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Urban Ergonomics and technology in the making of architecture.

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27 April 2024

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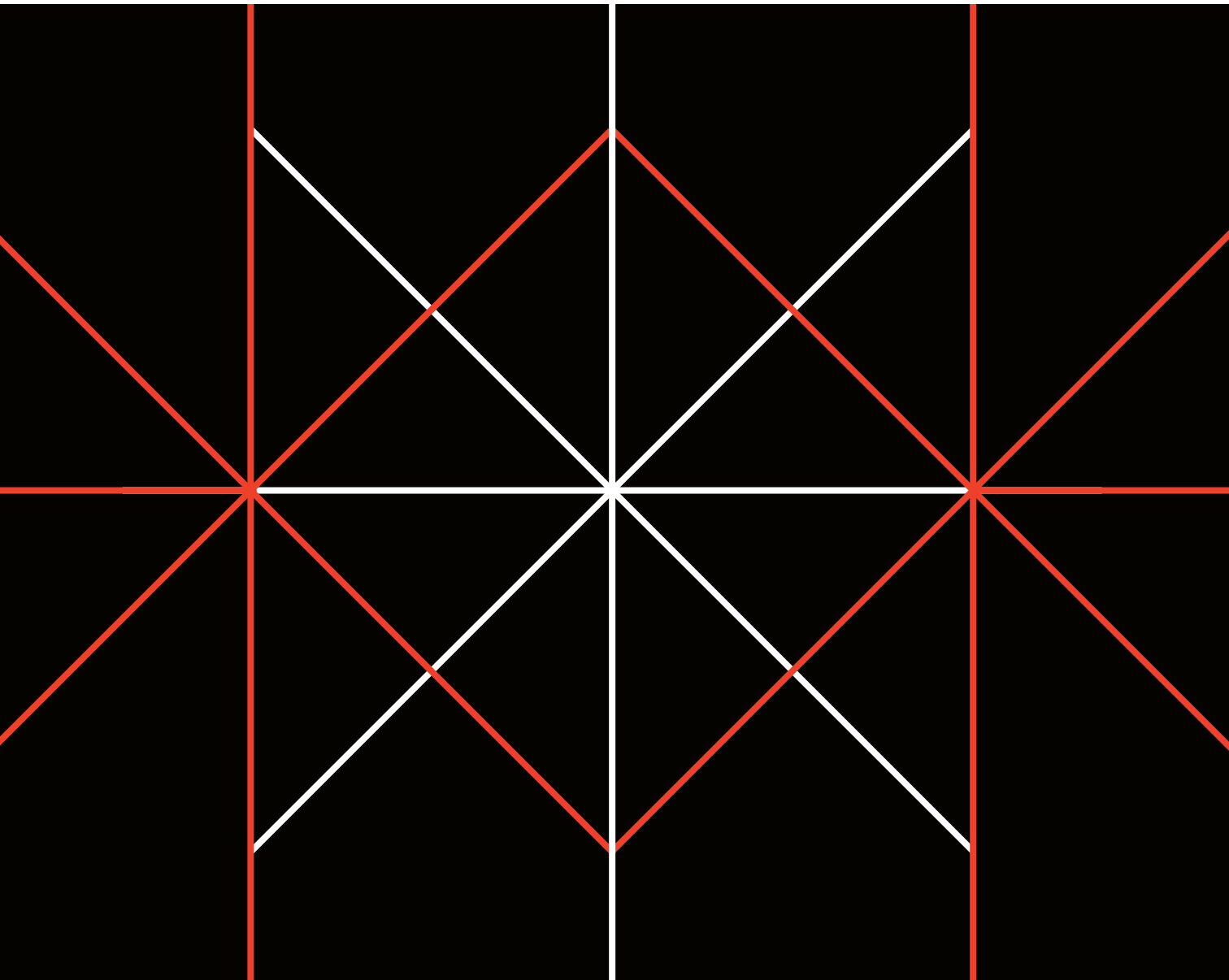

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PhD in Architecture.
History and Project

