

Digital Design Frontiers

Embodied Computation

Instructor: YAN Chao, Assistant Professor
Time: Monday 19:00-20:35, 17 Weeks
Venue: 408, South Main Building

Overview:

Over the last 30 years, digital technology has cultivated a significant paradigm shift in architectural research and practice. From artificial intelligence to meta-universes, a series of emerging concepts are mapping the futures of architectural design and experience within a mixed reality. Within this digital turn, embodiment is becoming increasingly important in seeking the true nature of architectural spatiality.

The course, entitled Embodied Computation, explores new values for embodiment in contemporary digital design. It offers an overview of the history, theory and methodology of embodied behavioral study in the field of architecture, and reveals the significance of the diagrammatic translation of spatio-temporary pattern of human body. Further, the course discusses a set of methods and technical paths for constructing the behavioral-based spatial morphologies, and also discusses the potential mutual-informative workflow between behavioral research and architectural design. In general, the course intends to open a new paradigm of digital design in association with the nature of human body.

Objectives:

The course will teach the diagrammatic principles and computational mechanisms to interpret, represent and design the body-environment systems, paying close attention to geometrical configurations, perceptual effects and behavioral patterns of human body.

- Students will develop a comprehensive understanding on human body in the context of architecture, especially their dynamic configurations in association with digital design.
- Students will learn a series diagrammatic tools to research and represent the complex relationships between body behaviors and architectural space.
- Students will learn a productive design method that uses human body and its behavioral pattern as the formal repertoire to explore spatial possibilities.

Outcomes:

Through the whole semester, the students will complete two case studies with the diagrammatic and computational tools introduced in the course.

- **Midterm:** Complete a case study with conceptual and diagrammatic tools
- **Final:** Complete a case study with computational and scientific tools

Schedule:

Introduction WEEK01: Introductory Lecture: Embodied Computational Design What is Computational Design? Tools and Authorship What is Embodied Computational Design? Body Behavior Study and Generative Morphology
Embodied Theory WEEK02: Bodies in Architecture (Physical and Virtual) WEEK03: Embodiment and Perception (Ornament/Space, Perception) WEEK04: Fields: Human and Environment (Objecthood and Minimalist Arts, Art and Architecture) WEEK05: Parametricism and Tectonicism (Architecture and Social Behaviors) WEEK06: Human Body and Machine (Interactive Architecture, Cybernetics) WEEK07: Non-human Body Behaviors (Hyperobject / OOO / Robots)
WEEK08: Midterm Presentation
Computational Methodology WEEK09: Research Methodology of Body Behaviors (Observing, Reasoning, Modeling) WEEK10: Measuring the Body WEEK11: Mapping the Behaviors into Architectural Space WEEK12: Agent-based Modeling WEEK13: Generating Embodied Forms
Invited Lectures WEEK14: Invited Lecture (TBC) WEEK15: Invited Lecture (TBC) WEEK16: Invited Lecture (TBC)
WEEK17: Final Presentation