

Abstract Submitted
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Rhythmicity, recurrence, and recovery of flagellar beating¹

KIRSTY WAN, RAYMOND GOLDSTEIN, DAMTP, Univ. of Cambridge — The eukaryotic flagellum beats with apparently unflinching periodicity, yet responds rapidly to stimuli. Like the human heartbeat, flagellar oscillations are now known to be noisy. Using the unicellular alga *Chlamydomonas reinhardtii*, we explore three aspects of nonuniform flagellar beating. We report the existence of rhythmicity, waveform noise peaking at transitions between power and recovery strokes, and fluctuations of interbeat intervals that are correlated and even recurrent, with memory extending to hundreds of beats. These features are altered qualitatively by physiological perturbations. Further, we quantify the recovery of periodic breaststroke beating from transient hydrodynamic forcing. These results will help constrain microscopic theories on the origins and regulation of flagellar beating.

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Kirsty Wan
DAMTP, Univ. of Cambridge

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