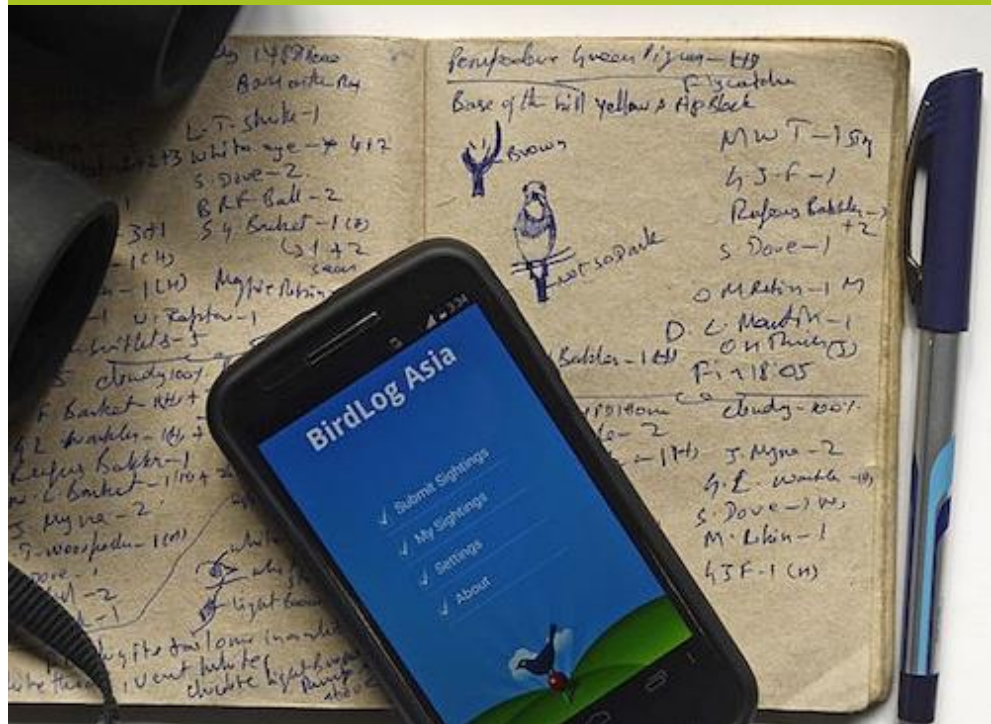




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BOU ASM
10 - 11 October 2022

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OFFERED ORAL PRESENTATION | Tues, 11 Oct, 1815 UTC

Nicolas Adreani

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Citizen scientists reveal that asymmetric nest architecture is not random and highly repeatable

Bilateral, or left-right, asymmetry is a discrete trait that has evolved independently across multiple life forms, and can be randomly, genetically and/or environmentally determined. In a population, the frequency of left and right phenotypes can vary randomly or be fixed (i.e. one predominant phenotype) depending on, for example, their adaptive value. Bilateral asymmetry has been described and quantified in individual morphological or behavioral traits. But bilateral asymmetry is also present in animal architecture, like bird nests. How common this trait is in animal architecture, or its importance, remains to be quantified. Here, bilateral asymmetry can provide insight into the proximate and evolutionary mechanisms that underly animal architecture. We used a citizen-science approach to quantify the occurrence of bilateral asymmetry in the complex and collectively-built nest of the Rufous Hornero (*Furnarius rufus*). We assessed the possible evolutionary mechanisms underlying asymmetric nest architecture and predict a genetic underpinning.


Nicolas Adreani is an Argentinian biologist from the University of Buenos Aires who did his PhD at the Max Planck Institute for Ornithology on animal vocal communication. He is a passionate birder and most of his research interests fall within understanding the mechanisms underlying birds' behaviour.

OFFERED ORAL PRESENTATION | Mon, 10 Oct, 1645 UTC

Using citizen science to monitor an exotic parakeet species

Hany Alonso

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Ring-necked parakeets *Psittacula krameri* have been introduced in many countries outside their native range. In Portugal, there has been a clear expansion in their distribution, but no effort has been made for monitoring numbers at a national scale, as prospection of roosts in urban areas is a challenging task. To overcome this problem, a citizen-science based monitoring scheme was developed. During the autumn of two consecutive years (2020-21), we challenged non-specialist citizens to report late-hour observations of parakeets. Observations were filtered and suspicious roost sites were then visited by experienced observers, who also made roost counts. Overall, we received 727 observations of parakeets submitted by citizens and 33 roosts were identified at a national level. Ca 88% of the roosts were first identified by non-specialist citizens and roost counts allowed a national population estimate of 2200-2500 parakeets, which represents an 9-fold increase in their numbers in less than 20 years.

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Hany Alonso, working at SPEA, is the national coordinator of the common breeding bird census in Portugal, being also involved in many different bird monitoring schemes. Recently, he has been developing citizen science initiatives to monitor exotic species in the cities.

OFFERED ORAL PRESENTATION | Tues, 11 Oct, 1230 UTC

The citizens behind the science: personal perspectives from the North American Breeding Bird Survey

Veronica Aponte

Environment and Climate Change Canada
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Co-authors: Marie-Anne Hudson (Environment and Climate Change Canada), David Ziolkowski Jr. (United States Geological Survey) & Michael Lutmerding (United States Geological Survey)


Established in 1966, the North American Breeding Bird Survey (BBS) is a mostly volunteer-based bird monitoring program that provides long-term, large-scale population information for hundreds of North American bird species. Its recognition as the foundation for landbird conservation planning in the U.S. and Canada stems from both its scientifically rigorous sampling design and the outstanding dedication of its highly skilled participant workforce that conducts standardized roadside surveys. Each year, more than 3,000 participants ensure that more than 3,300 BBS transects are surveyed, and they have amassed over 100 million bird sightings since the survey began. Through the BBS, people have been generously contributing to bird conservation and meaningfully connecting with nature, all while maintaining a long-standing civic legacy, creating tradition among family and friends, and developing a sense of personal pride and accomplishment. This presentation showcases some of the stories and motivations of the BBS' citizen scientists.

Veronica Aponte has been a biologist with the Canadian Wildlife Service of Environment and Climate Change Canada since 2013 and is currently the national coordinator for the Breeding Bird Survey for Canada.

OFFERED ORAL PRESENTATION | Mon, 10 Oct, 1400 UTC

Albatrosses from space: using crowdsourcing and satellites to monitor breeding Wandering Albatrosses

Marie Attard (she/her)

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Monitoring the world's threatened albatross species is challenging due to their remote nesting locations, making ground or aerial surveys expensive, infrequent, and often incomplete. With rapid advancement of

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geospatial technologies, citizen science can contribute to accurate and reliable georeferenced wildlife data, while also raising public awareness of current conservation efforts. We implement an online citizen science campaign on Maxar's GeoHive crowdsourcing platform to count breeding Wandering Albatrosses (*Diomedea exulans*) in South Georgia using 31-cm resolution satellite imagery. Crowdsourced image counts may provide accurate data on population sizes, highlighting the utility of this approach as a long-term monitoring tool, with great potential for further expansion to other sites and seabird species. Future endeavours to employ crowdsourced image counts as a training tool for machine learning algorithms will enable automated data extraction of albatrosses at different breeding sites, and aid ecological monitoring through the detection of animal attendance patterns and habitat preferences.

Marie Attard's research focuses on exploring vertebrate diversity and how species respond to environmental challenges, such as land-use change, predation and climate change. Her research at the British Antarctic survey uses super-high resolution satellites and citizen science to monitor breeding populations of great albatrosses on remote islands.

