


## **Weak Architecture: How to Enhance Neural Efficiency Using Public Space?**

Teixeira, D., Vasconcelos, R. O., Fernandes, K. and Ong, I.  
Institute of Advanced Studies, University of Saint Joseph, Macao, China.



Our brain has a biological necessity to enhance its neural efficiency and tries to satisfy it in a continuous quest for knowledge about the world. The built environment may be an important catalyst in this biological quest.

The problem with the built environment is that it looks excessively static. As we perceive the world as a process, constantly changing, we are not able to develop any sense of place and higher-level consciousness unless we understand its dynamics. Only then we may be aware of ourselves, the world, and the constancy of this relationship over time.

Architects need therefore an artifice to succeed in transforming a static view of an environment in a multisensorial image-synthesis of its flow, something essentially projective that enables intimate experiences of place open to multiple interpretations.

The aim of this project is twofold: 1) determine how weak design strategies (i.e. based on experiential events) in the public space can affect human behavior regarding memory, consciousness, and emotions; 2) evaluate whether these effects can be determined at the neurophysiological level.

This project combines expertises of Architecture, Psychology and Neuroscience, in order to investigate the process associated with perception and encoding of architectural cues that induce emotional attachment and enhanced use of public place.

As a first case study, we considered a site-specific architectural intervention in a public space in Hong Kong. We conducted in loco behavioral observations to evaluate movement patterns, physical use and social interactions related with the object. Semi-structured interviews were performed to assess attention, emotions and short-term and/or long-term memories associated with the study site. Data is still under analysis.

The next step will be testing neurophysiologically the reactions of subjects, under laboratory-controlled conditions, to architectural cues (suggested by the field work) while they move through a 3D virtual environment. Event-related brain activity, heart rate, skin conductance and eye movement will be measured simultaneously.

This project will provide insights into the identification of the somatic markers that operate within and outside consciousness and make emotion and sensuousness necessary to the process of attention, reasoning, memory and ultimately attachment to a place.

## **About the speakers**

**Diogo Teixeira** is a doctoral candidate in Architecture at the Technical University of Lisbon (Portugal). His major research interests are event-based design strategies, emotions and public space, namely understanding how architecture influences emotions and may be responsible for creative processes such as learning and modeling our memory associated with a place. He conducted research in the Institut d'Urbanisme de Paris (France) and in the Laboratori d'Urbanisme of the Polytechnical University of Catalonia (Spain).

Teixeira is currently a Senior Lecturer and Program Coordinator of Architecture at the University of Saint Joseph (Macao, China), where he teaches design studios, lectures on urbanism and sustainability, and is responsible for the program's strategy and curriculum reform.

**Raquel Vasconcelos** completed her doctorate in Biology (Ecophysiology) at the University of Lisbon (Portugal). Her major research interests are animal behaviour and neurophysiology, namely understanding how social signals are encoded by the vertebrate nervous system and the mechanisms underlying spatial memory formation. She has been using fish as a model system to address several questions related with social behavior, acoustic communication and auditory processing. She conducted research in several electrophysiological laboratories, namely at the University of Vienna (Austria), the University of Washington (USA) and the Marine Biological Laboratory (MBL, Woods Hole, USA). Recently, she had the opportunity to obtain a fellowship from the Grass Foundation to carry independent research at the MBL on auditory feedback and vestibular sense.

Vasconcelos is currently an Assistant Professor at the University of Saint Joseph (Macao, China), where she teaches several modules related with Neuroscience to the Psychology undergrad students and will start soon co-coordinating a M.Sc. in Neuroscience. In parallel, she is starting a new research laboratory at the same institution (USJ), where the main research lines will focus on social behavior, neurophysiology of hearing and spatial memory using several model systems including humans.

**Keith Fernandes** is a 3<sup>rd</sup> year student of Psychology.

**Irene Ong** is a master student of Psychology.