsinki, I will begin my fieldwork by providing wild passerine birds within the region with food via bird feeders and test my prediction during winter (December-March). When the passerines arrives, depending on the feeder, it would either be presented with a dummy version of its predator (sparrow hawk, pygmy owl, etc.) or a wood pigeon for the control group. The dummy figure,

provided by Dr. ██████████ would be set up in a box about a meter away with one side exposed to the bird feeder. This side would be covered with a curtain that is controlled by the observer, altering what the bird can see. In addition to this, small speakers that are placed near the bird feeder will have the ability to play the vocalizations of the prey or non-prey. I will use the vocalizations, physical cues (plumage and body size), or both to observe the response in the passerine species that is feeding. Behavior and conspecific interactions (interactions between individuals of the same species) would be recorded from five meters away and via a set-up camera near the feeder to later analyze the behavior of an individual. Throughout these experiments, I will continue to expand my knowledge on passerines through the review of primary literature, and in January, I plan to begin writing. Once data collection is completed, I intend to pair it with the information Dr. ██████████ has on the Great Tit and other passerine species to help explain and analyze the behavior recorded.

I aim to contribute to the body of scientific literature examining the global impacts of climate change by presenting at conferences and submitting to peer-reviewed journals for publication. This research will advance our understanding of how species at northern latitudes are responding to climate change, especially areas influenced by urbanization. Understanding the effect temperature fluctuations have on passerine species within urban areas has yet to be explored and I am excited to venture into this area under Dr. ██████████. The information gathered from this research will advance our knowledge about the factors influencing species-specific variation in response to climate change.

The University of Helsinki would provide me with the amazing opportunity to conduct research in an area that is warming at twice the global rate due to climate change [7,8]. I intend to use my experience in Helsinki as a Fulbright student to stride towards understanding more about climate change and the effect it will have on European wildlife and apply the information towards conservation practices. While conducting my research, I plan to get involved in local English teaching programs, allowing me to integrate with the community and understand more about Finnish culture. In these exchanges, I would get to improve my Finnish while also engaging with members of the local community about my background and research.

The completion of this research project would be incredibly enriching for me, both professionally and academically. In the future, I plan to further my involvement in climate change research and how it is affecting not only the movement ecology of avian fauna but behavioral ecology as well. As someone who lives in Florida and whose family is from St. Croix, a small Caribbean island, my surroundings and the surroundings of my loved ones are being changed by rising sea levels. Taking this interest and exploring it throughout my academic career has made me passionate about understanding climate change and the effect it will have on the Earth. I decided to cultivate this passion and forge a path into wildlife biology to understand more about how to protect the gifts that fill this world.

## **Bibliography**

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