CITIES IN A CHANGING WORLD:
QUESTIONS OF CULTURE, CLIMATE AND DESIGN

• Paper / Proposal Title:
Pedestrian’s perception of the urban-scape: A 3D duo analysis and simulation

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• Abstract (300 words):
Walkable environments offer multiple advantages to residents and are widely considered as a better place to live in. Therefore, it is important to study the physical qualities which make better walkable environments.

Previous research has defined six main urban physical qualities under which a walkable environment can be evaluated: Human Scale, Enclosure, Imageability, Transparency and Visibility, Complexity, and Connectivity. Each urban quality is composed of many different attributes, therefore is inherently different and requires a different assessment method.

This paper’s focus is on the physical urban quality of enclosure. Enclosure can be defined as the spatial relationship between the street and its defining edges, mainly buildings in an urban setting. Enclosure has a direct impact on the perceived space, as it shapes the pedestrian’s sightlines.

The research proposes using two analytical models to measure enclosure in the urban settings: DVA (Dynamic Visibility Analysis) (Fisher-Gewirtzman, 2018) and a novel
analytical model: the DESSA (Dynamic Enclosure Street Section Analysis). The DVA measures the visible space as viewed by a pedestrian. The data is classified by categories (e.g. visible sky, trees, sidewalks, commerce, etc.) and by viewing distance. The DESSA measures the sequential relationship between the street and the buildings enclosing it: measuring the ratio between the buildings' heights, their distance from the sidewalk and the width of the road, along a defined path.

Both tools operate synchronously on a 3D virtual environment, thus allowing an in-depth, quantitative exploration of the spatial relationship between the street, its defining edges, and potential visible space. Each holds an important role in the streetscape and the pedestrian’s experience. The tools can be used by designers and decision-makers to select better design alternatives during the design process. The paper demonstrates the capability of the tools by examining three different urban settings in New York City.

• Author(s) Biography (200 words each):

Roei Yosifof is an architecture graduate student at the faculty of Architecture and Town Planning at the Technion, Israel Institute of Technology, where he completed his B.sc degree in Architecture with honors. He works in an architecture and urban planning firm as well as a research assistant in professor Fisher-Gewitzman’s lab for the past 3 years.

As a research assistant, he takes part in various research projects which focus on the perception of space by the users. Roei’s main research interests are developing analytical models of quantifiable urban physical attributes, which can assess the performance of urban fabrics in the fields of walkability, human scale, and the pedestrian experience.

Dafna Fisher-Gewirtzman is an Associate Professor and the Chair of the Architecture program at the Faculty of Architecture & Town Planning at the Technion – IIT. She serves as Academic Director of the VisLab, the immersive virtual reality visualization laboratory. Over the years, she has been invited as a visiting lecturer at several international universities including ETH in Zurich, UCL, the Future City Lab at the National University of Singapore as well as a visiting professor at CUSP-NY.

Her research focus is on the field of visual analysis and simulation and development of novel, automated architecture design tools based on potential residents' perception of space, directed toward the development of sustainable built environments. In addition, she leads research in adaptive re-use architecture documentation and analysis.

Her research is financially supported by the Israel Science Foundation and JOY VENTURES. She is a UNESCO fellowship recipient and a laureate of the prestigious Yanai Prize for Excellence in Academic Education and the Henri Gutwirth Fund for the Promotion of Research. Her work has been published in leading professional journals and presented in numerous international conferences and universities around the world.