

Abstract Submitted
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A Biomimetic Ultrasonic Whistle for Use as a Bat Deterrent on Wind Turbines¹ PAUL SIEVERT, University of Massachusetts, Amherst, BANAFSHEH SEYED-AGHAZADEH, Miami University, DANIEL CARLSON, ZARA DOWLING, YAHYA MODARRES-SADEGHI, University of Massachusetts, Amherst — As wind energy continues to gain worldwide prominence, more and more turbines are detrimentally influencing bat colonies. In 2012 alone, an estimated 600,000 bats were killed by wind turbines in the United States. Bats show a tendency to fly towards turbines. The objective of this work is to deter bats from the proximity of the swept area of operational wind turbine blades. Established field studies have shown that bats avoid broadband ultrasonic noise on the same frequency spectrum as their echolocation chirps. A biomimetic ultrasonic pulse generator for use as a bat deterrent on wind turbines is designed and studied experimentally. This device, which works based on the fundamentals of flow-induced oscillations of a flexible sheet is a whistle-like device inspired by a bat larynx, mechanically powered via air flow on a wind turbine blade. Current device prototypes have proven robust at producing ultrasound across the 20 - 70 kHz range for flow inlet velocities of 4 – 14 m/s. Ultimately, a deterrent as described here could provide a reliable, cost-effective means of alerting bats to the presence of moving turbine blades, reducing bat mortality at wind facilities, and reducing regulatory uncertainty for wind facility developers.

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