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► **To cite this version:**

Raphaël Royauté, Dana Schabo, Sascha Rösner, Kim Lindner, Finja Strehmann, et al.. Novel Tools for Automated Activity Monitoring of Forest Bird Communities. Festival of Ecology 2020, Dec 2020, Online, United Kingdom. 10.17605/OSF.IO/V6ZN5 . hal-04168263

**HAL Id: hal-04168263**

**<https://hal.science/hal-04168263v1>**

Submitted on 21 Jul 2023

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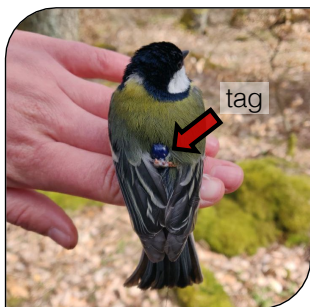
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# NOVEL TOOLS FOR AUTOMATED ACTIVITY MONITORING OF FOREST BIRD COMMUNITIES

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## RATIONALE

- Activity data are essential for accurate conservation schemes as they shed light on species space use and timing of activity
- For many small vertebrates in dense habitats, the fine-scale monitoring of activity patterns is limited
- We developed a novel, automated method based on fixed VHF antennas allowing to classify movement states in small flying vertebrates



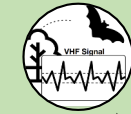
Great tit with VHF tag



Fixed VHF antennae

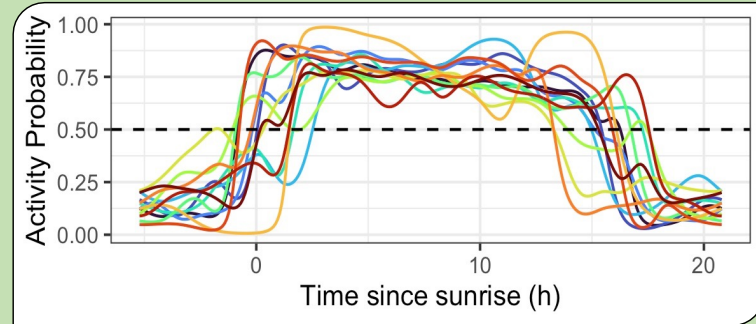
## METHODS

**Fig. 1.** Marburg Open Forest, Germany  
Location of fixed VHF stations in red



Train Machine Learning model to detect active / passive bouts from VHF signals

Model validation: Birds, bats and humans

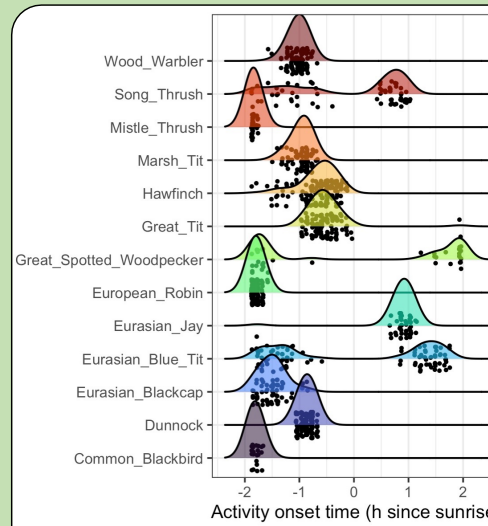


**Fig. 2.** Probability of activity predicted over 24 h for 13 forest bird species.

Hierarchical Generalized Additive Models of active / passive states classified over 1-min intervals

Comparison of circadian activity patterns among 13 common European forest bird species

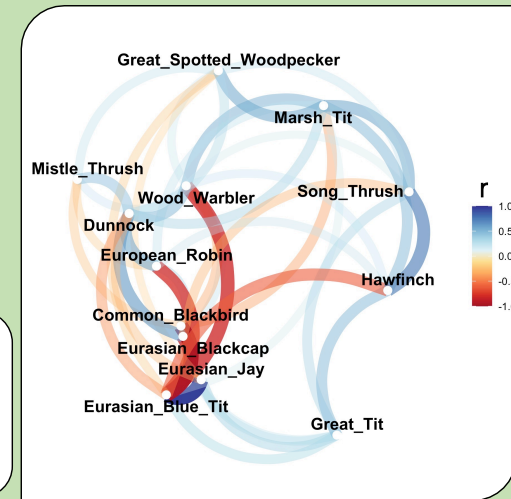
## KEY FINDINGS



**Fig. 3.** Onset of activity compared among species.  
Onset: time when P(activity) at minimum

**Fig. 4.** Correlation of activity bouts among species.

$r > 0$ : synchronized  
 $r < 0$ : avoidance



- Forest songbirds are mostly synchronized in activity onset and duration of activity bouts
- Automated tools now allow the monitoring of an entire community of small flying vertebrates