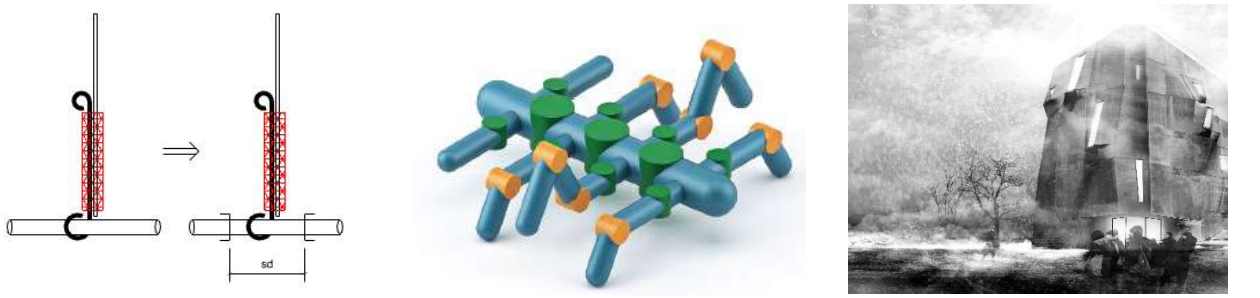
Computing, Cognition, and Syntax I: Beyond Seeing, Doing, and Being

Spring 2025 - Tues & Thurs 9:30-10:50 am - Units: 9 - Instructor: Vernelle A. A. Noel vnoel@andrew.cmu.edu



Images: Shape Grammars in craft and tectonics (Noel), Robotics (Zhao, Xu, et al), and architecture (Sean Li)

Course Description:

This interdisciplinary course investigates the intersections of computing, cognition, and syntax through the visual-perceptual, rule-based approach of shape grammars. The course delves into shape grammars in research, pedagogy, and practice in design fields (architecture, engineering, art), and its continued developments. The course offers foundational knowledge of historical methods developed in the field, while also exploring new directions and questions for contemporary applications of shape grammars in situated making practices (e.g. crafts, digital fabrication), embodied cognition, and robotics. Students will learn how to use shape grammars to analyze visual works, create computational descriptions, and generate meaningful outcomes of creative acts. The course covers the fundamentals of shape grammars through lectures, readings, discussions, hands-on exercises, and projects. It also explores new questions, critical perspectives, theoretical insights and potentials for shape grammars, and its ability (or inability) when it comes to analyzing, describing, and expressing what humans see, do, and experience. This course is ideal for graduate and undergraduate students interested in application, research, and development in computational practices. No background in computing or computer programming is assumed and is not a requirement. Students with varied interests are welcome.

Learning Objectives:

1. ***Understand the Fundamentals of Shape Grammars:*** Gain foundational knowledge of shape grammars and their use in analysis, description, and synthesis of visual work and events.

2. ***Develop Analytical and Creative Skills:*** Enhance skills in employing shape grammars for analytical (finding design rules) and generative (creating new visual possibilities) purposes.

3. ***Engage with Theoretical Perspectives:*** Critically examine theoretical insights, computer implementations, and contemporary questions about shape grammars with focus on “the social,” corporeal, and technical.

4. ***Critically Assess Shape Grammar's Capabilities:*** Explore the strengths and limitations of shape grammars in describing and analyzing what humans see, do, and experience in the creative practices.

5. ***Investigate Situated Making and Embodied Practices:*** Examine the intersections of shape grammars with embodied cognition, movement, and situated-making practices, and understand their implications for knowledge-making.