ADDITIVE MANUFACTURING OF CONCRETE STRUCTURES

3 Credits (tech elective)
Thursdays 9:10 AM to 12:10 PM (to be confirmed)
Room: 150 Stuckeman Family Building (SCDC)

Instructors:
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Teaching Assistant: TBA

COURSE INTENT:
If you are interested in harnessing digital technology to learn cutting-edge strategies to model and materialize 3D forms (buildings, landforms, objects) this course offers an opportunity in your skill development.

COURSE CONTENT:
Additive manufacturing (AM) is a prominent topic in architectural, landscape, and engineering investigations and in the production of load-bearing concrete walls with minimal material waste by avoiding the use of formwork.

We will explore, discuss and conduct experiments with the design of 3D-printable building materials such as concrete and clay (including the use of sand, cement-based and non-cementitious geopolymer mortars made of slag and fly ash); design and implementation of 3D-printing systems, processes, techniques (single and dual extrusion), reinforcing strategies and fibers; and toolpath design.

Ideally, students will be organized in multi-disciplinary design teams of architecture, landscape architecture, and engineering students. Landscape architecture students are expected to focus on the use of AM to model landscape formations, architecture students on the design of a structure (e.g. tiny house), and engineering students on structural and on manufacturing aspects. However, all are expected to collaborate and present one, single and unified solution, covering these multiple aspects.

COURSE STRUCTURE:
This is a project-driven course that includes seminar and lab sessions. In regular group discussions students and faculty will discuss assigned reading materials, individual research conducted by students, and share findings to further develop and clarify ideas in preparation for experiments leading to the final project.

Hands on experiments will take place in our lab, and sometimes in other labs across campus. Experiments will be designed and conducted in a studio-like environment with faculty guidance based on analysis and discussions among students and faculty.