KEYNOTE | Tues, 11 Oct, 1430 UTC

Returning the gift: empowering citizen scientists to monitor and conserve the world's birds

Tom Auer

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Citizen science projects in ornithology tend to have a one-directional nature with regards to the data being collected. Observational frameworks are established, often with participant incentives related to curation of their own data, then citizen scientists collect and report the data and academics analyze and publish on that data. While altruistic motivations for participation can be met in this manner, the one-directional tendency fails to fully realize potential positive feedback loops in the citizen science participation process. Through the lens of a "value-added reciprocity cycle," I will discuss emerging ideas for how citizen science projects can amplify their impact by leveraging recent advances in a variety of fields, including machine learning, artificial intelligence, social science, and social justice. With these advances, projects can reciprocate the original gift of data collection by generating new, value-added products and processes that facilitate learning, increase motivation, satisfy altruistic needs, empower advocacy, and foster inclusivity, working towards shared goals of appreciating, monitoring, and conserving our world's birds.

Tom Auer helps lead the production efforts for eBird Status and Trends and the development of geovisualizations of these products for public engagement, science, and conservation. The results of this work can be seen at eBird Science.

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POSTER PRESENTATION | Tues, 11 Oct, 1050 UTC

Biases in large-scale citizen science data and their consequences for quantifying biodiversity

Louis Backstrom (he/him)

The University of Queensland, Australia

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Global biodiversity is in crisis. Effective monitoring of the state of biodiversity is more important than ever, and yet our knowledge of the natural world remains inadequate to combat the challenges presented by the Anthropocene. Here, I will explore the utility of citizen science as a source of biodiversity knowledge and investigate the effect of biases found in citizen science datasets on their ability to assist in monitoring long term change in biodiversity. I will detail for the first time the interactions between biases, and then apply this framework to a series of population trend analyses.


Louis Backstrom is an Honours student at the University of Queensland, supervised by Richard Fuller. This presentation will detail the findings of his honours project this year, investigating biases in large-scale citizen science projects and their effects on analyses of species' population trends.

OFFERED ORAL PRESENTATION | Mon, 10 Oct, 1345 UTC

Not just species recording: what is the role for citizen scientists in supporting habitat assessment?

Ailidh Barnes (she/her)

British Trust for Ornithology, UK

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Reversing the global biodiversity crisis requires not only conservation and management of species, but the habitats in which they live. However, while there is a long history of biodiversity recording by citizen scientists, especially in Europe, information on habitats is less frequently recorded and undervalued by bird surveyors, meaning knowledge of their extent and quality is generally poor. Habitat information is valuable for a range of reasons, and both citizen scientists and Earth Observation methods provide opportunities to expand the range and scale of habitat recording. We provide a framework for determining the factors, opportunities and challenges that should be addressed to allow citizen scientists, particularly those that are already collecting ornithological data in the UK, to contribute to habitat monitoring. We illustrate the application of our framework both to assess the extent/quality of existing habitat, but also as a tool for validating Earth Observation data.

Ailidh Barnes works as a Research Ecologist in the Monitoring Research Team at the British Trust for Ornithology (BTO) covering a wide range of projects related to understanding change in populations of birds and other taxa, and the effectiveness of protected areas using national citizen science collected data.

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OFFERED ORAL PRESENTATION | Tues, 11 Oct, 1545 UTC

The opportunities and challenges of attracting and retaining volunteers for a long-running citizen science project

Gill Birtles (she/her)

British Trust for Ornithology, UK

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The Wetland Bird Survey (WeBS) is one of the longest running citizen science projects, starting in 1947. Since then, the survey has been reliant on volunteer counters to collect monthly data at their allocated wetlands, to assess population trends of non-breeding waterbirds in the UK. WeBS covers a variety of habitats which means that we need to engage with, retain and support a diverse range of counters with varying skill levels. In addition, we need to reach out to fresh audiences to attract new volunteers to ensure the survey's future is secure. We will highlight the opportunities for attracting and retaining volunteers, such as using technology to advertise vacant sites, streamlining data inputting to be more user friendly, creating guidance videos and working with others to reach new audiences. Alongside, we need to support those users that find technology challenging and prefer to remain analogue, which can bring its challenges.

Gill Birtles is the WeBS Counter Network Organiser, meaning she is responsible for supporting and coordinating the network of volunteer counters who carry out WeBS across the UK, ensuring the efficient and effective running of the survey, especially by supporting new and existing volunteers.

TWITTER-ONLY PRESENTATION | Tues, 11 Oct, 1340 UTC

The fourth breeding bird atlas of Finland: citizen scientists gather data with new tools

Heidi Björklund (she/her)

Finnish Museum of Natural History, Finland

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The fourth breeding bird atlas of Finland is implemented in 2022–2025. Finland has 3859 atlas grid squares of 100 km², many of them in remote areas or in the archipelago. Nevertheless, the atlas relies strongly on citizen scientists that are chiefly volunteer ornithologists. To facilitate their task, several options were provided and new tools launched to gather and report observations. Atlas was repeatedly promoted in the media to raise awareness and tempt also the general public to participate. Based on experiences of the first field season, we discuss the effectiveness of these measures in means of data coverage and engagement of citizen scientists.

Heidi Björklund is one of the two national coordinators of the fourth breeding bird atlas of Finland. She has also coordinated other bird monitoring programs in Finland, all involving citizen science. Her doctoral

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thesis handled the effects of habitat changes, conservation measures and interspecific interactions on raptors.

OFFERED ORAL PRESENTATION | Tues, 11 Oct, 0930 UTC

Using citizen science to understand phenology

Jennifer Border (she/her)

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Climate change has significantly altered the phenology of plants and insects meaning the time of peak food supply for migratory animals has changed. There is evidence that many species have altered their own arrival times to compensate for this, but the degree to which species have been able to shift their phenology varies. A better, more detailed, understanding of the extent and cause of phenological variation between species is vital for us to be able to better understand, predict and respond to current and future threats to biodiversity due to climate change. Here we used data from the EuroBirdPortal on occurrence for 30 African- European migratory bird species to model phenology at a 100km by 100km resolution throughout Europe. We model the entire arrival period which allows a much more in-depth analysis of phenological patterns and explore between species variation in the spring arrival period with latitude and temperature.

Jennifer Border, after doing a PhD on Whinchats population limitations, started as a Research Ecologist at the BTO in autumn 2015 and worked on a range of projects mostly using citizen science data before starting work on a 3 year postdoc project in combination with Durham University focused on the Migration and Phenology of Europe-African Migratory Birds.

OFFERED ORAL PRESENTATION | Tues, 11 Oct, 1745 UTC

Combined citizen science datasets reveal interactions between raptors and prey within a migration corridor

Ryan Bourbour

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During autumn, populations of bird-eating raptors and songbirds migrate 1000s of kilometers together across the globe. Although their populations are likely linked through predator-prey relationships, their wide-ranging movements over space and time make specific ecological interactions difficult to study. At a migration monitoring station, we used beak and talon swabs conducted by trained citizen scientists to obtain diet data from 523 ringed Accipiter hawks. Using eDNA techniques, we documented 1390 prey items from 65 species, representing the community of avian prey within a migration corridor. To gather prey availability data, we extracted weekly abundances within our study region from the publicly available

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eBird Status and Trends data. By combining hawk diet data and songbird abundance data collected through two citizen science frameworks, we were able to run discrete choice models to reveal how prey traits may influence the interactions between raptors and prey communities during their fall migrations.

Ryan Bourbour is a PhD candidate in the Graduate Group in Ecology at the University of California, Davis studying raptor ecology and migration in North and Central America.

KEYNOTE | Mon, 10 Oct, 1430 UTC

Can we optimize biodiversity sampling by citizen scientists?

Corey Callaghan (he/him)

German Centre for Integrative Biodiversity Research (iDiv), Germany
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Citizen science data are increasingly used to monitor biodiversity. But these data are 'noisy', with redundancies and gaps arising from unstructured human behaviors in space and time. The collective effort of citizen scientists can generate a great deal of data quickly, but can this data collection process prioritize the powerful — but finite — effort? I will discuss whether the information content of these data can be maximized for biodiversity conservation and monitoring. Using citizen science data from the eBird platform as a case study, I will demonstrate quantitative frameworks of how citizen science sampling and initiatives can be prioritized. I will then show some results of whether or not citizen scientists are indeed willing to sample biodiversity in a more meaningful manner. Biodiversity monitoring will continue to rely on a diverse set of end-users and contributors, including citizen science data. The capacity to prioritize where biodiversity data are most urgently needed will provide the fundamental data to improve environmental decision-making. I will conclude with a potential vision for engaging citizen scientists to sample biodiversity in the future.

