62-706
GENERATIVE SYSTEMS FOR DESIGN

A course for visual artists, enthusiasts, and designers in different areas (game, product, architecture, building performance, etc.)

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Register to learn how techniques derived from computational design and artificial intelligence or inspired by urban and natural phenomena can lead to novel design solutions.

Generative Systems is important to various disciplines.

Approaches, based on methods in optimization and classic artificial intelligence, to more recent computational techniques, such as parametric modeling, agent-based modeling, neural networks, etc., have been instrumental in their development. With recent advances in machine intelligence, we have models that can learn from data and experience. In this course we focus on classical techniques, albeit with more than a passing nod to recent learning techniques. The course gives an overview of the main topics in generative systems, with historical notes and technical specifications. The course addresses topics such as variational modeling, rule-based modeling, directed and dynamic simulation, optimization, and learning. Appropriate data structures, algorithms and models will be discussed, and implemented through exercises and projects. The goal of the course is to foster the student's capacity to computationally formulate design problems with an emphasis on the synthesis of design alternatives.
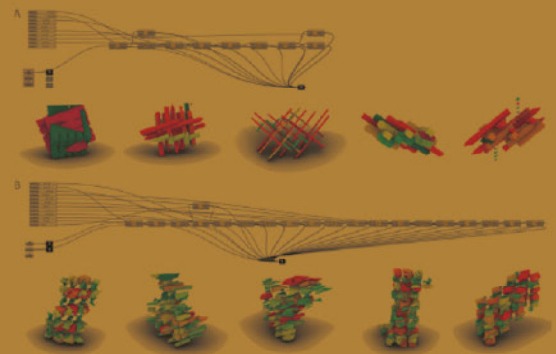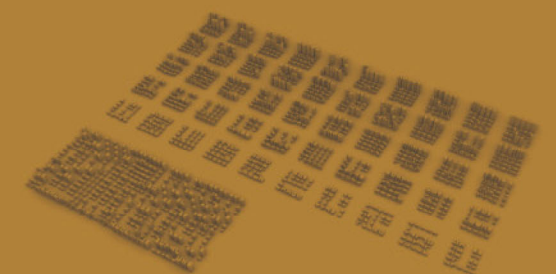

Use of genetic programming, Michael Stesney

Generating parametric definitions for sculptures. A-B: two parametric graphs with custom operations and variations of the resulting sculpture above.
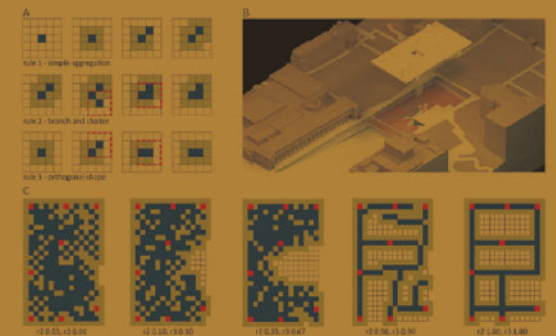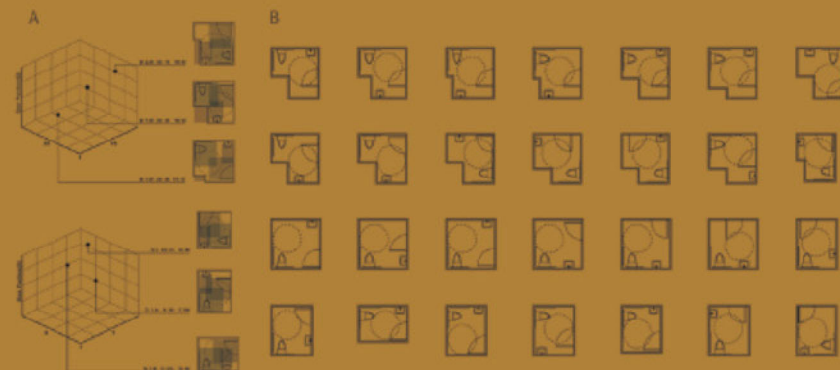

An underground gallery on campus, Jinmo Rhee

Space planning using probablistic translation of Diffusion Limited Algorithm.

Autoilet, Jichen Wang and Joon Young Choi

A: parameter space of the input (boundary, corner and door placement) for rectangular and L-shaped footprints. B: examples of solutions using Depth First Search (DFS) for placement of toilet, sink and ADA circle.

Alphabet City, Jichen Wang and Aprameya Pandit

In his book The Alphabetical City, Steven Holl suggests that buildings in a continuous urban space are like letters in words or sentences, such as T, I, U, O, H, E, B, L, X.