

# ESR2 - Determination of visco-elastic properties of flagella

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Cilia and flagella are highly conserved motile organelles common to a wide range of eukaryotic species. Their relentless beating is key to processes ranging from fertilization to embryonic development, and results from the inner working of the axoneme, a complex structure where hundreds of molecular motors are precisely organized along a flexible microtubule-based scaffold. The mechanical properties of the axoneme underpin flagellar activity, but are currently not well understood. So far, experiments have only probed the static elasticity of the axoneme, but recent studies point to a major role played by internal viscosity. Focussing on the model system *C. reinhardtii*, this project will use an active-rheology approach based on periodic forcing of paralyzed flagella to measure directly both viscous and elastic components of flagellar mechanics. The project will develop the required experimental and data analysis techniques, and lead to an improved, experimentally-tested model of the axoneme. Flagellar elongation will be used here as a tool to differentiate between flagellar and basal-body viscoelasticity.

In this project the Early Stage Researcher (ESR) will establish experimental protocols to study dynamic response of axonemes to externally imposed periodic shear. The flagellar response will be measured as a function of amplitude and frequency of the applied shear stress and the mechanical properties of the basal-bodies will be established.

**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 the partner teams.

**Requested profile:** We welcome highly-motivated applicants holding a 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.

**Deadline for applications: January 20, 2021.**

**Hiring procedure:** Applications (CV, transcript of studies, statement of motivation and at least one letter of recommendation) should be sent by email to Marco Polin ([mpolin@imedea.uib-csic.es](mailto:mpolin@imedea.uib-csic.es)). 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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