

Abstract Submitted  
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**Biomimetic model systems of rigid hair beds: Part II – Experiment** MANI S.S JAMMALAMADAKA, KAITLYN HOOD, ANETTE HOSOI, MIT — Crustaceans – such as lobsters, crabs and stomapods – have hairy appendages that they use to recognize and track odorants in the surrounding fluid. An array of rigid hairs impedes flow at different rates depending on the spacing between hairs and the Reynolds number,  $Re$ . At larger Reynolds number ( $Re > 1$ ), fluid travels through the hairs rather than around them, a phenomenon called leakiness. Crustaceans flick their appendages at different speeds in order to manipulate the leakiness between the hairs, allowing the hairs to either detect the odors in a sample of fluid or collect a new sample. Theoretical and numerical studies predict that there is a fast flow region near the hairs that moves closer to the hairs as  $Re$  increases. Here, we test this theory experimentally. We 3D printed rigid hairs with an aspect ratio of 30:1 in rectangular arrays with different hair packing fractions. We custom built an experimental setup which establishes poiseuille flow at intermediate  $Re$ ,  $Re \leq 200$ . We track the flow dynamics through the hair beds using tracer particles and Particle Imaging Velocimetry. We will then compare the modelling predictions with the experimental outcomes.

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