



École Centrale de Lyon - INSA de Lyon – Université Claude  
Bernard Lyon 1

**Laboratoire Ampère**  
Unité Mixte de Recherche du CNRS - UMR 5005  
Génie Électrique, Électromagnétisme, Automatique, Microbiologie environnementale  
et Applications

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Object : 6 months Post-Doc Position, available since Oct/Nov 2020, in Lyon, France

In a context of pesticide use reduction, [Greenshield](#) project aims at developing a mobile robot to fight pests, based on spectral analysis for their detection and a laser for their destruction ([more details](#)). The main idea is to use a 3D and/or hyperspectral imaging system enabling a rotating laser beam to shoot the pests very quickly, efficiently and with minimum impact on the environment. The project started in 2017 and should finish by the end of 2021.

A first prototype of the robot featuring the complete detection-destruction chain has been realized. Experiments have to be performed to highlight its performance and limitations. A comparative study between several detection and targeting approaches has to be held. These experiments will help finalize a second and final prototype for Proof-Of-Concept purpose. Microchip microcontrollers will control the robot motion while a GPU board performs recognition and localization tasks. An optimization of the embedded systems should be brought. Actually, we aim at realizing out-door realistic experiments in fields. They will be held in collaboration with the Green Shield Technology start-up and 3 other research laboratories ([BF2I](#), [Femto-ST](#), [INL](#)).

This project is a rare example of real transdisciplinary research involving teams whose expertise include robotics (Ampère), insect biology (BF2I), photonics (INL), micro-systems (Femto-ST).

The applicant will be integrated in the Robotics research group of [Ampère](#) laboratory, in the “[Methods for System Engineering](#)” department. This team, composed of five permanent researchers, one electronic engineer, one mechanic technician and 3 PhD students in mean, has acquired strong skills in industrial robotics, advanced control laws, haptic systems and hybrid actuation (pneumatic+electric). Its task in the Greenshield project consists of integrating all the modules necessary to realize an autonomous mobile robot. It is supported by a local Fab-Lab to provide 3D printing and other modern construction means. Three students in internship of MsC will also help in this period (in enhancing AI-based detection algorithms, laser targeting and robot motion control).

We are looking for a person with scientific curiosity and ability to work autonomously. A proactive team working attitude and good communication skills (at least in English) will also be necessary. This person will have to co-supervise M.Sc candidates on the post-doc topics. European work permit is necessary.

Duration: 6 months

Funding: ANR-funded project.

Net salary: From 1865€ net per month depending on the professional experience

Required profile:

- PhD in Robotics, Control Theory, Computer Vision or closely related field
- Good theoretical and practical background in



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- Computer Vision, Image processing
- Mobile Robotics (navigation)
- Mechatronics/automation/control electronics
- AI, computer engineering
- Good programming skills (python, C/C++; Matlab)
- Knowledge of 3D modelling (e.g. SolidWorks)
- Taste for experimentation
- Experience in practical implementation of control laws and algorithm on real-time embedded systems (GPU, microcontrollers), Ubuntu/Linux
- Good level of English (written and oral), TOEIC > 850, French (basic will be a plus),

The position will remain open until satisfactory candidate is found.

Please send via email to [arnaud.leleve@insa-lyon.fr](mailto:arnaud.leleve@insa-lyon.fr) (in **.pdf** format with scanned signature) your application including :

1. A letter of intent specifying research experience and intended contributions and the starting date
2. The curriculum vitae including a complete list of publications and scientific achievements and interests
3. Master degree marks
4. An e-copy or at least summary and outline of your PhD
5. E-copy of up to 3 representative recent paper publications
6. Names and email addresses of at least two permanent staff acquainted with research activities of the candidate to be contacted for letter of recommendation

The name of each file should start with candidate-name followed by applied position (post-doc) and nickname of the content. All files must be at least provided in a compressed package file or better, available online for later download to limit mailbox saturation.

The candidate may be asked by email for an e-interview (skype, zoom, ...) with the appointment committee. The applications will be analyzed in September 2020.

Arnaud LELEVÉ,  
Scientific supervisor of the project