Corey Callaghan is a Marie-Curie Postdoctoral Research Fellow at the German Centre for Integrative Biodiversity Research (iDiv) in Leipzig, Germany. His research aims to understand patterns and processes of biodiversity in space and time, with a special emphasis on urban biodiversity.

OFFERED ORAL PRESENTATION | Tues, 11 Oct, 1500 UTC

Diversifying citizen science through inclusion of young people

Natasha L Constant (she/her)

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This study focuses on the issue of better engaging young people in citizen science programmes. It explores the motivational factors and barriers of engaging young people in a prospective citizen science programme where volunteers carry out biodiversity surveys to support efforts on farmland. We explored

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how best to engage young people through focus group discussions with 34 young people aged between 18-29 with different volunteering experiences. Qualitative findings from the focus groups identify a range of motivations for young people to participate in citizen science including: career development, new interests and knowledge, altruistic values, social interactions, inclusivity and connections to new places and nature. Several barriers were identified including logistical constraints, lack of knowledge and interest, programmatic and organisational issues, overcoming negative stereotypes of farmers and distrust of farmers in volunteer competency. We present a series of recommendations to broaden the diversity of citizen scientists toward a younger demographic.

Natasha Constant is a Senior Social Scientist working for the Royal Society for the Protection of Birds (RSPB). Natasha is interested in the role of indigenous and local knowledge systems and customary management of natural resources for biodiversity conservation and ecological restoration. Natasha is interested in developing participatory social science methodologies for engaging communities and stakeholders in a process of inclusive knowledge sharing and coproduction to address environmental and social issues.

KEYNOTE | Tues, 11 Oct, 1130 UTC

Community-based monitoring: A tool for nature-based solutions, OECMs (Other Effective area-based Conservation Measures) and convivial conservation?

Finn Danielsen (he/him)

Nordic Foundation for Development and Ecology (NORDECO), Denmark
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In recent years, the use of Indigenous and local knowledge for informing decision-making has received increased attention. Likewise, new approaches have been proposed to address the escalating biodiversity, climate, and development challenges by protecting ecosystems. These include Nature-based Solutions, other effective area-based conservation measures (OECMs), and convivial conservation. If the new approaches are not to repeat the mistakes of past interventionist-based conservation, causing resource conflicts, green grabbing, human rights abuses, and failed ecosystem protection, they will need to involve community members and their knowledge. In fact, their success or otherwise will critically depend on it. In this key-note, I will use practice-based experiences and the literature on community-based monitoring from the past five years to explore how community-based monitoring is used, summarize the advantages and shortcomings, propose how it can be more effective, and discuss how the field is likely to evolve.

Finn Danielsen is co-founder of Nordic Foundation for Development and Ecology and NORDECO and has long experience with nature-based solutions and community-based natural resource management.

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OFFERED ORAL PRESENTATION | Tues, 11 Oct, 1730 UTC

Community science as a potential tool to monitor bird behaviour and human-bird interactions

Jenny Dunn (she/her)

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Interacting with wildlife is an increasingly common activity, and the feeding of waterbirds, whilst anecdotally common, is surprisingly rarely quantified. Using the EpiCollect5 App, we designed a project to allow citizen scientists to report sightings of an individually marked Mute swan population, submitting the location and identity of the bird (if known), alongside basic behavioural data on the interaction of the reporter with the swans (e.g. time spent observing, whether or not supplementary food was provided). Over two years, Citizen Scientists submitted nearly 3,000 reports (some reporting multiple birds). Here, we report a 99% accuracy of individual identification ($n = 4,251$), based on the location of known territories and validation of photographs submitted alongside sightings. We also present data on the frequency of supplementary feeding of birds across an urban-rural land use gradient, validating submitted data on feeding frequency and interaction duration using stratified field observations of known birds.

Jenny Dunn works at the University of Lincoln, UK, where her research focuses on avian ecology and bird-parasite interactions. Her collaborators on the Lincoln Swan project are Dr Teresa Romero, who works on animal social behaviour and cognition, and Dr Laëtitia Maréchal, who works on human-animal interactions.

PANEL SESSION | Mon, 10 Oct 1800 UTC

How public participation furthers the work of the British Trust for Ornithology (BTO), The Cornell Lab of Ornithology and The Rare Breeding Birds Panel (RBBP)

Mark Eaton

Rare Breeding Birds Panel, UK

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The Rare Breeding Birds Panel (RBBP) has collated data on rare breeding birds in the UK since 1973, and uses these data to report on the status of their populations and support conservation and research purposes. Data is received from a wide range of sources, but the great majority comes from citizen scientists, either targeting effort at collecting data on rare breeding birds or more passively making observations as part of recreational birdwatching activity. This talk will describe how the RBBP functions and give examples of its work. I will outline the great value that the RBBP obtains (with limited resources) from the traditions and culture of bird recording in the UK, but also discuss the shortfalls of current approaches, and the barriers to more effective monitoring.

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Mark Eaton has been a member of the RBBP since 2007. He was Panel Chair between 2012 and 2020, when he moved to the role of Secretary following the retirement of Mark Holling. Previously Principal Conservation Scientist in the Monitoring Research section of the RSPB Centre for Conservation Science, he now concentrates on the day-to-day running of the RBBP as well as Chairing the European Bird Census Council.

OFFERED ORAL PRESENTATION | Tues, 11 Oct, 1015 UTC

Latitudinal and climatic effects on the breeding phenology of a declining seabird

Alice Edney (she/her)

University of Oxford, UK

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The timing of breeding plays an important role in determining reproductive success, which depends on a seasonal peak in food availability matching nutritional requirements of growing young. However, phenological changes are one of the most evident responses to rising global temperatures. Trophic mismatch may be greater at higher latitudes, meaning data is needed across species' ranges to assess which populations could be most threatened by a changing climate. We use data from the Zooniverse citizen science project, Seabird Watch, to investigate breeding timing of a globally declining seabird, the Black-legged Kittiwake *Rissa tridactyla*. Volunteers tag kittiwakes in time-lapse images collected throughout their North Atlantic range. By extracting key phenological dates, we show how timing is influenced by latitude and environment, potentially affecting reproductive success. We demonstrate the value of cameras for monitoring declining species in remote areas, and citizen science for processing large volumes of data, while providing science outreach.


Alice Edney is interested in seabird ecology and conservation and using novel technologies to understand factors affecting threatened species. Currently, her research uses time-lapse imagery to investigate Black-legged Kittiwake phenology and breeding success. Data comes from the palearctic camera network developed by the citizen science project, Seabird Watch (<https://www.zooniverse.org/projects/penguintom79/seabirdwatch/classify>).

OFFERED ORAL PRESENTATION | Tues, 11 Oct, 1300 UTC

Love, learning and care for birds: relational values in ornithological citizen science

Wessel Ganzevoort (he/him)

Radboud University, The Netherlands

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Birding offers an intriguing window into how people build a relationship with nature and wildlife. Within the context of the Horizon2020 research project EnviroCitizen, we foreground the 'citizen' in ornithological citizen science. Through a series of over 90 in-depth interviews with birders in six countries across Europe

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(including both bird ringers and counters) and many fieldwork visits to birding activities, we developed a rich empirical account of how birders reflect on their passion and everyday practice of birding. Our research focusses especially on different relational values that can be distinguished, which include memorable encounters and bonds with specific birds, strengthening connections with nature and place, forms of learning and development of new perspectives, and diversity and inclusion (the social dimensions of volunteer ornithology). We link these relationships to feelings and practices of care for and about birds, illustrating how these relational values inspire birders' commitment to protect birds.

