

## Pedram Pourghasem Omandani

**Pedram Poughasem Omandani is a researcher specializing in the field of architecture and soundscapes, with a Master's degree from Estonia and Wageningen University. Previous research focused on "Soundscape in Landscape Architecture," inspired by a musical background. Currently he is enrolled at the doctoral program at the Czech Technical University (ČVUT) to investigate sound masking in urban design and architecture, with a goal to improve urban environments.**

# Investigating Soundscape Preferences, Evaluation, and their Relationship with Urban Design, Architecture, and Sound Masking

Soundscape perception and evaluation are crucial considerations in urban design and architecture. However, an additional aspect that can significantly impact the quality of urban environments is sound masking. Sound masking refers to the intentional addition of background sound to reduce the intelligibility and impact of unwanted sounds, thus enhancing acoustic comfort and privacy. In the philosophy of architecture, some philosophers and philosophical concepts are connected to the study of soundscape preferences, evaluation, and their relationship with urban design, architecture, and sound masking.

By considering the auditory experience alongside the visual and physical aspects, urban designers can contribute to the overall well-being and quality of life in cities, fostering a more holistic and immersive urban design approach. On the other hand By incorporating soundscape design principles, urban designers can address noise pollution and create harmonious soundscape design spaces that support various activities and functions. For example, in public spaces, such as parks or plazas, urban designers can consider the placement of sound absorbing materials, introduce natural sounds like water features or vegetation, or strategically design the layout to minimise noise intrusion from surrounding traffic.

## Research Questions:

1. How does the contextual variability in different urban environments affect the effectiveness of sound masking techniques?
2. How can researchers capture and analyse the subjective experiences and individual variability in preferences and evaluations of sound masking effectiveness?
3. What are the challenges involved in integrating sound masking techniques into the urban design and architectural processes, and how can they be overcome

## Methodology:

The methodology employed in this research involves several steps. Firstly, urban sounds are archived and categorised based on their different sound levels and distances from sound sources, providing a comprehensive database of diverse environmental sounds found in urban settings. Next, a virtual reality (VR) simulation is created, focusing on a specific area in the centre of Prague, chosen for its vibrant urban environment. The simulation

encompasses various activities and scenarios that represent real-life urban contexts, such as bustling streets, parks, cafes, and public squares.

Using VR technology, the simulation incorporates soundscapes by adding different sound profiles to each scenario. These sound profiles are carefully designed and tailored to simulate the effects of sound masking techniques and variations in urban design. The sound profiles may include the intentional addition of background sounds, altering sound levels, and manipulating the spatial distribution of sound sources. The VR simulation is designed with multiple variations, incorporating different combinations of sound and visual elements. These variations allow for the analysis of different reactions and perceptions of participants when exposed to various sound masking strategies and design suggestions.

Participants experience the VR simulation and provide feedback through subjective evaluations, surveys, and interviews, capturing their perceptions of acoustic comfort, privacy, and overall experiences in the simulated urban environment. The collected data, both qualitative and quantitative, are then analysed to identify patterns, preferences, and correlations between sound masking strategies, design suggestions, and participants' responses. The analysis aims to provide insights into the effectiveness and acceptance of sound masking techniques in enhancing acoustic comfort and privacy in urban environments.

Overall, this mixed-method approach, combining the use of VR technology, sound manipulation, and participant feedback, allows for a comprehensive exploration and evaluation of the relationship between sound masking, urban design, and individual experiences in an immersive and controlled environment.

#### **Outcomes:**

1. **Enhanced Acoustic Comfort and Privacy in Urban Environments:** Provide valuable insights and strategies for improving acoustic comfort and privacy in urban design and architectural projects through the effective integration of sound masking techniques.
2. **Optimal Sound Masking Strategies for Urban Settings:** Identify and recommend sound masking strategies that are best suited for different urban contexts, considering factors such as noise sources, building types, and cultural preferences.
3. **Quantifiable Assessment of Sound Masking Benefits:** Establish measurement tools and evaluation frameworks to assess the impact of sound masking on individuals' experiences, well-being, and performance in urban settings. Provide evidence-based data to support the implementation of sound masking in urban design and architectural decision-making processes