POST DOC POSITION IN Radiative transfer simulation in urban environment

- Recruitment grade: young researcher (i.e. with PhD)
- Location: Anglet, France
- Duration: 24 months, starting late 1st October 2023
- Deadline: 1st June 2023
- Gross Salary Range: 3065.20 euros / month

CONTEXT AND AIMS

The Urban Physics Joint Laboratory develops numerical tools and measurement devices 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 universal ray tracing engine (sound/light/heat), which allows simulating radiative transfers at the scale of a district or an entire city.

TASKS AND PROPOSED METHODOLOGY

The first task will be to choose a coherent combination of programs (a mesh generator, a ray-tracing library, a graphical user interface) that will serve as the basis for the code to be developed. The sound field is mainly produced by specular reflection, while the light field is generally governed by diffuse reflection. In the first case, the ray tracing method gives the best results. In the second, the radiosity method is better suited. The use of extended view factors makes it possible to link these two methods. On the other hand, in the case of thermal fields, ray tracing must be coupled with a finite element method to simulate conduction in walls. The software developed here should make it possible to calculate the radiative loads on the skin of a geometry meshed for the finite elements.

By the end of the first year, a working prototype should be achieved, in order to realize the following tasks:
- Measurement campaigns with photographic, thermal and acoustic cameras;
- Geometric modeling of the urban scene;
- Comparison of measurements/simulations to verify the hypotheses of the proposed physical model.

FUNDING

This post doc position is funded by the project E2S-UPPA (Energy Environment Solutions) whom 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 Civil Engineer (or equivalent), having developed a doctoral thesis in the field of ray tracing methods applied to sound, light or heat transfer, with good knowledge in urban physics 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, acoustics, urban physics), 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 3065.20 euros 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. 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 2023.

The deadline for submitting the application is 1st June 2023.