Wessel Ganzevoort is a postdoctoral researcher at the Institute for Science in Society (Radboud University). His work focusses on the profile, motivations and experiences of biodiversity citizen scientists and other green volunteers.

OFFERED ORAL PRESENTATION | Tues, 11 Oct, 1215 UTC

The carbon footprint of biodiversity monitoring

Simon Gillings (he/him)

British Trust for Ornithology, UK

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Citizen science plays a crucial role in biodiversity monitoring, but a rarely asked question is, how sustainable are monitoring schemes? Well-designed schemes often involve randomised survey locations and repeat visits, potentially forcing volunteers to drive to surveys, producing significant carbon emissions in the process. We investigated this for a major national breeding bird monitoring scheme, estimating that volunteers travelled c.286,000 km to survey locations (92% by car), generating c.47 tonnes of carbon dioxide emissions. These emissions may seem insignificant, accounting for 0.0001% of total UK emissions in 2019, but for a sector tasked with monitoring and conserving the natural environment, they are significant. Already, reliance on private cars is a barrier to participation, and one that may become harder to overcome as transport is decarbonised. Critically, research and conservation institutions need to find ways to balance the benefits of accurate biodiversity information with the carbon costs of acquiring it.

Simon Gillings is Principal Data Scientist at BTO. He is involved in research and development of several biodiversity monitoring schemes and the production of data products and services for different audiences.

OFFERED ORAL PRESENTATION | Mon, 10 Oct, 1415 UTC

Citizen science based approaches to monitoring wintering waterfowl in large Marine Protected Areas

Jen Graham (she/her)

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In the winter of 2019/2020 citizen science volunteers surveyed 11 species of divers, grebes, seaducks within Moray Firth SPA, visiting 76 vantage points over 2 surveys. Surveys were coincident with digital aerial surveys. We analysed relationships between density estimates derived from the citizen science surveys and a Bayesian Model (derived from digital aerial survey data). Relationships were generally weak. However, distributions appear similar in inshore waters, which supports citizen science survey methods as a means of understanding inshore distributions of these species. Our findings also suggest that physically smaller species, which inhabit inshore waters in small numbers tend to be better surveyed by vantage point methods than DAS methods. Finally, by using multiple observers there is the opportunity to provide a snapshot for the entire coastline of a large marine site which has benefits for monitoring as well as engaging members of the public in our marine protected area network.

Jen Graham is a Marine Ornithology advisor for NatureScot, specialising in offshore renewable advice, and policy advice relating to marine birds. Jen started her career at NatureScot in a graduate placement, researching novel methods for surveying inshore wintering waterfowl in large marine protected areas.

TWITTER-ONLY PRESENTATION | Tues, 11 Oct, 1320 UTC

Feather collection by citizen scientists supports a PhD project on wildfowl migratory connectivity

Ros Green (she/her)

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Common shelduck migrate between breeding, moulting and non-breeding sites each year, and may interact with offshore wind farms on route. However, we do not understand the extent of connectivity between the numerous known sites, or how many shelduck migrate between them, which limits our understanding of the scale of interaction with offshore wind farms. This summer, citizen scientists have collected shelduck feathers from moult sites around the UK, Netherlands and Germany, for stable isotope analysis. An isoscape of the moulting areas will be produced from these feathers, and compared to feathers collected from non-breeding sites, in order to understand the extent of connectivity and whether sea crossings have been made between the two sites. This is a novel use of citizen science sample collection across international borders, and will help engage the public with the unusual moult migration of shelduck, and the current plans for offshore wind farm development.

Ros Green is a part-time PhD student in the Seabird Ecology Group at the University of Liverpool, whilst also continuing her work as a Research Ecologist in the Wetland and Marine Research Team of the British Trust for Ornithology. Her research focusses on shelduck migration in relation to offshore wind farms.

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OFFERED ORAL PRESENTATION | Mon, 10 Oct, 1600 UTC

Beyond mark-recapture: using biometrics collected by volunteer ringers to assess climate change impacts

Hugh Hanmer (he/him)

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Climate change affects the phenology of annual lifecycle phases, such as reproduction and migration. Differential shifts in the timing of these events could have important population implications directly, or provide information about the mechanisms driving population trajectories. Using citizen science monitoring and biometric data from ringing and nest recording, we examine if such differential shifts occur in the declining Willow Warbler (*Phylloscopus trochilus*). We find evidence of differential shifts across geographic and spring temperature gradients between breeding initiation, breeding progression and moult. Moult initiation following warmer springs advances faster in the south than in the north, resulting in proportionally shorter breeding seasons, reflecting higher nest failure rates in the south and in warmer springs. Tracking shifts in multiple lifecycle phases allowed us to identify failure points in the breeding cycle in regions with negative trends, thereby demonstrating the utility of phenology analyses for illuminating mechanistic pathways underlying observed population trajectories.


Hugh Hanmer is a Research Ecologist in the BTO Terrestrial Ecology team working primarily on urban birds and with avian demographic data from citizen science monitoring. Outside of work he is also a keen bird ringer and birdwatcher.

POSTER PRESENTATION | Tues, 11 Oct, 1350 UTC

iratebirds: A dataset of bird attractiveness to humans, covering all the birds of the world

Anna Haukka (she/her)

Finnish Museum of Natural History, Finland

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Amidst the global biodiversity crisis, shedding light on the factors that make us like a species can inform conservation actions, e.g. by leveraging flagship potential and helping identify threats. Despite attempts to quantify birds' attractiveness to humans, there is no global database providing homogeneous measures of attractiveness that are comparable across species. We present a data set on the visual attractiveness of bird species to humans, generated through an internet browser-based questionnaire. Respondents ($n = 6\,212$) were asked to rate the spontaneous attractiveness of bird species based on photographs from the Cornell Lab of Ornithology's Macaulay Library database. The rating scores were modeled to obtain final scores of attractiveness for each species. The data covers 11 319 bird species and subspecies globally, with respondents from 78 countries providing over 400 000 scores. This is the first attempt to quantify the overall attractiveness of all the bird species to humans.

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Anna Haukka is a doctoral researcher whose project aims to understand the drivers and bird species traits underpinning the global trade in wild birds. With a background in ecology, geography and education, she is interested in how humans' perceptions and choices impact nature conservation.

KEYNOTE | Mon, 10 Oct, 1300 UTC

Big data in ornithology: challenges and opportunities from the rise of citizen science

Alison Johnston (she/her)

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Ornithological citizen science data collection has increased rapidly in recent years. This increase is mostly due to the expansion of projects that collate bird observations without using a designed or pre-specified protocol. The flexible protocols attract many participants, and the resulting datasets are therefore many times larger than traditional ornithological datasets. These 'big data' provide tempting opportunities to learn more about birds in parts of the world and times of year with few existing data. However, these data are also messy, which present challenges for the researcher or conservationist who need reliable ecological results. We explore the challenges and opportunities of the new era of big data in ornithological citizen science. We describe some analytical methods that can be particularly valuable with unstructured or semistructured citizen science data. And we ask whether these messy data will ever replace the rigour of structured surveys.

Alison Johnston is a Reader in Statistics at the University of St Andrews who has made significant advances in the field of ornithology, by developing novel statistical techniques to further our understanding of the avian world and the challenges species face.

TWITTER-ONLY | Tue, 11 Oct, 1120 UTC

Big data in ornithology: challenges and opportunities from the rise of citizen science

Neville Kingdon

Game & Wildlife Conservation Trust, UK

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The Partridge Count Scheme (PCS) is a volunteer-based monitoring system, running since 1933, serving as a means for delivering grey partridge conservation advice to farmers, land managers and gamekeepers. Members undertake their own counts in the spring & autumn, which are submitted to the PCS. Demographic parameters are calculated for each count area, including breeding density, chick survival rate/young-to-old ratio, and over-winter survival. Feedback on counts helps members identify limitations in their partridge conservation efforts and modify habitat management. Biannual newsletters provide recognition of successful conservation efforts, and access to research findings for both partridges and

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other farmland wildlife, while local events provide a focus for land managers to get together. We will show how count results are communicated back to PCS members, provide long-term national trends in demographic parameters, and highlight what aspects of grey partridge conservation need to be addressed locally and nationally.

