**Acoustical Evolution Increases Battle Between Predator, Prey**

*Moth wing structure, composition absorb bat echolocation calls.*

\*\*\* EMBARGOED UNTIL JUNE 9, 2021 AT 1 P.M. EASTERN U.S.\*\*\*

MELVILLE, N.Y., June 9, 2021 -- In the evolutionary battle between hunter and hunted, sound plays an integral part in the success or failure of the hunt. In the case of bats vs. moths, the insects are using acoustics against their winged foes.

During the 180th Meeting of the Acoustical Society of America, which will be held virtually June 8-10, Thomas Neil, from the University of Bristol, will discuss how moth wings have evolved in composition and structure to help them create anti-bat defenses. The session, "Moth wings are acoustic metamaterials," will take place Wednesday, June 9, at 1 p.m. Eastern U.S.

Nocturnal moths are under intense selection pressure by the bats that hunt them. Some moths have developed a form of acoustic camouflage by evolving structures on their bodies and wings to absorb ultrasound. This decreases the strength of the bat's echo return and gives the insects a better chance of survival.

"The wings of a moth will produce strong echoes to a hunting bat owing to their large size," Neil said. "As such, it is important the moth cloaks the wing with sound-absorbing material, so it matches the acoustic camouflage brought about by the fur on the body. The only way to create the much thinner sound absorber allowed on the wings is by developing a resonant absorber, and we discovered moth wings have evolved this approach."

The scales covering moth wings allow as much as 70% of the sound hitting them to be absorbed. More amazingly, these scales are individually tuned to different frequencies, forming an array of resonant absorbers, which together create broadband absorption by acting as an acoustic metamaterial -- the first known in nature.

Neil said the strategies identified in moths have already been partially explored from a theoretical and technical standpoint. The advantages of using a metamaterial design for sound absorption is the absorbers can be much thinner than the wavelength of the sound they absorb. In the case of the moths, their absorbers are 100 times thinner than the wavelength of a bat's cry.

"In theory, we could take inspiration from the moths and build sound absorbing panels made from lots of differently tuned resonating paddles, with the goal of achieving sound absorption that is on par with traditional sound absorber panels but being just a fraction of the width," Neil said. "With this approach, we would be getting close to a much more versatile and acceptable sound absorber wallpaper rather than the typically bulky absorber panels we use today."

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**----------------------- MORE MEETING INFORMATION -----------------------**

**USEFUL LINKS**

Main meeting website: <https://acousticalsociety.org/asa-meetings/>

Technical program: <https://acousticalsociety.org/technical-program-and-special-sessions/>

Press Room: <http://acoustics.org/world-wide-press-room/>

**WORLDWIDE PRESS ROOM**

In the coming weeks, ASA's Worldwide Press Room will be updated with additional tips on dozens of newsworthy stories and lay language papers, which are summaries of presentations written by scientists for a general audience and accompanied by photos, audio and video. You can visit the site during the meeting at <http://acoustics.org/world-wide-press-room/>.

**PRESS REGISTRATION FOR MEETING SESSIONS**

We will grant free registration for credentialed and professional freelance journalists who wish to attend the meeting sessions. If you are a reporter and would like to attend, contact the AIP Media Line at media@aip.org. We can also help with setting up interviews and obtaining images, sound clips or background information.

**VIRTUAL MEDIA BRIEFINGS**

Press briefings will be held virtually during the conference. Credentialed media can register in advance by emailing media@aip.org and including your full name and affiliation in the message. The official schedule will be announced as soon as it is available, and registered attendees will be provided login information via email.

**ABOUT THE ACOUSTICAL SOCIETY OF AMERICA**

The Acoustical Society of America (ASA) is the premier international scientific society in acoustics devoted to the science and technology of sound. Its 7,000 members worldwide represent a broad spectrum of the study of acoustics. ASA publications include The Journal of the Acoustical Society of America (the world's leading journal on acoustics), Acoustics Today magazine, books, and standards on acoustics. The society also holds two major scientific meetings each year. For more information about ASA, visit our website at [http://www.acousticalsociety.org](http://www.acousticalsociety.org/).

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