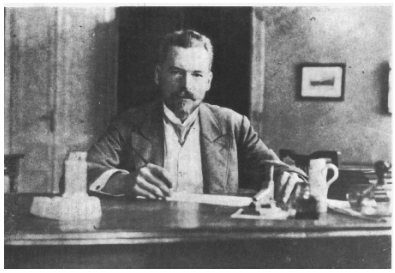

Contribution ID: **28** Type: **Invited talk**

Elastohydrodynamics of microscale swimming

Tuesday, 28 September 2021 12:00 (30 minutes)

Swimming microorganisms and engineered artificial swimmers use multiple strategies to achieve propulsion in the viscosity-dominated microworld. A number of them use long, filamentous appendages called cilia or flagella. The motion of these slender objects is governed by a complex interplay between the driving forces, the elastic properties of the fibres, and the resistance forces of fluid. In my talk, I will describe the basic ideas behind microscale swimming and highlight the role of elastic flagella in swimming. I will show examples of both natural swimmers and artificial systems which can be described using elastohydrodynamics.

A recently studied system involving an emulsion of microscopic droplets of oil in water exhibits swimming induced by an extrusion of elastic fibres by the droplets [1]. The extrusion is controlled by a surface phase transition of the surfactant, and it drives the motion of droplets. Extruded fibres undergo dynamic buckling and produce complex shapes, which we describe by a combination of theoretical modelling and numerical simulations, which serve as the basis for interpretation of experimental data.

[1] D. Cholakova, M. Lisicki, S.K. Smoukov, S. Tcholakova, E. Lin, J. Chen, G. De Canio, E. Lauga, N. Denkov, *Rechargeable self-assembled droplet microswimmers driven by surface phase transitions*
Nature Physics (2021).

Primary author: LISICKI, Maciej (Institute of Theoretical Physics, Faculty of Physics, University of Warsaw)

Presenter: LISICKI, Maciej (Institute of Theoretical Physics, Faculty of Physics, University of Warsaw)

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