Neville Kingdon has been working for the Game & Wildlife Conservation Trust since 1999, with 20+ years' experience in survey work and GIS.

OFFERED ORAL PRESENTATION | Tues, 11 Oct, 1245 UTC

The dark side of amateur birdwatching

Jakub Kronenberg (he/him)

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While amateur birdwatchers provide multiple benefits to bird conservation, including as citizen scientists, they also contribute to environmental problems. Even the indirect use of nature, such as the observation of birds, may lead to unintended environmental consequences. This paper highlights five categories of impacts related to birdwatching: (1) direct impacts (directly limiting the future availability of birds); and four categories of indirect impacts, i.e., impacts on broader ecosystem structures and processes, which can ultimately also affect birds: (2) impacts related to managing ecosystems to maximize their birdwatching potential (affecting ecosystems' capacity to provide other services); (3) impacts associated with accessing ecosystems to observe birds (affecting other ecosystem components); (4) additional consumption of products, infrastructure or services required to observe birds, and their life-cycle environmental impacts; and (5) broader impacts on the society as a whole (environmental awareness of the importance of birds and their conservation challenges).

Jakub Kronenberg's research focuses on economy–society–environment interactions, in particular from the perspective of ecological economics. He works on environmental values and governance at the University of Lodz, Faculty of Economics and Sociology, where he leads the Social-Ecological Systems Analysis Lab.

KEYNOTE | Tues, 11 Oct, 1700 UTC

How citizen science has helped us learn about garden bird health

Becki Lawson (she/her)

Institute of Zoology, UK

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Feeding garden birds as a part of wildlife friendly gardening practice is a common pastime in Great Britain. Multiple citizen science projects have capitalised on the opportunity provided by this close human/wildlife

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interface, to gather data on wild bird species distribution and abundance, and to advance understanding of their behaviour and ecology. Whilst resource provision of supplementary food can benefit wild bird populations, it may inadvertently alter pathogen transmission dynamics and predispose to disease spread through, for example: congregation of birds in high density at feeding stations; species feeding in close proximity that would not typically mix; or poor levels of hygiene which allow build-up of contaminated food waste and faeces. Since the early 1990s, veterinarians at the Zoological Society of London have relied on help from concerned members of the public who report sightings of sick or dead garden birds, enabling disease investigations to be conducted. Since 2013, we have partnered with scientists at the British Trust for Ornithology, Froglife and the Royal Society for the Protection of Birds, on the Garden Wildlife Health project (www.gardenwildlifehealth.org). With assistance from members of the public and participants in the BTO's Garden BirdWatch scheme, together we have learned about multiple endemic and emerging diseases affecting garden birds, their impact on biodiversity and wild animal welfare, and potential implications for public and domestic animal health. This talk will illustrate with examples how we translate surveillance findings collected through citizen science into action by provision of best practice guidance for supplementary feeding to help safeguard wild bird health.

Becki Lawson's main area of interest is the study of disease effects on free-ranging wildlife populations, particularly where these pathogens have significant welfare or conservation implications, and assessment of wildlife population health. She is also interested in the epidemiology of disease transmission between free-ranging wildlife, domestic animals and humans, and the role which anthropogenic activity may have on influencing these processes.

KEYNOTE | Tues, 11 Oct, 0900 UTC

Adapting to a changing world: monitoring schemes must follow nature's lead

Dave Leech (he/him)

British Trust for Ornithology, UK

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The British Trust for Ornithology's (BTO's) Ringing and Nest Record Schemes are the largest and longest-running of their type in the world. More than 3,000 volunteer surveyors contribute their time and effort annually, resulting in spatial and temporal coverage of an extent that would be impossible to achieve via the use of professional fieldworkers alone. Structured projects provide standardised data that contribute to population models, while the substantial additional volume of undirected activity supports training and encourages innovation; demographic schemes currently play a key role in assessing risks of disease incursion and predicting impacts of habitat management, uses that could not have been foreseen when the datasets were initiated.

This model has served the conservation community well for many decades but it must adapt to an increasing array of new challenges. Current recruitment and training strategies may not be optimal for an increasingly mobile population with a decreasing amount of free time. A more litigious environment may act as a disincentive for landowners granting access to monitoring sites, while the desire for greater accessibility to data inevitably raises tricky questions of ownership. Scrutiny of practices from a bird and

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participant welfare perspective necessitates greater transparency around the checks and balances in place. This presentation will not provide all the answers but aims to stimulate the discussions that eventually do.

Dave Leech is Head of the BTO's Ringing & Nest Recording Team and is responsible for managing the Nest Record Scheme, the Barn Owl Monitoring Programme, and the Constant Effort Scheme and Retrapping Adults for Survival ringing projects.

OFFERED ORAL PRESENTATION | Tues, 11 Oct, 1200 UTC

Empowering young people through citizen science

Samuel Levy (he/him) and **Megan McCleverty** (she/her)

British Trust for Ornithology, UK

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We'll explain how a youth-led programme in a major UK charity has empowered young people to take up citizen science, whilst overcoming the barriers they face. We'll reflect on the impact of projects aiming to highlight young voices and increase engagement, whilst establishing a community of young ornithologists. This has been through targeted youth events, including talks from specialists in their fields, a training course on birding, in-person events and youth representation at pre-existing events. An impactful project has been the donation and distribution of used equipment to individuals, schools and university groups to kickstart an interest in citizen science. We have developed a framework to learn from our programmes and develop a new adaptive way of working. Looking to the future we are organising a youth conference to provide a platform to expand the youth empowerment in the UK conservation sector and encourage collaboration.

Megan McCleverty & Samuel Levy have both been members of the BTO's Youth Advisory Panel since January 2020. Sam has just finished a degree in Ecology and Wildlife Conservation at Bournemouth and Megan is currently studying Zoology at Bristol. They are both BBS surveyors and enjoy helping to get others involved in the natural world.

OFFERED ORAL PRESENTATION | Tues, 11 Oct, 1600 UTC

Four tips for volunteer recruitment and retention in citizen science based long-term monitoring projects

Da-Li Lin

Taiwan Endemic Species Research Institute & University of Queensland, Australia

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Citizen science (or community science) has been an effective and efficient mechanism to collect large quantities of observations by thousands of volunteers for biodiversity conservation. However, volunteer

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recruitment and retention is the key behind managing citizen science projects and a challenge for scientists and project managers. In recent years, numerous citizen science projects for conservation have emerged in Taiwan, leading to a rapid and massive accumulation of observations, especially for birds. Based on our experiences, we suggest four tips concerning volunteer recruitment and retention, including (i) managing project websites and social media for announcing news and information as well as interacting with participants; (ii) launching workshops and including special incentives for training participants and improving skills; (iii) publishing annual reports and holding regular meetings as well as press conferences that highlight volunteer contributions, especially in multilingual editions; (iv) building healthy interpersonal relationships, a key factor for volunteer recruitment and retention.

Da-Li Lin is a PhD student of the University of Queensland and a research fellow of the Taiwan Endemic Species Research Institute, working on wildlife-habitat relationships, landscape ecology, citizen science, and avian ecology. He is also a keen writer and translator on popular science journals and books.

