

## Two PhD fellowships in bio-inspired fluid dynamics and electrocapillarity

### Description

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Within the ElastoCap project, granted by the F.R.S.-FNRS (Belgian National Fund for Scientific Research), the Nonlinear Physical Chemistry Unit (NLPC) of the Université libre de Bruxelles (ULB) and the Interfaces and Complex Fluids Laboratory (Influx) of the Université de Mons (UMons) invite applications for **two PhD fellowships to begin in July 2019 or soon after** (no later than **October 2019**).

The successful candidates will conduct **experiments** and **theoretical modeling** to study **fluid flows driven by electrocapillarity** in the context of the capture of fluids by living organisms. A project summary is included below.

### Type of appointment

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**Maximum 48 months full time for each position.** The successful candidates must have appropriate authorization to work in the EU before employment begins.

### Salary

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Approximately 1950€ net per month.

### Required Qualifications

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Completed MSc or equivalent in Physics or related fields. Good oral and written communication skills (in English) to work in a multidisciplinary team environment.

### Application Procedure

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Applicants should submit a cover letter including a statement of interest, a curriculum vitae and the name and address of persons of reference to P. Damman and F. Brau via email.

### Deadline

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**Review** of applications will **begin on June 01, 2019** and continue until the position is filled.

### Project summary

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Some insects, birds and small mammals primarily feed on nectar. During the course of evolution, their tongue has gradually specialized for this task by acquiring a complex assembly of flexible structures of small size compared to the capillary length. Most physicochemical mechanisms allowing them to quickly capture a much more viscous fluid than water are currently not fully understood. The various hypotheses mentioned to date fall into three broad categories: active suction by muscular actions (butterflies), capillary suction equivalent to Jurin's capillary rise (hummingbirds) and viscous dipping (bees, bats). The main objective of the ElastoCap project is to elucidate the mechanisms of nectar capture in bees and hummingbirds. To achieve this goal, the successful candidates will carry out systematic

experimental and theoretical studies of elasto-capillary effects coupled with viscous fluid flows for a series of models reproducing biological systems. They will study the influence of different parameters (elastic modulus, geometry of structures, viscosity, retraction velocity) on the capture dynamics and the quantity of fluid captured. The relevance of these models will be assessed by direct comparisons of their predictions with in-vivo measurements on hummingbirds and bees.

### Contact Person

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