

Researchers launch global dashboard to track invasive mosquitoes carrying deadly diseases

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Examples of mosquitoes uploaded to apps used to provide data to the Global Mosquito Observations Dashboard. Credit: USF

To combat the ongoing threat of mosquito-borne diseases worldwide, University of South Florida researchers have launched a mosquito-tracking dashboard driven by citizen science—a scalable solution proven effective in a recent USF study.

Funded by a four-year grant from the National Science Foundation, the

study and the Global Mosquito Observations Dashboard are part of a large-scale project to establish global surveillance of mosquito-borne diseases with automated mosquito identification.

The dashboard combines data from three partner apps: Mosquito Alert, NASA's GLOBE Observer and iNaturalist. Each app uses [citizen science](#), where everyday people around the world provide photos of mosquitoes using their smartphones.

With the combined international data, the dashboard—accessible via computer browser or mobile device—has the potential to provide data at a frequency and geographic resolution otherwise impossible because of cost and other constraints.

"This dashboard represents a unification of global citizen science platforms for mosquito surveillance and control," said principal investigator Ryan Carney, assistant professor of integrative biology.

"This tool will help mosquito control personnel to seek and destroy [invasive species](#) and monitor [disease](#) vectors on an international basis by leveraging the geo-reference computers people carry around in their pockets every day: their smartphones."

Each year, mosquitoes cause nearly 700 million infections and more than one million deaths, making mosquitoes the deadliest animal on Earth. Because only a small percentage of the mosquito species transmit diseases, extensive surveillance and precise identification are critical in community defense.



Example of a mosquito tracked by the new Global Mosquito Observations Dashboard. Credit: James Gathany (Centers for Disease Control)

Given the general lack of vaccines and cures, there is a universal need for increased and sustained mosquito surveillance and habitat mitigation worldwide. The [real-time data](#) available on this dashboard will help researchers, mosquito-control personnel and policymakers detect disease vectors early.

To test the effectiveness of citizen science for the surveillance of [mosquitoes](#), Carney and a team of three USF students asked citizen scientists to target primary vectors of Zika, yellow fever, dengue and Chikungunya. Not only did the citizen scientists succeed in locating

vectors, but their efforts resulted in the first iNaturalist observations in the U.S. of *Aedes scapularis*, an invasive species that causes yellow fever. The documentation was shared with local vector control officials in Texas and serves as a model for monitoring in Florida, where the species recently invaded.

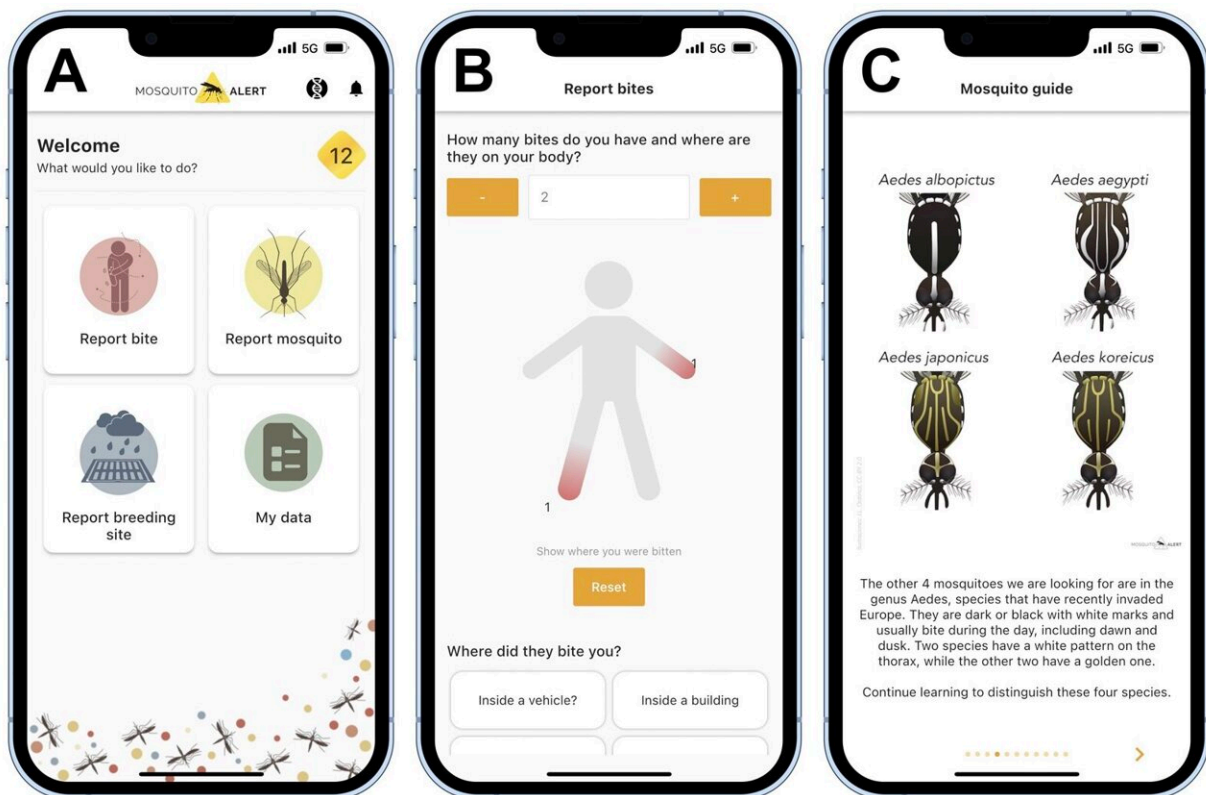


A USF researcher demonstrates how an app identifies mosquito species for tracking using the new Global Mosquito Observations Dashboard. Credit: USF

The study, recently published in a special edition of the journal *Insects*, will serve as a reference for future planning and execution of citizen science projects.

For the remainder of the grant, USF engineering Professor Sriram Chellappan will lead efforts to train and test [artificial intelligence algorithms](#) to create an [image recognition software](#). The software, set to launch this fall, will be used to identify mosquito species in uploaded citizen science images.

"Our algorithms for species recognition are especially accurate in detecting critical mosquito vectors," Chellappan said. "It will yield valuable tools for citizen-assisted surveillance to combat diseases."



An example of how the new Mosquito Alert app works. Credit: USF

The algorithms will be tested throughout a new campaign that just

launched in collaboration with the Centers for Disease Control and Prevention to track the invasive urban malaria vector *Anopheles stephensi* in Africa. Citizen scientists in Africa are encouraged to share their mosquito photos on [MosquitoesInAfrica.org](https://mosquitoesin africa.org) to assist in detection.

"As this work takes on a bigger focus on Africa, the project can aid mosquito-borne disease prevention in susceptible populations and prevent deadly outbreaks," said Karlene Rivera, an undergraduate student researcher working on the grant in the Carney Lab. "This project has major implications in the world of artificial intelligence and disease prevention."

More information: Ryan Carney et al, Integrating Global Citizen Science Platforms to Enable Next-Generation Surveillance of Invasive and Vector Mosquitoes, *Insects* (2022). [DOI: 10.3390/insects13080675](https://doi.org/10.3390/insects13080675)

Provided by University of South Florida

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