OFFERED ORAL PRESENTATION | Mon, 10 Oct, 1330 UTC

Nicole Michel (she/her)

National Audubon Society, USA

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Incorporating social justice variables in distribution models derived from community science data

Community science datasets have long been known to contain spatial sampling biases, much of which can be accounted for through spatial and/or temporal filtering. However, some spatial sampling bias is linked to socioeconomic variables such as racial and economic demographics. There is increasingly a push to consider social justice in conservation planning exercises, yet including variables linked to sampling bias within distribution models could amplify that bias in the resulting outputs. We explored the occurrence and implications of socioeconomically-linked spatial sampling bias in an abundance-based model of a single species, Northern Mockingbird (*Mimus polyglottos*), in racially and economically diverse Orleans Parish, Louisiana, USA. We found that spatial sampling frequency was linked to racial demographics (the proportion of black and indigenous people of color [BIPOC]) and socioeconomic conditions (measured by the CDC's Social Vulnerability Index). When these variables were added to base models including environmental covariates only, predicted abundance was significantly lower in areas with higher Social Vulnerability. Therefore, we recommend that socioeconomic variables should be carefully considered for inclusion, and used as overlays or in secondary prioritizations rather than incorporated within models where possible.

Nicole Michel is Director of Quantitative Science at National Audubon Society and leads a team who produce the modeling efforts needed to understand trends, patterns, and drivers of bird abundance and occupancy and evaluate population response to management actions. She has >20 years' experience researching bird populations using an array of field and analytical methods.

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TWITTER-ONLY | Tues, 11 Oct, 1100 UTC

Demographic variation in space and time: citizen science data reveals targets for conservation actions

Catriona Morrison (she/her)

University of East Anglia, UK

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The dynamics of wild populations are governed by demographic rates which vary spatially and/or temporally in response to environmental conditions. Conservation actions for widespread but declining populations could exploit this variation to target locations (or years) in which rates are low, but only if consistent spatial or temporal variation in demographic rates occurs. Using long-term demographic citizen science data for wild birds across Europe, we show that productivity tends to vary between sites (consistently across years), while survival rates tend to vary between years (consistently across sites), and that spatial synchrony is more common in survival than productivity. Identifying the conditions associated with low demographic rates could therefore facilitate spatially targeted actions to improve productivity or (less feasibly) forecasting and temporally targeting actions to boost survival. Citizen science data can provide a powerful resource to inform conservation policy and reveal appropriate scales for actions to influence demographic rates.


Catriona Morrison is a post-doctoral researcher at the University of East Anglia. Her primary research interests lie in understanding the demographic and environmental processes influencing the population dynamics of birds.

OFFERED ORAL PRESENTATION | Tues, 11 Oct, 1000 UTC

Exploring the use of historic nest records in South Africa to examine changes in avian breeding phenology

Rebecca Muller (she/her)

University of Cape Town, South Africa

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Nest record schemes (NRS) which collect records of bird breeding events have proven to be amongst the most valuable source of historic data with which to examine shifts in phenology. However, most studies using NRS to explore such phenological shifts have taken place in the northern hemisphere. South Africa ran a NRS during the 20th century, which amassed nearly 100 000 nest record cards for several hundred species. However, these data have never been analysed to explore phenological shifts at a multi-species level. We investigated the feasibility of using these data to detect lay date shifts across multiple species during the 20th century. We explore for temporal or spatial biases in these citizen science data and compare different methods to extract the valuable data from these nest record cards in the most efficient way, exploring whether different approaches make any material difference in our ability to detect changes

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in breeding phenology. Our study highlights the value of historical citizen science data, and the importance of maintaining such schemes to maximise their long-term benefits.

Rebecca Muller is completing a double PhD degree between University of Cape Town (South Africa) and University of Groningen (Netherlands). She is broadly interested in animal ecology and hopes to use the skills obtained during her PhD to further the field of conservation action and policy in an African setting.

OFFERED ORAL PRESENTATION | Tues, 11 Oct, 1830 UTC

Morphometric comparison of the responses of the Cape and House Sparrow along the urban gradient

Sage Keenan Naidoo (he/him)

University of the Witwatersrand, South Africa

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Urbanisation has important implications for biodiversity, including its influence on the morphological characteristics of organisms. Evidence of urban ecosystem effects on avian morphological traits are prominent within Global North literature but is virtually absent in the Global South context, with literature generally reporting a negative correlation between measures of body condition and body size with urbanisation level. To test these responses in a Global South context, morphometric responses of the native Cape, and its invasive congeneric, the House, Sparrows will be evaluated along the South African urban gradient using SAFRING's long-term bird ringing data. Data analysis is yet to occur, however it is expected that the native Cape Sparrow will experience a similar negative correlative response as observed in the Global North, while the invasive House Sparrow is expected to show a generally conserved relationship between its morphometric responses and urbanisation.

Sage Keenan Naidoo is currently a student of the University of the Witwatersrand, completing his Honours degree in the field of Animals, Plants, and Environmental Sciences, and has a particular interest in the field of animal sciences and the effects global change has had on animal biodiversity.

PANEL SESSION | Mon, 10 Oct, 1800 UTC

How public participation furthers the work of the British Trust for Ornithology (BTO), The Cornell Lab of Ornithology and The Rare Breeding Birds Panel (RBBP)

Ian Owens

Cornell Laboratory of Ornithology, USA

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Birds play a unique role in our understanding of how the planet works and conserving its diversity because, through the efforts of bird watchers and citizen scientists, we know more about large-scale patterns of occurrence, abundance, movement and population trends in birds than any other comparable

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group. I will explore how emerging technologies are opening-up new horizons for birdwatchers and citizen scientists to gather even more useful data to inform conservation efforts, to do that at an unprecedented scale, and inspire even more people to care about birds and nature. I will start by highlighting the power of applying artificial intelligence models to large-scale databases of 'unstructured' observations, and what this reveals about population trends at a continental scale. I will then look at how automatic-recognition of songs and calls is changing how we find and identify birds, and the impact of this 'bioacoustic revolution' on birding, monitoring and public engagement. Finally, I'll review how these new technologies are empowering birding communities around the world, and how to make new technologies available and useful at a global scale.

Ian Owens oversees the Cornell Laboratory of Ornithology's scientific, public, operational, and fundraising programs. He is also a professor in the Department of Ecology and Evolutionary Biology and his main research interests are in large-scale patterns in life histories, mating systems, and extinction risk; and evolution in wild populations.

OFFERED ORAL PRESENTATION | Tues, 11 Oct, 1800 UTC

Diet over time: exploring temporal patterns in the diet of Eurasian Sparrowhawk using citizen science

Connor Panter (he/him)

University of Nottingham, UK

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Existing methods to study raptor diet, e.g., analysing prey remains or pellets at nest sites, are often confined to the breeding season and do not allow diet to be studied across longer time periods. The use of web-sourced photography is a promising new method that can overcome limitations of previous methods, allowing diet to be studied throughout the entire year. We analyse temporal differences in prey, between sexes, of Eurasian Sparrowhawk (*Accipiter nisus*) in the UK. From 666 photographs, on average, prey weights declined during summer for both sexes. Compared to summer, Rock Doves (*Columba livia*) increased significantly in the female diet during winter, and Eurasian Blackbirds (*Turdus merula*) were significantly more important in the male diet in spring than autumn. Web-sourced photography has enabled, for the first time, the quantification of raptor diet throughout the entire year and is a cost-effective, accessible way to study temporal patterns in diet.

Connor Panter is the editor of #theBOUblog and an Envision DTP PhD Researcher within the School of Geography, University of Nottingham (UK). His project focuses on patterns of species abundance and the effects of climate change and environmental degradation. Connor has broad research interests spanning ornithology, macroecology and conservation. He is particularly interested in the ecology and conservation of raptors, and regularly uses citizen science data within his research.

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TWITTER-ONLY | Mon, 10 Oct, 1505 UTC

eBird Taiwan: Background, interactions, and applications

Scott Pursner (he/him)

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eBird Taiwan, the traditional Chinese language portal of eBird, was launched in 2015. Checklists dating back to 1973 have been added by volunteers, creating a robust set of long-term data. With over 5,000 users and over 678,100 completed checklists, this open data platform has become the most important database for biodiversity information in Taiwan, accounting for two thirds of all biodiversity data. Open to everyone, managers actively promote the platform and foster a sense of community via special events and recognizing user contributions on social media and the eBird Taiwan portal page. The observations collected on eBird Taiwan have had a wide range of applications. These include the creation of Taiwan's first national bird report, government use in spatial planning for implementing its green energy policy, and NGO use in applying to adopt habitat critical to migratory bird species in Taiwan.