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COLOPHON

URBAN ERGONOMICS AND TECHNOLOGY IN THE MAKING OF ARCHITECTURE

Francesca Moro

Cycle
37° - PoliTo Grant / Joint PhD Tsinghua

Year
2021 - 2024

Supervisors
Giovanni Durbiano, Li Zhang, Martijn De Geus

Research Group
Theory of the Architectural Project

The topic of this Ph.D. research lies in the development of the Chinese-born Urban Ergonomics discipline and method for designing, focused on studying spatial strategies to address the issues of megacities. The methodology identifies a series of features that reduce the efficacy of architectural action and introduces human behavioural data as a potential source of information that would allow the construction of descriptive models to interlink human experience to urban morphology. The effort made by Urban Ergonomics and similar data-driven researches lies in integrating data analysis and synthesis into the process of making architecture: this represents this research's key node of investigation. Within a socio-technical framework on architecture as a design process and adopting an ethnographical approach to observe these researches, this Ph.D. research sets out to investigate what the technological dimension of the project of architecture is and in what terms the introduction of data modifies it. This Ph.D. research aims to observe Urban Ergonomics and similar current data-driven design methodologies with a pragmatical perspective, unfolding their technical dimension within the project of architecture. Given their ongoing nature and drawing on Bruno Latour's works, the technical work behind them can be made visible by adopting ethnography as an observational tool.

What is Urban Ergonomics?
Rose in the Chinese context, Urban Ergonomics identifies human spatial experience as the focal point to building its methodology, starting from a series of issues: analysing the poor quality of urban space, resolving the irreproducibility and subjectivity of traditional design methods, comprehending the links between human behaviour and the urban form. To address this ensemble of matters, multiple pieces of literature are reviewed and hierarchically considered, which brings to the definition of taxonomies of problems, behaviours, urban scales, and inscription devices: all forming knowledge on human bodies, to be inscribed into the application of the method. Parallel to this, a method for analysing space is defined by decomposition through activity segmentation, mobility configurations, and pace definition. Within this set of parameters, human behavioural data is inserted, thus producing a graphic analytical map.
The relevance of data is nowadays vastly recognised as a potential resource to develop urban environments. Within Urban Ergonomics, specific types of data are selected to understand human behaviour in urban space. This attitude, however, is sizably present in many current researches investigating the depth held by data on architectural practices. Therefore, within the limits of this Ph.D. research, a selection of parallel case studies is defined to grasp the research object better and represent a larger picture of interests and actions towards the application of data in architecture.

Foucault, M. (1976). *Sorvegliare e Punire.* Torino: Einaudi.
Latour, B. (2004). *Politics of nature: How to bring the sciences into democracy.* Cambridge, MA: Harvard University Press.
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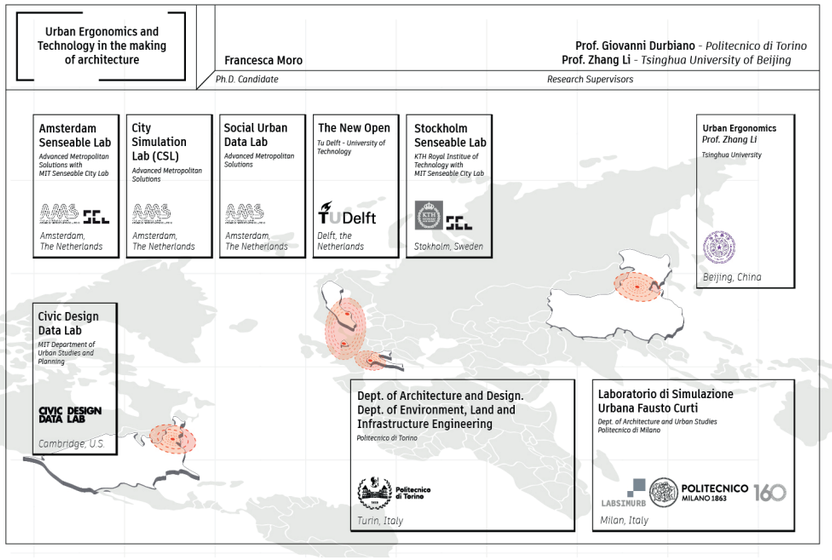

