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Seminar Presented by

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RTH 526
or
Zoom Meeting
https://usc.zoom.us/j/99680049945
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Navigating complex buildings: spatial cognition and agent-based simulation

Abstract:
Research in Spatial Cognition and Architectural Psychology has shown time and again how people often get lost or disoriented during wayfinding in unfamiliar buildings with complex multilevel geometries or mixed-used development such as transit hubs, hospitals, and shopping malls. The implications of feeling lost are numerous and range from confusion, stress and frustration to unnecessary operational costs and delays. Despite these negative implications and although considerable evidence shows that wayfinding is largely shaped by preliminary design decisions (e.g., the location of the entrance and circulation cores or visibility between spaces and floors), wayfinding in architecture is primarily associated with signage design. As a result, wayfinding aspects are usually addressed at the very end of the construction process and are mostly delegated to environmental communication designers.

A powerful approach to increase the integration of wayfinding evaluation into the architectural design process, and to harness the potential of architecture to shape occupants' wayfinding is the use of computational, agent-based simulations. This approach is particularly relevant today given the ubiquity of Building Information Modeling (BIM), resulting in digital representations of buildings throughout their lifecycle. Nevertheless, a common tendency in pedestrian modeling and occupancy models in AEC is to simplify the complex process of wayfinding to a routing problem, formulated as the `Shortest-Path' problem. This simplification overlooks evidence concerning the role of perception and cognition during wayfinding in complex buildings, leading to potentially erroneous predictions that may hinder architects' ability to design wayfinding by architecture.

This talk will position cognitively plausible agent simulations within the spectrum of methods available to measure building usability and way finding, linking it with methods such as a) behavioural experiments in existing large-scale buildings, b) systematic variation of building features and testing the impact with human participants in Virtual Reality and c) spatial analytics such as Space Syntax. We will discuss how cognitive agents can capture perceptual and behavior aspects of way finding and to what extent they are predictive in wayfinding design.

Bio sketch:
Christoph Hölscher is Full Professor of Cognitive Science in the D-GESS at ETH Zürich since 2013, with an emphasis on Applied Cognitive Science. Since 2016 Christoph is a Principal Investigator at the Singapore ETH Center (SEC) Future Cities Laboratory, heading a research group on 'Cognition, Perception and Behaviour in Urban Environments'. Christoph is the Program Director of Future Resilient Systems FRS at the SEC since 2019, leading the current FRS 2 phase (2020-2025). He holds a PhD in Psychology from University of Freiburg, served as honorary senior research fellow at UCL, Bartlett School of Architecture, and as a visiting Professor at Northumbria University Newcastle. Christoph has several years of industry experience in Human-Computer Interaction and usability consulting.