

## Simulating the global avian soundscape now and into the future

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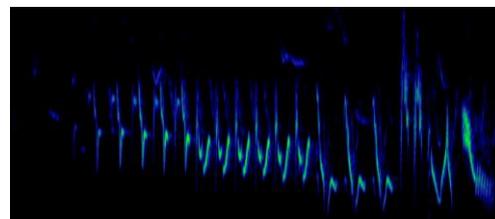
**Background:** Despite a relatively good knowledge of the distribution of the world's birds, our understanding of their population sizes across areas is, at best, fragmentary, and often completely lacking. Moreover, substantial changes to both the distributions and numbers of species are predicted under future climate scenarios, which will have marked effects on the many ecosystem services that birds provide. This will impact ecosystem processes but also the cultural linkages between people and nature.

**Aims:** The current project aims to collate data on bird abundances, building on previous projects at Durham (e.g. Stephens et al. 2019), and to use such data alongside other global datasets to model the current abundances and to simulate future abundances and distributions of birds globally. Moreover, as birds provide valuable cultural service provisioning the world over, we will explore the impacts of such changes on these services, focussing primarily on changes to the avian acoustic environment (a major contributor to human well-being; Cox et al. 2018) in terrestrial landscapes.

**Methodology:** In Durham, we have already explored the use of abundance data in modelling species abundance-environment relationships (Howard et al. 2014; Stephens et al. 2019), and have a database of typical density estimates for a large proportion of the world's terrestrial birds. In addition, we have expertise in using species distribution models to simulate changing ranges and populations under climate change (e.g. Baker et al. 2015; Stephens et al. 2016, Hof et al. 2019). In this project, we will combine both types of models to project current and future bird communities in different habitat types. We also have worked in recent years with acoustic data and derived indices to understand how the audio environment in an area changes in relation to environmental and biotic factors (e.g. Bradfer-Lawrence et al. 2019). Here, we will use population and community modelling to recreate soundscapes across the terrestrial world, and will explore the spatial variation in such contemporary soundscapes, incorporating factors affecting the timings of vocalisations. We will similarly recreate soundscapes under scenarios of future climate change to explore where and when avian soundscapes will change markedly in future. To validate our models, we will compare our artificial soundscapes to actual audio recordings from around the world, augmenting available recordings with audio recorders deployed as part of this project.



**Timetable of Activities:** In their first year, the student will augment current datasets of species population densities and relative abundances, and will work with others in the group using species distribution models to simulate (and test) the abundance of individual bird species. These data will be combined with habitat preference data to simulate (and validate) avian assemblages across the world. In year two, these data will be combined with avian vocalisation data to produce artificial audio recordings (soundscapes) for sites, which will be summarised using acoustic indices. In year three, these processes will be extended to simulate future avian assemblages and soundscapes.



**Maintenance Payment** to successful student: £14,700 (approx.) p.a. plus international tuition fees for 3 years (see <https://www.dur.ac.uk/study/pg/finance/funding/bursaries/scholarships/csc/> for further details).

**Application Process:** The funding is aimed at **students from the People's Republic of China**. If you are interested in applying, in the first instance contact Professor Willis (s.g.willis@durham.ac.uk) asap (by 15th Dec at the very latest), with a CV and a covering letter, detailing your reasons for applying for the project. Applicants encouraged to formally apply should do so online via [www.durham.ac.uk/postgraduate/apply](http://www.durham.ac.uk/postgraduate/apply) attaching their CV, covering letter, 2 academic references, and evidence of previous academic qualifications. Applicants will also need to register with the China Scholarship Council: <http://apply.csc.edu.cn/csc/main/person/login/index.jsf>

**CLOSING DATE FOR APPLICANTS: asap - 15<sup>th</sup> December 2019** latest date to contact Prof Willis. [This post is also advertised on findaphd.com](#)