



## **School of Computing, Engineering, and the Built Environment Edinburgh Napier University**

### **PHD STUDENT PROJECT**

#### **Funding and application details**

**Funding status:** Self funded students only

**Application instructions:**

Detailed instructions are available at <https://blogs.napier.ac.uk/scebe-research/available-phd-student-projects/>

*Prospective candidates are encouraged to contact the Director of Studies (see details below) to discuss the project and their suitability for it.*

#### **Project details**

**Supervisory Team:**

- DIRECTOR OF STUDY: Dr Inji Kenawy (Email: [I.Kenawy@napier.ac.uk](mailto:I.Kenawy@napier.ac.uk))
- 2<sup>ND</sup> SUPERVISOR:

**Subject Group:** Built environment

**Research Areas:** Architecture, Building & Planning

**Project Title:** Spatial decision support analysis for sustainable mobility policies.

**Project description:**

This PhD project aims to develop a spatial framework to integrate sustainable mobility into current urban transport planning policies. Transport is one of the main accounts of air pollution within cities contributing to a significant percentage of air pollutants. Additionally, according to the Department for Business, Energy & Industrial Strategy, it represents 27% of greenhouse gas emissions, which is the key driver of observed climate change. This represents the highest percentage compared to greenhouse gas emissions produced by other sectors including residential, energy, business...etc (DfT, 2021). Sustainable mobility is therefore becoming a major challenge faced by all countries by which transport-related issues are addressed.

So, what are our options? Walkability and cyclability are two sustainable modes of transport which have a noticeable impact on both users' health and the environment. In Edinburgh for example, the key statistics show that the physical activity advantages resulting from walking and cycling help prevent 344 early deaths, which is valued at more than 1 billion British pounds. Furthermore, approximately 23,000 tonnes of greenhouse emissions could be saved if 80% of car trips of up to three miles were substituted by walking and cycling (City of Edinburgh, 2022). Both modes of transportation are therefore considered by many cities and embedded in their policies. Edinburgh is one of the cities that consider walkability as a priority, the first aim in the proposed city plan Strategy 2030 is "Delivering a network of 20-minute walkable neighbourhoods and embedding a 'place-based' approach to the creation of high quality, high density, mixed-use, and walkable communities, linked by better active travel and public transport infrastructure, green and blue networks and bringing community services closer to homes." (City of Edinburgh Council, 2021). This 15-minute city concept has gained significant attention from various other cities to achieve a more sustainable environment. It is simply the ability to provide access to all human needs within 15 minutes by walking or cycling. So how to turn an existing city into a walkable/cyclable one? This involves both the ability to walk/cycle as well as the quality of the pedestrian/cyclist experience (Duany and Steuteville, 2021). Both walkability and cyclability are affected by built environment attributes, such as the streetscape design and accessibility and climatic parameters (Fonseca et al, 2022). Measuring these attributes should involve the users' perception, which includes structured, subjective, and behavioural indicators (Berzi, Gorrini and Vizzari, 2019). It is therefore crucial to widely engage the diverse public in the decision-making process and to assess the effectiveness of the surrounding built and urban environment on both modes of transportation based on their experience.

This PhD project aims to develop a spatial framework to integrate sustainable mobility into current urban transport planning policies taking into consideration users' experience. The methods used would include qualitative, quantitative, and spatial analysis (GIS). Case studies will be selected as part of the research journey. The main research questions of the research are to include:

1. What are the sustainable mobility modes (SMM) in cities?
2. How are SMM linked to the existing planning policies?
3. What are the variables affecting these SMM?
4. What are the users' perceptions and experiences with SMM?
5. How could SMM be embedded in the current policies for existing cities?

If you're interested in sustainable mobility, and spatial and behavioural analysis, the supervisory team is looking forward to reading your application.

Keywords: Sustainable Transportation, Sustainable Urban Mobility, Users' Behaviour, Spatial Analysis, Climate change, Walkability, Cyclability, Participatory approach.

## References:

- [1] DfT: Department of Transport, 2021, Official Statistics: Transport and environment statistics: Autumn 2021, <https://www.gov.uk/government/statistics/transport-and-environment-statistics-autumn-2021/transport-and-environment-statistics-autumn-2021> , accessed 14 November 2022.
- [2] City of Edinburgh, 2022, <https://www.edinburgh.gov.uk/cycling-walking/statistics-cycling-edinburgh?documentId=12666&categoryId=20087>

- [3] City of Edinburgh Council, 2021, City Plan 2030 proposed plan, <https://www.edinburgh.gov.uk/downloads/file/29997/proposed-plan-written-statement>
- [4] Duany, A. and Steuteville, R., 2021, Defining the 15-minute city, Public Square CNU, <https://www.cnu.org/publicsquare/2021/02/08/defining-15-minute-city>
- [5] Fonseca, F., Ribeiro, P.J., Conticelli, E., Jabbari, M., Papageorgiou, G., Tondelli, S. (2022) Built environment attributes and their influence on walkability, *International Journal of Sustainable Transportation*, 16 (7).
- [6] Berzi, C., Gorrini, A., Vizzari, G. (2019). Mining the Social Media Data for a Bottom-Up Evaluation of Walkability. In: Hamdar, S. (eds) *Traffic and Granular Flow '17*. TGF 2017. Springer, Cham. [https://doi.org/10.1007/978-3-030-11440-4\\_20](https://doi.org/10.1007/978-3-030-11440-4_20)

## **Candidate characteristics**

### **Education:**

A first-class honours degree, or a distinction at master level, or equivalent achievements in Architecture, Built Environment, Urban Development

### **Subject knowledge:**

- Urban Studies,
- Sustainable Cities

### **Essential attributes:**

- Urban Design, Built Environment Studies, Academic Writing, Critical Analysis, Research Methods, Research Analysis.