

## ARCH 4605/6605 Special Topics in Construction: *Digital Ceramics*

Cornell University, AAP, Department of Architecture

Spring 2020, Tuesday 12:20-2:15pm; 144 E Sibley

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Figure 1 - Selection of student work produced in prior installments of Sabin's seminar titled, *Special Topics in Construction: Digital Ceramics*, Department of Architecture, Cornell University.

This course explores the integration of complex phenomena towards the design, production, and digital fabrication of ceramic form in the design arts and architecture. Course work covers advances in digital technology, digital fabrication, advanced geometry, and material practices in arts, crafts, and design disciplines. Algorithmic design techniques are integrated with digital fabrication for the production of ceramic components at a range of scales and applications. Case studies explore the role of ceramics in design and architecture and its reciprocal relationship in alternate fields and industries. Techniques in parametric and associative environments are incorporated with feedback derived from material and environmental constraints as well as performance assessments. Projects interrogate the physical interface between digital complexity and fabricated material assemblies in order to address novel applications of non-standard ceramic components, bricks, and tiles towards the production of 3D textured prototypes and screen systems. Project work follows three tracks including 3D printing, CNC mold production, and slip-cast ceramic component design.



Figure 2 – Process images for *PolyMorph*, a large spatial structure produced by Jenny Sabin Studio featuring 1400 digitally produced and individually hand cast ceramic components. On view as part of the 9<sup>th</sup> ArchiLab, titled *Naturalizing Architecture*. Now part of the permanent collection at Frac Centre, Orleans, France.

The production of ceramic blocks and tiles has a vast technological and design history. Ceramic modules of standard measurement have been used as a building block and replacement of stone for centuries. Ceramic bricks and tiles, so ubiquitous in their application in the built environment, have surprisingly lacked recognition as a viable building component in contemporary architecture practice. The use of CAD/CAM technologies to automate the design and fabrication of ceramic form has since inspired a new appreciation for ceramic material in architecture, but further design research and production is necessary. Importantly, the plastic nature of clay offers up a potent material solution to contemporary generative design processes in architecture, which frequently feature organic and natural forms of increasingly complex expression and ornamentation. Given its structural and material capabilities alongside contemporary advancements in fabrication, *digital ceramics* presents a series of intricate tectonic methodologies with scalable applications in architecture. New to this installment will be a focus on environmental performance.