Scott Pursner is the Director of International Affairs for the Taiwan Wild Bird Federation. He serves as a liaison between the TWBF and international groups, manages the TWBF's collaboration with the UK's Royal Society for the Protection of Bird on seabird bycatch mitigation, and oversees English language social media.

KEYNOTE | Mon, 10 Oct, 1530 UTC

Public participation in monitoring the abundance of Indian birds

Suhel Quedar (he/him)

Nature Conservation Foundation, India

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Ornithology in India has a long history of over 150 years. Despite this, there is much to learn about fundamental aspects like range, seasonality and abundance. Even more rudimentary than this is our understanding of population change, with the exception of a few well-studied species. India is a big country with relatively few professional ornithologists, but a large and increasing number of skilled and enthusiastic birdwatchers. In this talk, I describe an effort to work with individuals and groups of birdwatchers in an attempt to gather observations onto a common, public platform. Since 2014, the information collated in this way has transformed our understanding of the distribution and timing of migration of Indian birds, and has enabled the first assessment of abundance trends of most of the species that regularly occur in the country.

Suhel Quedar's main interest is in engaging with the larger public in better understanding the natural world and how it is changing. He works on projects run in collaboration with the National Centre for

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Biological Sciences, as well as other partners. Over the years, he has studied various aspects of animal behaviour: flocking in Cinereous Tits, mate choice in Baya Weavers, and brood parasitism by Koels on Crows.

POSTER PRESENTATION | Mon, 10 Oct, 1735 UTC

Citizen Science in service of nature conservation

Martin Rümmler (he/him)

Nature and Biodiversity Conservation Union, Germany
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Since 2005, on the second weekend of every May for one hour, everyone can count birds in settlement areas for the largest nature-focused Citizen Science project in Germany. Observers report the highest simultaneously seen number of individuals for each species (point count). We analysed data of the 64 most common species as well as four diversity parameters and checked for influencing environmental factors. Data reflect known population trends and correlations with environmental factors, thus confirming the scientific relevance of this Citizen Science project. Particularly striking is the apparent influence of agriculture on the diversity measures of settlement birds. Future analyses of this dataset with additional variables and at further spatial scales have the potential to identify and describe a wide range of further factors influencing both bird diversity and population trends in settlement areas – findings that will also benefit nature conservation (policies).

Martin Rümmler is a biologist and, in his position as Policy Officer Bird Conservation at NABU, is responsible for the garden bird count project.

TWITTER-ONLY | Mon, 10 Oct, 1745 UTC

Unraveling a century of global change impacts on winter bird distributions in the eastern United States

Sarah Saunders (she/her)

National Audubon Society, USA
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We analyzed long-term changes in winter occurrence of 89 species across nine bird groups over a 90-year period within the eastern United States using Audubon Christmas Bird Count (CBC) data. We estimated variation in occurrence probability of each group as a function of spatial and temporal variation in winter climate and LULC. We reveal that spatial variation in bird occurrence probability was consistently explained by climate across all nine species groups. Conversely, LULC change explained more than twice the temporal variation in bird occurrence probability than climate change on average across groups. This pattern was largely driven by habitat-constrained species, whereas decadal changes in occurrence probabilities of habitat-unconstrained species were equally explained by both climate and LULC changes

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over the last century. Effective land management will be critical for improving species' resilience to climate change, especially during a season of relative resource scarcity and critical energetic trade-offs.

Sarah Saunders joined National Audubon Society in 2018, where she is a quantitative ecologist in the Science division. Residing in Michigan, Sarah primarily works on projects focused on the Great Lakes region, including modeling occupancy and abundance trends of marshbirds, and coordinating science work across Audubon's Great Lakes Initiative.

OFFERED ORAL PRESENTATION | Tues, 11 Oct, 1030 UTC

Analysing population trends in South African bird species using the SABAP2 citizen science project

Christopher Shortland (he/him)

University of the Witwatersrand, South Africa
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Global change poses threats to biodiversity at an unprecedented scale. Large-scale monitoring has become a critical component of risk assessment. Africa historically has had a lack of monitoring schemes but with the introduction of citizen science projects in South Africa, such as the Southern African Bird Atlas Project 2 (SABAP2) there is potential to set an example for the use of large-scale citizen science on the continent. Studies done on SABAP2 has largely been done at very small scales. This study aims to analyze population trends of all of South African's bird species using the SABAP2 dataset over a 13-year period. Further, individual habitats and specific life history traits within the region will be assessed with the selection of indicator groups. Population trends will help identify groups of birds within South Africa that are vulnerable to the effects of global change to inform policy and conservation moving forward in time.

Christopher Shortland is an Honors student at the University of the Witwatersrand. He is a hobbyist birder and prospective scientist. The use of citizen science has interested him for many years and his ambition is to provide a platform that informs not just the public, but other scientists, about its usefulness.

OFFERED ORAL PRESENTATION | Tues, 11 Oct, 1530 UTC

Citizen science rapidly delivers extensive distribution data for birds in a key tropical biodiversity area

Tom Squires (he/him)

Manchester Metropolitan University, UK
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Citizen science projects remain rare in biodiverse yet data-poor countries, contributing to a shortfall in data for biodiversity monitoring and promoting public stewardship of nature. We document and analyse

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BigMonth2020, a month-long birdwatching event across Java and Bali, publicised through social media and incentivised with grants and competitions. Over 20,000 lists containing 100,000 bird records were submitted to the 'Burungnesia' phone app. Spatial coverage extended to 71% of the islands' 3,408 atlas grid squares, including 1,613 previously undocumented squares, with 353 bird species recorded, representing 74% of Java and Bali's avifauna excluding vagrants; 27 threatened species were recorded, with new records for 204 grid squares. Almost 25% of contributors were female, 72% were under 30 years old, and most were graduates and members of birdwatching clubs. The project cost less than US\$10,000 to run, and provides a model for rapidly establishing distributional baselines for monitoring biodiversity in the tropics.

Tom Squires is a PhD student at Manchester Metropolitan University and his main interest is Conservation Ecology. His research focusses on the conservation of birds affected by the cage-bird trade in Indonesia, specifically the islands of Java and Bali, and included developing a new citizen science event to record birds.

OFFERED ORAL PRESENTATION | Tues, 11 Oct, 0945 UTC

The role of citizen science to monitor the UK's rare and scarce breeding birds

Andrew Stanbury (he/him)

Royal Society for the Protection of Birds (RSPB), UK
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National bird surveys of priority species in the UK have been organised and run by nature conservation organisations for well over 30 years. The main aims are to monitor trends in numbers and distribution of rare and scarce breeding birds in the UK, particularly those not covered by other UK monitoring schemes, either through a complete census or sample survey. In most cases, species have been surveyed at 6 or 12 yearly intervals. A review is currently in progress to establish a new monitoring framework for rare and scarce breeding birds in the UK. Many surveys have employed professional field staff, but skilled volunteers have always been an important component, and their significance has, and is likely, to increase. In this talk, we will outline the role of citizen science has played in monitoring scarce breeding birds and give examples, including Bittern, Hen Harrier, Willow Tit and Turtle Dove.

Andrew Stanbury works as a Conservation Scientist in the Monitoring section at the RSPB Centre for Conservation Science. Over the last two decades he has been involved with many monitoring projects, including national surveys of Turtle Dove, Dotterel, Ring Ouzel, Snow Bunting and Cirl Bunting.

