

Willing to experience intersectoral, interdisciplinary and/or international research? Apply with Centrale Nantes to the MSCA Postdoctoral fellowship 2025 call for proposals and join us!

Candidate profile

We are seeking a highly motivated postdoctoral researcher with a background in urban informatics, computer science or urban studies. As this is an interdisciplinary topic, the postdoctoral researcher should ideally have expertise in urban studies and walkability metrics, knowledge of data collection and sensor integration (including environmental sensors and eye-tracking technologies), strong machine learning and deep learning skills (especially embedding models and spatial data analysis), and experience in developing hybrid methods that integrate qualitative and quantitative data. In addition, he/she should have the ability to collaborate across disciplines, advanced programming and data science skills, knowledge of spatial and visual data analysis, and a proven track record in research and dissemination of results in relevant fields. Applications covering only some of these skills will also be considered.

Project description

Supervisors: Myriam SERVIERES, Vincent TOURRE, Thomas LEDUC

Keywords: Data Science, Walkability, hybrid methods, eye tracking, interviews, urban analysis, Urban Design Qualities, visual perception, Deep Learning

Topic open:

Walkability, characterized by the convenience and enjoyment of navigating an urban environment on foot, is an essential component of urban design. Promoting pedestrian mobility is crucial in urban mobility strategies aimed at decarbonizing transportation systems and enhancing the health and quality of life for citizens (SDG 3, 11). Previous studies have demonstrated a direct correlation between urban walkability and pedestrians' sensory perceptions (Ewing et al., 2009). The perception of urban spaces by pedestrians has also been extensively studied to measure or qualify the qualities of these spaces. Studies by Nasar (1989) and Ewing et al. (2009) have aimed to link the physical attributes of urban environments with pedestrian perceptions of these locations.

In 2006, Ewing et al. introduced Urban Design Qualities (UDQ), quantifiable elements designed to evaluate users' reactions to the physical characteristics of urban spaces. While this approach has significantly advanced the understanding of urban perception, it remains incomplete as it does not capture the lived, everyday experiences of ordinary pedestrians. Recently, automated methods for qualifying urban spaces have leveraged Street View imagery (SVI) and deep learning to predict perceptions such as safety or attractiveness of places (Dubey et al., 2016). However, these methods overlook the actual, embodied experience of pedestrians within the space, which is crucial for assessing walkability.

The goal of this research project is to create a walkability perception map contributing to sustainable mobility planning and improving urban quality of life. To achieve this, we propose to use a hybrid method that will combine qualitative and quantitative approaches to capture pedestrians' perceptions of urban spaces. Field studies will collect subjective data through questionnaires and interviews, as well as quantitative data using wearable eye-tracking devices (Tobii eye-tracking glasses) to assess what pedestrians see and experience as they move through the environment. These measurements will encompass various dimensions of perception, including visual impressions, air quality, noise levels, and thermal experience. The collected dataset will serve as a basis for studies on the relationship between pedestrian experience and urban space, enabling the development of machine learning models.

By extrapolating the field data to the full urban area using deep learning techniques based on specific embedding models, this research aims to create a more comprehensive and nuanced understanding of walkability. This approach will link what pedestrians see, perceive, and feel, thereby addressing gaps in existing methodologies and providing a robust foundation for sustainable mobility planning and the improvement of urban quality of life.

AAU is a mixed research unit of the CNRS involving the École Centrale de Nantes, the UGA and national architecture schools of Nantes and Grenoble, under the supervision of the French Ministry of Culture. The laboratory currently has 148 members, including 37 PhD students.

AAU brings together two teams on two sites, the CRENAU in Nantes and CRESSON in Grenoble.

Since its creation in 1998, the laboratory has become highly interdisciplinary, both in terms of its composition (architects, sociologists, computer scientists, anthropologists, urban planners, geographers, physicists, historians, philosophers), the themes and challenges it addresses (architecture, environment, city) and the tools it designs and implements (in situ survey methods, modeling and simulation of environmental phenomena, virtual reality, etc.).

This project is part of the work of the AAU Lab's CRENAU team in the field of urban informatics, which is concerned with how humans perceive space through the prism of the digital.

Dubey, Abhimanyu et al. (2016). "Deep Learning the City: Quantifying Urban Perception at a Global Scale". In: Lecture Notes in Computer Science. Vol. 9905 LNCS. Springer Verlag, pp. 196–212. isbn: 978-3-319-46447-3. doi: 10.1007/978-3-319-46448-0_12. arXiv: 1608.01769

Ewing, Reid, Susan Handy, et al. (Aug. 2006). "Identifying and Measuring Urban Design Qualities Related to Walkability". In: Journal of Physical Activity and Health 3.s1, S223–S240. issn: 1543-3080. doi: 10.1123/jpah.3.s1.s223

Ewing, Reid and Susan Handy (2009). "Measuring the Unmeasurable: Urban Design Qualities Related to Walkability". In: Journal of Urban Design 14.1, pp. 65–84. issn: 13574809. doi: 10.1080/13574800802451155

Nasar, Jack L. (1989). "Perception, Cognition, and Evaluation of Urban Places". In: Public Places and Spaces. Ed. by Irwin Altman and Ervin H. Zube. Human Behavior and Environment. Boston, MA: Springer US, pp. 31–56. isbn: 978-1-4684-5601-1. doi: 10.1007/978-1-4684-5601-1_3

