

MPIDS Colloquium



MAX-PLANCK-GESELLSCHAFT

Navigation of biflagellate algae can be described accurately by an adaptive response of their flagella to light

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Aquatic organisms change their direction of swimming in response to a light stimulus, in order to increase their fitness, and hence their chance of survival. This so-called “tactic” behaviour is known as *phototaxis*. In the laboratory we study single-cell algae which utilise this behaviour in order to satisfy their photosynthetic needs. Our understanding of phototaxis in biflagellate algae stems almost exclusively from the model species *Chlamydomonas reinhardtii*, via studies of its flagella, eyespot and steering. However, no comprehensive model linking all these aspects of its physiology and behaviour has been constructed and tested experimentally. In this talk, I will present a mathematical model that we have developed by coupling an adaptive flagellar photoresponse to rigid-body dynamics tailored to details of flagellar beating. We corroborate the model with experimental data -- at the *flagellar* and *tactic* levels -- to explain the accurate phototactic steering of this alga.

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**MPIDS, Prandtl lecture hall,
Am Faßberg 11, Göttingen**

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