

LiDAR: A New Approach to Safeguarding Nature & Protecting Public Health

Using laser technology and AI to monitor insects across the UK

About the project

We are researchers at the Liverpool School of Tropical Medicine (LSTM, UK) and Lund University (Sweden), developing a new laser-based system to monitor mosquitoes and other insects. The 4-year project (2026-2030) aims to combine safe laser sensing, artificial intelligence and ecological expertise, to create a new way of monitoring insects that will benefit both **environmental protection** and **public health** across the UK.

Why this matters

Insects play a vital role in ecosystems, but many species are declining. At the same time, climate change is increasing the risk that diseases transmitted by insects (e.g. mosquitos) could emerge in the UK. Researchers need better tools to understand:



- 📊 *Changes in insect populations and biodiversity*
- 🌳 *How insect populations respond to environmental conditions*
- 🚨 *Whether mosquito populations are increasing or spreading*

What are we doing?

We are testing **Entomological LiDAR** (Light Detection and Ranging) - a remote sensing system that uses an infrared laser beam to detect insects flying through it. The technology can identify insects by analysing characteristics such as:

- 🪰 *Wing-beat frequency*
- 📈 *Size*
- 🎨 *Colour*
- 📍 *Flight patterns*

Unlike traditional trapping methods, LiDAR can monitor insects continuously without harming them and can record hundreds of thousands of observations each day.

This will be the first time the technology has been used for mosquito monitoring in the UK

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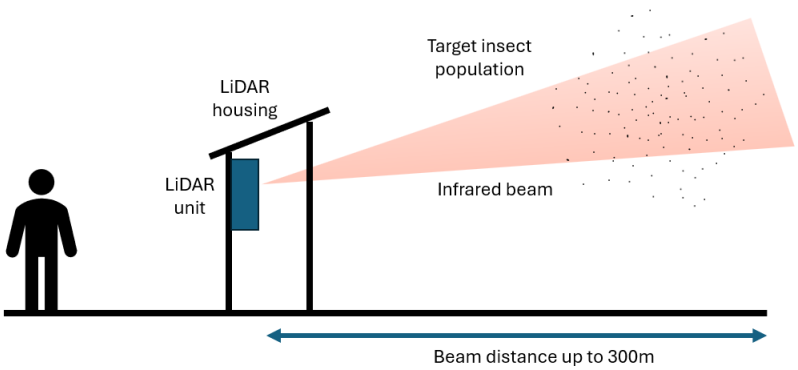
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How LiDAR works

We will set up our portable LiDAR units in various wetland areas across Merseyside and then around the UK to detect insect species. Once in place, the LiDAR units are checked by the research team on a weekly basis.

At LSTM, we will develop computer models to recognise the most important mosquito species, including those that are domestic and invasive to the UK. The LiDAR uses camera lens with large apertures to ensure that the laser emitted is eye safe. The infrared light is invisible and runs silently, meaning it does not interfere with local wildlife behaviour.



1. Insects fly through an infrared laser beam.
2. Light from the insect is reflected back to the LiDAR unit and the data is recorded.
3. 'Images' are subject to machine learning and modelling to analyse the data.

- ☑ Eye safe
- ☑ Silent operation
- ☑ Does not disturb wildlife
- ☑ Infrared light is outside the visible spectrum

Why LiDAR is different to conventional insect traps?

Traditional trap	LiDAR
Captures insects	Non-invasive
Periodic monitoring	Continuous monitoring
Limited samples	Daily observations
Labour intensive	Automated data collection

- 🌿 Captures data from all flying insects
- 📈 Higher number of insect observations
- 🦋 Reduced need to capture and kill insects
- 🦟 Earlier detection of disease risks
- 🏥 Better preparedness for future public health challenges

How can you help?

We are seeking sites of interest install the LiDAR unit whilst we are in our testing phase. Specifically, we require sites that feature wetlands/standing water with active insect and/or mosquito populations. Ideally, these sites will have a power supply, are secure and have a direct field of view of a couple of hundred metres. We envision our LiDAR systems to be operational for research and monitoring in 2027 and are seeking interested collaborators now, who are keen to understand more about insect biodiversity and mosquitoes in their area.

Get in touch

The project is led by **Dr Christopher Jones** at the **Liverpool School of Tropical Medicine** with key partners from **Lund University, Sweden** who are the developers of the LiDAR technology.

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