Call information

Organisation	Ecole Centrale Nantes
Research field(s)	Urban informatics
Researcher Profile	R1 – First stage researcher
Country	France
Application deadline	31 March 2025
Type of contract	Temporary
Job status	Full-time
Hours per week	39
Offer starting date (estimated)	1 Apr 2026
Is the job funded through the EU Research Framework Programme?	Horizon Europe – MSCA European Postdoctoral Fellowship

Research environment

Centrale Nantes is a top-ranked institution recognized internationally for its excellence in research and education, particularly in engineering and technology. It is known for its leadership in fields such as **marine engineering**, **civil engineering**, and **mechanical engineering**, frequently appearing in the upper echelons of global rankings. For example, it ranks **125th worldwide in Mechanical Engineering** according to the **QS World University Rankings by Subject 2024**, reflecting its prominence in this area.

Additionally, Centrale Nantes is positioned in the **top 300 globally for Engineering**, and in the **top 500 for Physical and Computer Sciences** in the **Times Higher Education World University Rankings by Subject 2024**, highlighting its multidisciplinary strength.

Notably, Centrale Nantes was named **the top institution in France in the "Engineering Schools to Change the World"** ranking, compiled by **Les Echos START and ChangeNOW**, which evaluates schools based on their contributions to social and ecological transitions. This ranking showcases its dedication to sustainability and innovative solutions to global challenges.

Centrale Nantes' research extends beyond traditional engineering disciplines. It is recognized for pioneering work in **artificial intelligence** and **robotics**, often ranking among the **top 100 worldwide** in these fields. Its **computational mechanics** and **hydrodynamics** research centers are considered among the best in Europe, further cementing its status as a leader in cutting-edge scientific research.

Through strong global partnerships and innovative initiatives, Centrale Nantes continues to enhance its reputation as a world-class institution in scientific and technological research, with a strong focus on sustainability and impactful solutions for societal challenges.

Please take look at our institution before submitting your application: <https://www.ec-nantes.fr/>

Profile required

Eligibility criteria - Specific Requirements

- **You are a First-stage or an Experienced Researcher** eg. in possession of a doctoral degree at the time of the call deadline (10th Sept 2025) and a maximum of 8 years full-time equivalent experience in research (self-assessment tool [here](#)).
- **You comply with the mobility rule:** eg. you must not have resided or carried out your main activity (work, studies, etc.) in France for more than 12 months in the 36 months immediately before the call deadline (September 10th, 2025). All nationalities welcome!
- **You want to carry out an innovative research:** only the best proposals will be selected by the European Commission. All domains of research are eligible!
- **You already have great achievements in research:** Curriculum Vitae is an important criterion of MSCA application.

Conditions of employment

Duration	12 to 24 months
Salary	Around €6 000 (fully loaded cost of employment) per month Exact salary to be published in the MSCA PF call in April 2025.
Support to mobility and family	mobility allowance (€ 710 per month) + family allowance (€ 660 per month) if applicable - both allowances are fully loaded cost of employment
Secondment	An interdisciplinary and/or intersectoral mobility (3 months up to 1/3 of fellowship) is possible when relevant
Additional benefits:	- Teleworking possible - 75% transport reimbursement - Sustainable mobility bonus (if cycling or car-pooling)

Selection process

How to apply to MSCA Postdoctoral Fellowship with Centrale Nantes:

Step 1: Find a supervisor at Centrale Nantes (application before March 31st, 2025)

- *Select a pre-determined topic.* You apply in **English** to one or two research subject(s) provided by supervisors (please see table 2 below) :
 - Detailed Curriculum Vitae (including list of publications);
 - A concise statement of research's relevance to the selected topic/duration, along with a detailed proposal outlining your project idea for the MSCA Postdoctoral Fellowship;
 - Link and/or information about your doctoral thesis;
 - Contact information of two references (not mandatory, recommended).

Please apply by sending your application to pauline.rouaud@ec-nantes.fr and yolaine.lebeau@ec-nantes.fr before **March 31st, 2025**. Please always include both contacts so that your request can be processed as quickly as possible.

If your application is retained (feedback at the latest: end of April 2025), then, the next step is to apply jointly to the MSCA PF (call launched by the European Commission - HORIZON-MSCA-2025-PF-01-01).

Step 2: Prepare the application to the MSCA PF

April-May 2025

- You receive an informative MSCA-PF starter package via an online meeting with advice on institutional aspects and horizontal issues (open science, gender, ethics and research data management...) - fellow + supervisors + EU project managers
- You elaborate jointly the research approach with your supervisor(s)

June 2025

- One joint meeting in Nantes. You receive a dedicated training session "Preparing for an Horizon Europe MSCA Postdoctoral Fellowship" advice on how to write your proposal - fellow + supervisors + EU project managers

July-August 2025

- Online meeting for proofreading - fellow + supervisors + EU project managers

September 2025

- Online meeting for administrative support for your MSCA PF application - fellow + supervisors + EU project managers
- We apply for you (deadline for the application: September 10th, 2025)

Please read this page to understand how MSCA PF works: <https://marie-sklodowska-curie-actions.ec.europa.eu/actions/postdoctoral-fellowships/6-steps-to-prepare-your-application>

Centrale Nantes is committed to equality and diversity. In line with our CSR commitments, this call is open to all.