POSTER PRESENTATION | Tues, 11 Oct, 1110 UTC

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Monitoring raptor population trends through protocolized volunteer-based migration counts

Tohar Tal (he/him)

Batumi Raptor Count, Georgia

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Migration counts can be a vital way to monitor population trends for raptors, especially for populations breeding and/or wintering in understudied areas. Case in point is our highly standardised effort to monitor the autumn migration of over one million raptors in the East African-Palearctic Flyway through a 100% volunteer-based effort. Every autumn, for over 13 years, on average 40 counters of all ages, backgrounds and with different levels of raptor identification experience join our almost three-month project. Experienced coordinators provide training in raptor identification and count strategies, and delegate counters in the field based on individual talents and learning goals. This talk will focus on tools and sustainable strategies to maximise data quality gathered through our citizen science project. Data is recorded fully digitally and afterwards, according to peer-reviewed methods, semi-automatically processed for upload in GBIF. Our highly coordinated and supervised citizen science effort, which is considered a useful model for long-term migration monitoring, has revealed population trends in globally important, and otherwise poorly surveyed raptor populations.

Tohar Tal is a Biology bachelor student, majoring in Ecology & Evolution, at the University of Groningen and member of the BRC team since 2020. Between 2019 and 2022 he lead a series of three pilot spring counts, based on which he is currently writing the first description of spring raptor migration in the globally important Batumi bottleneck.

PANEL SESSION | Mon, 10 Oct, 1800 UTC

How public participation furthers the work of the British Trust for Ornithology (BTO), The Cornell Lab of Ornithology and The Rare Breeding Birds Panel (RBBP)

Juliet Vickery

British Trust for Ornithology, UK

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The British Trust for Ornithology, a UK based environmental NGO, represents a 90 year-long, unique partnership between citizen scientists and professional staff. It engages and supports volunteer observers to help deliver long term, nationwide data on population trends and demography of breeding and wintering birds. This talk will outline how increasingly sophisticated approaches, in terms of survey design, recording methods, data analysis and communication of results alongside better training and support for observers, has resulted in an extraordinary understanding of ecology and biology of UK's breeding and wintering birds. These data now need to be used more powerfully than ever to help address the two environmental crises we face of climate change and biodiversity loss. I will also consider the role citizen science can play in our own health and wellbeing and in engaging broader more diverse cross section of society in the natural world.

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Juliet Vickery is CEO of the British Trust for Ornithology, an Honorary Professor at the School of Biological Sciences, University of East Anglia, and an Honorary Research Fellow in the Conservation Science Group, University of Cambridge. She has enjoyed a varied career in conservation science in academia and the environmental NGO sector, including as Head of the BTO's Terrestrial Ecology Unit and Head of International Conservation Science at the RSPB.

POSTER PRESENTATION | Tues, 11 Oct, 1330 UTC

Citizen science as a tool to investigate decision-making in food-hoarding birds

Vera Vinken (she/her)

Newcastle University, UK

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Several species of tits have evolved food caching strategies in order to increase survival in winter when access to food is limited and unreliable. Hoarding provides a dependable food source and enables birds to build up sufficient fat reserves to survive long and cold nights. It is not fully understood what mechanisms underlie these food-hoarding decisions, what parameters are important, or how they function on different timescales. Our research uses agent-based models to test different decision rules under various environmental and physiological circumstances. We will validate these models using citizen science data. Our volunteers are currently collecting data on food-hoarding Paridae species across the UK and the USA. Birds are observed at garden feeders and information on species, behaviour, food source, time and location are submitted in an online platform and/or mobile application. Here we present our methods in combination with the results of a pilot study.


Vera Vinken is a PhD student in Behaviour Informatics in the Smulders lab at Newcastle University. She is interested in the mechanisms behind decision-making in food-hoarding birds. To learn more about this she uses computational models and data collected by citizen scientists.

POSTER PRESENTATION | Mon, 10 Oct, 1725 UTC

Exploring the barriers to engaging with nature for young people

Faye Vogely (she/her)

British Trust for Ornithology, UK

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Using data collected in a survey created and disseminated by BTO's Youth Advisory Panel, our poster explores the often under-recognised barriers for young people to engage with the natural world. Our survey shows that transport, finance, a lack of confidence and a large demand on a limited amount of time are barriers young people experience. As organisations, addressing or removing those barriers will be key to ensure that young people can be fully fledged members of the conservation sector and

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contribute to vital citizen science. Our poster argues that all UK conservation NGOs have a responsibility to work together to address these barriers.

Faye Vogely is the Youth Engagement Manager at BTO and has been working with its fantastic Youth Advisory Panel for the last 2.5 years. She is continuously inspired by the vision these motivated young people have, and loves being able to bring their ideas to life through the BTO.

OFFERED ORAL PRESENTATION | Tues, 11 Oct, 1515 UTC

Challenges of achieving and maintaining coverage for the Breeding Bird Survey and motivating new surveyors

David White (he/him)

British Trust for Ornithology, UK

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We explore how to engage with and retain volunteers in the Breeding Bird Survey (BBS) and Waterways Breeding Bird Survey (WBBS). In particular, we focus on how a Regional Network of volunteers perform an invaluable role in engaging with volunteer surveyors on a local basis, and the methods that are used to encourage more birdwatchers to take part in the survey. Additionally, we address the question of how to encourage more serious birdwatchers to survey common bird species, when their primary motivation is to spend their time covering a patch or looking for scarcer species.

David White supports the Breeding Bird Survey National Organiser with the day to day running and promotion of the survey. He also supports a Regional Network of volunteers to improve engagement with volunteers across England and to increase survey participation.

OFFERED ORAL PRESENTATION | Mon, 10 Oct, 1615 UTC

Approaching 100 years: Where next for the UK Heronries Census?

Ian Woodward (he/him)

British Trust for Ornithology, UK

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The UK Heronries Census is (as far as we are aware) the longest running annual species survey anywhere in the world. Having begun in 1928, the Census now holds 95 years of data collected by citizen scientists and the trend data have been used in text books to demonstrate the effects of severe weather on birds. However, is an annual Census for a single species now archaic in a world where other citizen science surveys can provide robust and highly structured datasets for multiple species which help to inform conservation policies and answer research questions? As the Heronries Census nears its centenary, I assess if and how it can remain relevant as it faces exciting new challenges and opportunities including

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the potential inclusion of trends for Little Egret and other scarcer heron species, and likely increased future use of drones to monitor heronries.

Ian Woodward is a Research Ecologist within the Wetland and Marine team at the British Trust for Ornithology where he has worked on projects involving a variety of species including Curlews and urban gulls. He has been the National Organiser for the BTO Heronries Census since 2016.

OFFERED ORAL PRESENTATION | Mon, 10 Oct, 1630 UTC

Population monitoring of the endangered Black-faced Spoonbill by citizen scientists across East Asia Countries

Yat-tung Yu (he/him)

The Hong Kong Bird Watching Society, Hong Kong
yyattung@hkbws.org.hk /  @YYT_HKBWS

Black-faced Spoonbills are waterbirds restricted in East Asia, with breeding grounds located mainly in Korea and wintering grounds located along the coast of South China, Taiwan, Japan and South-East Asian Countries. In the early 1990s, the global population of the Black-faced Spoonbills was less than 300 individuals and they have been listed as Endangered on the IUCN Red List since 2000. To monitor the population of the endangered Spoonbill, the International Black-faced Spoonbill Census has been carried out since 1993. Each year, hundreds of volunteer birdwatchers and researchers participate in the synchronised census at more than 100 wintering sites of the Spoonbill all over the world. This citizen science programme helped to raise public awareness and provides valuable data for conservationists to save the endangered Spoonbill from the brink of extinction. With joint conservation efforts, the number of the Black-faced Spoonbill has increased to over 6,000 individuals in the 2022 Census.

Yat-tung Yu is the Director of the Hong Kong Bird Watching Society. He served as one of the editors of the latest Black-faced Spoonbill conservation action plan published by BirdLife. He is currently the coordinator of the International Census of the Black-faced Spoonbill and the Black-faced Spoonbill Working Group in the East Asian-Australasian Flyway Partnership.
