Postdoc position

**Project: Aerial robot homing based on bio-inspired vision systems**

The aim of the project is to make an aerial robot to explore and to return to its base station automatically using biomimetic vision.

The idea is to use a combination of bioinspired visual systems to memorize the way in during the exploration and to use them to return home, on its base station.

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**Figure 1:** A) Different routes that ants take to and from the nest (Mangan & Webb, 2012). B) Visual exploration sequence of an ant to learn to return to the nest. C) Neural model return to the nest after learning (Wystrach et al., 2020). D) Kopis2 6S V2 (Kakute H7 Flight Controller flashed with PX4) equipped today with 2 panoramic cameras -Internship Sanchez (2022). E) The AntCar robot -Internship R. Vimbert (2021) and G. Gattaux (2022). Panoramas taken by the Raspberry Pi camera equipped with panoramic lenses.

The Biorobotic Lab is a rare example of real transdisciplinary research department. For almost 30 years, this research group, composed of five permanent researchers, one electronic engineer, one micro-mechanic technician and 6 PhD students, has acquired strong skills in the study of the visual system of invertebrates (especially fly and bee) and their behavior and sensorimotor control feedback loops (such as optic flow regulation) which are hard-wired into their brains.

The team built a variety of analog and digital electronic circuits, including aVLSI prototypes, that realized visual motion sensor array and also built no less than 8 wheeled and flying robots.

The Biorobotics research group will provide a micro-mechanical workshop as well as a workshop in electronics and will mobilize two specialized technicians in mechatronics. The technicians will be involved in the project to realize the different embedded electronic boards and mechanical parts that will be used for the tests and validation phases of the different prototypes. It will also make available several 3D printer and laser cutting machine for rapid prototyping of the support packages of the different mobile and aerial robots. In addition, the Biorobotics team will provide a flying machine arena equipped with 19 VICON cameras that monitor in real time the trajectory of the robots in volume of 6mx8mx6m.

**Duration:** 12 months + extension  
**Funding:** DGA/ANR-funded project.  
**Net salary:** between €2000 and €2600/month net depending on the professional experience

**Profile:**  
- Postdoc in Robotics, Mechatronics, Control Theory, Electronics or Computer Science  
- Taste for experimentation,  
- Very good level of English (written and oral), TOEIC > 850.

**Please send a CV and cover letter to:** Franck RUFFIER, Cnrs Research Director, ISM: franck.ruffier@cnrs.fr