

# Avian responses to novelty in a changing world

## Supervisors

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## Project description

As human activities cause rapid changes to environments throughout the world, native animal species face threats different to those they have evolved to cope with and are increasingly brought into conflict with human interests. The ability of animal populations to persist in modified environments, and the efficacy of conservation and wildlife management strategies, are strongly dependent on the sensory and cognitive processes by which animals appraise cues in their environment. For instance, many species have shown rapid declines owing to a failure to respond appropriately to the introduction of novel predators or noxious prey, with major knock-on effects for local ecosystems<sup>1</sup>. Conversely, the ability of crop pests to learn to ignore measures used as crop deterrents results in continued human-wildlife conflict and substantial economic costs<sup>2</sup>. An understanding of the mechanisms by which animals respond to threats in their environment is thus critical if we are to predict the likely effects of human disturbance, take action to mitigate these effects and design effective strategies to minimise conflicts between wildlife and human populations<sup>1,2</sup>.

This project will incorporate insights from cognitive theory, sensory ecology and evolutionary biology to determine the mechanisms by which birds recognise, communicate and generalise about threats in their environment. The student will be trained in experimental design, cognitive testing and analyses of avian vision, bioacoustics and statistics, liaise with the local farming community and learn how fundamental scientific questions can be applied to practical problems. Research will make use of a large, long-term study system of individually recognisable wild jackdaws, members of the large-brained corvid family, famed for their opportunism and commonly persecuted as crop pests. Specifically, the project will use experimental presentations whereby the visual and acoustic properties of stimuli (including model predators, humans of differing levels of threat and crop deterrents) are systematically altered to determine the processes by which birds:

- 1) Recognise threats: how do stimulus characteristics influence perception and processing of information about novel predators, dangerous humans and man-made objects?
- 2) Communicate about novel threats: can individuals use visual and acoustic signals to induce conspecifics to respond appropriately?
- 3) Generalise from previous experience: can individuals apply learned information to different contexts, enabling appropriate responses to novel threats?

Together this work will provide fundamental insights into birds abilities to respond to environmental change and assist in the development of effective, evidence-based wildlife management strategies.

1. Sih, A., Ferrari, M.C.O. & Harris, D.J. 2011 Evolution and behavioural responses to human induced rapid environmental change. *Evolutionary Applications* 4, 367387

2. Greggor, A. L., Clayton, N. S., Phalan, B. & Thornton, A. 2014 Comparative cognition for conservationists. *Trends in Ecology and Evolution* 29: 489495