

# DYNAMICS OF FLEXIBLE MICROFIBERS IN FLUIDS

## PhD Project

In nature and technology, there are many systems of elastic micro and nano filaments in a water-based environment, e.g. actin, microfibrils or diatom chains. Therefore, there is a lot of interest in theoretical, numerical and experimental studies of the dynamics of such objects in fluids, under a constant force or in an ambient fluid flow. The challenging task is to examine the influence of a filament flexibility on the main features of the dynamics.

In the proposed PhD Project, microparticle dynamics will be investigated in the systems settling under gravity and in the systems entrained by a fluid flow. To this goal, precise numerical codes Hydromultipole will be used, developed in our Division, and used in various contexts in cooperation with scientists from many leading laboratories worldwide. The programs are based on advanced multipole method of solving the Stokes equations, taking into account lubrication. More simple programs will be also written and used, based on simpler hydrodynamic models. A comparison with experiments will be also possible, based on similarity principle and video recording of particles settling in a very viscous fluid, such as glycerin or silicon oil.

### Literature

M. Gruziel, K. Thyagarajan, G. Dietler, A. Stasiak, M. L. Ekiel-Jeżewska, P. Szymczak, *Periodic Motion of Sedimenting Flexible Knots*, PHYSICAL REVIEW LETTERS, **121**, 127801, 2018.

C. I. Trombley, M. L. Ekiel-Jeżewska, *Stable Configurations of Charged Sedimenting Particles*, PHYSICAL REVIEW LETTERS, **121**, 254502, 2018.

M. Bukowicki, M. L. Ekiel-Jeżewska, *Different bending models predict different dynamics of sedimenting elastic trumbbells*, SOFT MATTER, **14**, 5786-5799, 2018.

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