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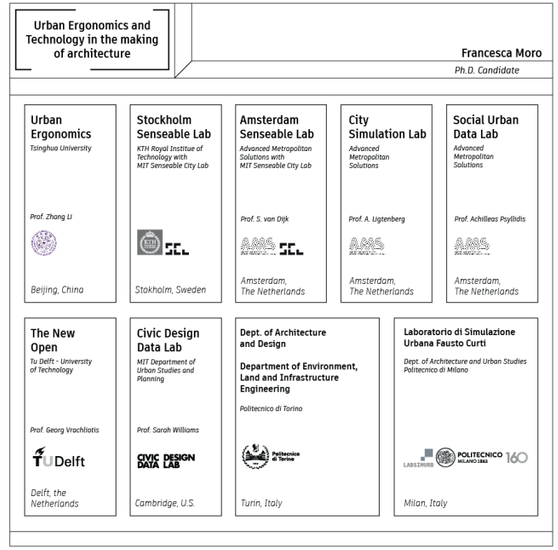

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Reconnecting practice and technology in architecture.
The Urban Ergonomics method entails a rationalist approach, where the dichotomies of cause-and-effect, society and nature, and subject and object are implied. Assuming human behaviour is natural and universal, objectively measured behaviour is deemed natural and universal as well. Therefore, the latter can be synthesised to inform descriptive models valid for all human beings to produce the design of space: a relationship of causality holds together behaviour and form. In Urban Ergonomics, technology is the set of tools employed to observe and register human experience, translating it into quantitative data. These implications place Urban Ergonomics in a specific discourse on knowledge and technology, which will be accounted for in this research.
However, this research will cut across these dichotomies and adopt the lens of Bruno Latour's pragmatist and relational perspective. Indeed, with this lens, Urban Ergonomics deploys many aspects that lead toward an innovative conception of technology in architecture. In this socio-technical framework, architecture is studied as a social practice, and the purification of domains is left in favour of understanding the entanglements of actors creating hybrids, giving weight to objects, practices and instruments.
Urban Ergonomics works towards constructing facts on human data and employs instruments or inscription devices to register human behaviour into signs or data. A new legitimacy for data is thus produced: it can be read as a non-human and pivotal actor in making architecture. This non-human nature represents a turning point in understanding Urban Ergonomics' analytical tool as a complex socio-technical object. Indeed, its conception is centred on the data that informs it and impacts the chains of mediators through which design action takes place. Several implications follow: the nature of inscription devices influences the types of data to be collected and its non-neutrality, materiality and durability; this part of the research will be focused on unfolding these questions.
In this last section, the research will cover the reading of Urban Ergonomics' analytical tool as a complex socio-technical object in the process of its concretisation. Technology is understood here as the autonomous and anonymous system of practices through which human relationships are mediated, produced and regulated. The relevancy of data-driven research like Urban Ergonomics lies in the degree of automatisation that can derive from integrating data toward design action: data starts to represent a form of potentially conducive knowledge on human behaviour flourishing into a socio-technical object capable of transforming people's behaviour and space through partially automatic technical procedures.

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“The PhD Program in Architecture. History and Project (DASP) was born out of two long lasting traditions of doctoral level studies and research in the area of Architecture at Politecnico di Torino. The PhD Program programmatically investigates the complexity of architectural cultures starting from the multi-disciplinary and trans-disciplinary interweaving between the history and the design of buildings, cities, territories.

On the one hand, in fact, urban and architectural composition and technology of architecture favor an interpretation of the project as a tool for measuring the stratifications of theoretical elaborations, technical innovations and modifications of built environment.
On the other hand, the historical disciplines for architecture and the city, far from a local vision and thanks to the cooperation with other histories (the economic, social, anthropological and aesthetic ones), trace paths that can be traveled by architects and urban planners, but also by other humanities scholars, such as philosophers and linguists”

Marco Trisciuoglio

(from the document Proposal for the accreditation of doctorates - a.y. 2023/2024, presented to the Italian Ministry of University and Research on June 5th, 2023)

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