Departing from the Bauhaus compositional principles and bottom-up strategies, we ask what composition can do for architecture today. This course will reflect on advances in computation, shared technologies, and the opportunities they compositionally open to us for architecture. Architecture is here researched by design, not by words, not by numbers but by composition only.

**Part One: Real Time Design**

Rapid digitalization embedded computation in everyday objects that project, predict, and control today's spatial use and means in real-time. By real-time design, we refer to design strategies that respond circular as compositional ecologies to the built environment's desires, demands, and purposes. Rather than drawing architecture as a compositional product, i.e., as an outcome of
industrial thinking processes and mechanics, we will use simulation principles to compose ever-changing and adapting compositional figurations.

The seminar will introduce real-time design within the simulation platform and game engine Unity3D. Modern game engines allow us to draw in three dimensions with physical forces applied. Here, we will design gravity-free compositions with multiple in-between spaces. Through repetition alone, we will achieve variability and open space. Groups of elements that act, move, and react in space. The three-dimensional explorations we will understand as digital compositions. Participants will produce 3dminensional paintings moving in space.

Part Two: Robotics as tools of design thinking

From physical simulation to simulating physical constraints, we will turn our digital compositions into robotic compositions. Neither material nor structural research, here robots are our artistic mediums to extend thinking into design. By simulating the physics of mechanization, we can speculate on the breaking from repetition and automation. Far from tools of production, here machines are modes of architectural thinking. We will have several workshops at the robotics lab, where we use simple 3dimensional operations to engrave and cut, to interlock and overlap physical artifacts. Participants will produce physical, large-scale models using robotic techniques.
Format
Outlined as learning-by-research and research-by-design, the course consists of a series of design experiments, from simple to complex, from research to design. The course starts with an introduction of basic modelling skills specific to interactive design. Within compositional studies; by design participants will learn to link architectural scales with simulation techniques. Robotic manufacturing is here a vehicle to reflect and incorporate physical constraints. Preliminary skills in Unity3D, CAD software, or manufacturing are not required.

Seminar structure
Participants will study in teams. First part of the semester we devote to the exploration of digital design thinking. A set of custom tutorials will introduce students to the game engine Unity in a playful way leading to interactive compositions. After the Spring Break, we will turn to the Robotics Lab. We will explore the constrains of machine opportunities through the 3dimensional cuts and engravings. Here compositional exploration will embed dynamic principles of physical simulation and robotic trajectories. We will build physical models out of plywood material using robotic lab and CNC cutting. The final output from our seminar will be one physical model produced by each group as a compositional output.