

Abstract Submitted
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Harbor seal whiskers synchronize with frequency of upstream wake HEATHER BEEM, MICHAEL TRIANTAFYLLOU, MIT — Harbor seals are able to use their whiskers to track minute water movements, such as those left in the wake of a fish [1]. The current study is a simple representation of what the whiskers experience as the seal chases a fish. A scaled whisker model (average cross-flow diameter: d_w) is first tested in a towing tank by itself and then towed behind a larger cylinder ($d_c = 2.5d_w$), which serves as a wake generator. A flexing plate attached to the model base allows the whisker to freely vibrate in response to the flow. Measurements from strain gages on the plate are calibrated to tip deflections. While in the cylinder wake, the whisker vibrates with an amplitude up to ten times higher than it does on its own ($A/d_w = 0.15$). Also, the whisker synchronizes with the vortex shedding frequency ($f_s = \frac{0.2U}{d_c}$) of the upstream cylinder over the range of reduced velocities tested, whereas on its own, the whisker oscillates around its own natural frequency in water. Seals may use the difference in vibration amplitude and frequency between these two cases to help detect the presence of a vortex wake.

[1] Dehnhardt, G., et al. (1998). “Seal whiskers detect water movements,” *Nature*, 394(6690), 235-6.

Heather Beem
MIT

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