

## POST DOC POSITION IN

# Measurement and simulation of radiative exchanges in urban areas

- Recruitment grade: young researcher (i.e. with PhD)
- Location: Anglet, France
- Duration: 24 months, starting late 1<sup>st</sup> November 2021
- Deadline: 3 September 2021
- Gross Salary Range: 2960 euros / month

### CONTEXT AND AIMS

The Urban Physics Joint Laboratory develops numerical tools and means of measurement to better understand energy interactions (sound, light and heat) in urban environments, in order to propose efficient solutions for architectural and urban projects.

The project proposed here consists in developing a ray trace environment powered by original measurements carried out in cities (optical properties of urban coatings).

### TASKS AND PROPOSED METHODOLOGY

The first task will be to extend the simulations to near infrared and thermal infrared, by deepening the study of the *Embree* library, which makes it possible to calculate directly in Intel® processors, then to take into account all the optical properties that are found in the urban environment. Particular attention will be paid to the quality of ray tracing (see: *A general rule for disk and hemisphere partition into equal-area cells*, B. Beckers & P. Beckers, Computational Geometry - Theory and Applications, Volume 45, Issue 7, Pages 275–283, August 2012).

By the end of 2022, the team should have a working prototype, in order to collaborate fully on the following tasks:

- Measurement campaigns
- Geometric modeling
- Comparison of measurements/simulations to verify the hypotheses of the proposed physical model
- Simulation of rehabilitation or modification scenarios of a neighborhood

By the end of 2023, the tool will have to be complete and well documented, so that it can be validated by external users. The tool will be free and open source, in order to ensure the best diffusion.

### FUNDING

This post doc position is funded by the project E2S-UPPA (Energy Environment Solutions) whose core scientific domain focuses on Environment and Energy to meet challenges related to the energy transition, geo-resources, aquatic habitats and the environmental effects of natural and anthropogenic changes (<https://e2s-uppa.eu/en/index.html>).



## **SUPERVISION AND CONTACT**

Supervisory team: Urban Physics Joint Lab (IPRA, E2S UPPA)

For additional information and proposal, please contact: **benoit.beckers@univ-pau.fr**

## **YOUNG RESEARCHER SKILLS REQUIRED**

Graduate Architect, Physicist or Engineer, having developed a doctoral thesis in the field of geometrical methods, with good knowledge in heat transfer and an interest in architecture and urban planning. The candidate must have a good level in French, English and Spanish. In particular, he/she should be able to give tutorials in French (Computer Aided Geometry, Urban Physics, Optics), and to participate in the setting up of a cross-border master's degree between France and Spain in the field of urban physics.

## **SALARY**

The salary of the successful candidate will be based on level chart for teaching and research personnel in the salary system of French universities. The salary will be 2960 euros/month (gross salary), including allowance for 64 hours teaching per year.

## **APPLICATIONS AND DEADLINE**

Please submit your application by email to [benoit.beckers@univ-pau.fr](mailto:benoit.beckers@univ-pau.fr). Please attach the following documents as a single pdf file:

- Detailed CV;
- Summary of the PhD (1 page);
- A motivation letter describing the applicant's previous research experience and how it is related to the present position (one, or maximum two pages);
- If the thesis is not yet defended, a letter from the Principal Director confirming that the defense will take place in 2021.

The deadline for submitting the application is 03/09/2021.