

ESR8 - Bacteria propulsion and interactions in monolayer biofilms

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Flagellated bacteria exhibit a particular mode of locomotion denoted as swarming, where they migrate collective over surfaces and from stable aggregates, which can become highly mobile. Bacteria in swarms are distinctly different from planktonic cells as they assume different morphologies — they are more elongated and the number of flagella is significantly increased — and they are densely packed. This points toward the importance of cell shape and propulsion in swarming. Moreover, collective swarming is observed for other microswimmers, e.g., trypanosomes, which are propelled in a completely different fashion.

In this project, the Early Stage Researcher (ESR) will apply mesoscale hydrodynamic computer simulations to arrive at a detailed understanding of the collective swarming behavior of peritrichous bacteria, specifically the relevant mechanism on the level of individual cells. In particular, the influence of fluid-mediated interactions on their collective behavior and the intra-cell and inter-cell flagella bundling mechanics will be addressed, as well as the influence of the microswimmer shape on their collective behavior in general.

Salary: The PhD salary is based on the [regulations of appointment and remuneration](#) for Marie Skłodowska Curie Fellows in ITN networks. The successful candidate will also benefit from additional funding for several visiting trips (typically 1 month each) in partner teams.

Requested profile: We welcome highly-motivated applicants holding an MSc and with excellent background in theoretical physics, biophysics, and/or soft matter physics.

Further obligations: The ESR is expected to travel to network partners for secondments and a mini-project for durations up to 2-3 months. In addition, the ESR participates in outreach activities (social media, participation in public events), as well as dissemination to popular press.

Funding conditions: Candidates must not have resided or carried out their activities - work, studies, etc. - in Germany for more than 12 months in the 3 years immediately before starting the PhD.

Hiring procedure: Applications (CV, transcript of studies, statement of motivation and at least one letter of recommendation) should be sent by email to Gerhard Gompper (g.gompper@fz-juelich.de). The recruitment is taking place following the [European Code of Conduct for Recruitment of Researchers](#), which all candidates are encouraged to study.

Selection process: PHYMOT is open to researchers regardless of gender, religion, ethnicity, disability, sexual orientation, political views, language, age and nationality. Applications from highly qualified applicants from outside the EU will thus be equally considered to other applicants. The integration of refugees is an EU priority and we will ensure equal opportunities to the researchers whose scientific careers have been interrupted. To ensure a gender balance in the project and work towards the Commission's own policies on narrowing the gap between the genders in research, should two applicants be found to be equally qualified the preference will be given to the one that will balance the gender distribution in the entire Network. All submitted applications will be checked against the defined admissibility and eligibility criteria (e.g. submitted electronically, readable, complete, in English, including grades and references), and applicants will be informed by email within two work weeks on the outcome. Evaluation criteria include: Scientific background (with particular focus on theoretical physics), previous publications, capacity for creativity and independent thinking and leadership, mentoring and presentation abilities.

Protection of personal data: The personal data of the applicants will be handled in compliance with applicable EU and national law on data protection (GDPR).

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