

COURSE INFO

ARCH 7040 Design Studio (Elective)

Semester: Spring 2024

Instructor: Assoc. Prof. Ferda Kolatan, fk@design.upenn.edu

Assistant Instructor: Caleb Ehly ehly@design.upenn.edu

External Design Consultant: Gökhan Karakuş gk@gadfoundation.com

Studio Times: Mondays & Wednesdays 12-6PM

Studio Title: Carvings & Aggregates: *New Prototypes for Cappadocia's Rock Architecture*

7040 STUDIO OBJECTIVES

The primary objective of the 7040 Design Studios is to equip departing students with essential knowledge, skills, tools, and techniques to formulate a relevant research inquiry and subsequently develop a detailed design project grounded in that research. The aim for students is to attain a comprehensive understanding of how to actively engage in broader discourses of our time through architectural design and contribute to the field at the highest level.

The research topics and methodologies will be introduced by individual studio instructors, encompassing a broad spectrum of diverse subjects related to environmental, technological, sociopolitical, aesthetic, and disciplinary questions. The studios explore these topics through theoretical, practical, and speculative formats, drawing on the instructors' expertise and field of inquiry. Each 7040 studio incorporates a one-week travel component, either domestic or international, facilitating in-depth examinations of the project site and its circumstances.

7040 COURSE GOALS

- To develop a detailed architectural project based on the research topic of the studio. This includes research documentation, site analysis, drawings, physical models, animations, and other representational formats as specified in the studio brief.
- To demonstrate a clear comprehension of the larger studio inquiry through the design project as well as through active participation in studio-wide discussions, concise written statements, and project presentations during reviews and pin-ups.
- To demonstrate fluency in the use and thoughtful utilization of state-of-the-art design tools and techniques (such as software, AI, data analyses, advanced imaging, fabrication, and material technologies, and more).
- To demonstrate advanced visual and representational techniques that adequately address the specific design objectives of the studio topic.

CARVINGS & AGGREGATES*New Prototypes for Cappadocia's Rock Architecture*

Rock Architecture in Göreme, Cappadocia, Turkey.

Everything changes, nothing perishes.

- Ovid, *Metamorphoses*

STUDIO TOPIC

The studio's objective is to develop and test contemporary versions of rock architecture inspired by the ancient cliff dwellings of Cappadocia, Turkey. In our Anthropocene age, architectural techniques derived from more environmentally sensible approaches have become necessary.¹ The use of rock, soil, stone, and other geological and natural materials for architecture has a millennia-long history, mostly forgotten today except for the use of cladding. The studio will experiment with new types of hybrid architecture that push "natural" materials beyond their common use in today's construction and advocate for their broader integration into design. The utilization of rock in architecture is not only advantageous for environmental resourcefulness and performance but also holds cultural significance. Techniques of carving, cutting,

¹ The Anthropocene, denoting our contemporary geological epoch, signifies the irreversible transformation of the Earth's upper strata by human technologies. This epoch is characterized by the dissolution of strict boundaries between 'nature' and 'technology.' Consequently, the traditional demarcation between these realms has become obsolete. In an age where novel mixed realities govern, architecture is compelled to dynamically adjust and grapple with the emergence of hybrid forms.

slicing, painting, and the application of pigmented stone mosaics have a long tradition of bestowing buildings with a special quality, imbuing them with a sense of cultural rite and meaning.

How can we derive new significance from these age-old techniques and materials by deploying them in novel ways? What additional performative, spatial, programmatic, and aesthetic qualities might they yield if applied through unconventional and experimental methodologies? Finally, how can we devise an architecture that is both daring, cultural, and contemporary as well as geological, tectonic, and environmentally cognizant? This studio aims to address these questions and articulate design positions relevant to the broader implications of design in the Anthropocene.

SITE

Cappadocia is a large region in Anatolia, renowned for its famous rock architecture that reaches back millennia. Since early antiquity, people of Hittite, Persian, Greek, and Turkish origins have migrated to and settled on the Anatolian plateau. The unique geological conditions in this area have produced diverse rock formations, primarily from volcanic tuff. The relative softness of the tuff and its malleability through simple tools have rendered it ideal for architectural purposes. Consequently, the region is renowned for its various rock architecture, which encompass a 3000-year history of human and nonhuman habitation ranging from mundane houses and precious churches to animal shelters and dovecotes. Declared a UNESCO World Heritage site in 1985, parts of Cappadocia have been transformed into a large open-air museum, while other areas are being utilized by everyday programs like hotels, restaurants, and shops.²



Project Site, Quarry Cappadocia, Turkey.

² <https://whc.unesco.org/en/list/357/>

PROJECT

The exact project site is located in and around a quarry which is no longer in use. Marked by the intricate traces of decades-long stone cutting and removal, the remaining quarry blends the natural with the man-made and resembles an “artificial cliff.” In the spirit of the Anthropocene, the project seeks to capture these synthetic qualities (including textures, colors, and shapes) and transform them into useful and desirable features for a new kind of architecture. The scale, type, and program of the individual projects will be determined by the students following their initial research and interests.

The project aims to derive innovative designs at the intersection of geology, culture, and technology. Techniques of carving, aggregating, casting, and shaping will be deployed to experiment with new tectonic forms, sectional space, and poche. The final projects should incorporate the unique geological and cultural circumstances of the place with a visionary approach that demonstrates how rock can serve as a legitimate and inspiring material for architecture today. All projects should be conceived as *prototypes*, meant to explore a specific problem while allowing for a broader applicability in similar situations.³

Carvings: To carve into rock is one of the oldest techniques to produce architecture. It is also one of the most ecologically resourceful practices as the main substance of the architecture, the rock itself, is already present and does not require much offsite manufacturing or transportation. The volcanic tuff in Cappadocia is soft enough to be carved easily and also provides advantageous thermal properties: natural cooling during the hot summer months and warmth in the harsh winters. Aside from these practical concerns, the rock formations have also distinct formal, textural, and color-related qualities that are contingent on the complex geological composition of the site. Accordingly, several different typological variations of rock dwellings have emerged over time in the region, each displaying a different range of spatial/geometrical qualities and material effects.

Aggregates: *Aggregate* is defined by Merriam-Webster as “formed by the collection of units or particles into a body, mass, or amount.” Concrete is thus an aggregate, as it is mixed from shapeless particles into a larger mass or form (done traditionally through casting or pouring, but newer techniques of concrete spraying and printing belong to the same category). As such the additive techniques of aggregation stand in contrast to the subtractive techniques of cutting and carving rock. Furthermore, concrete, as a material, is formless and liquid while rock is solid and robust. Exploring the dynamic tension between fluid and stable forms is another aspect to be examined into in the studio.

The dichotomy between fluidity and stability offers a compelling problem, not only for design. Current theoretical speculations often pitch theories based on *objects* against those based on *flux*.⁴ The age-old debate of what constitutes the “nature of all things” has been alternating between notions privileging fixed essences and notions favoring processes and change. In this sense, Ovid’s above mentioned quote, uttered some 2000 years ago, still maintains its relevance. While *everything changes*, the residue and the effects of these changes live on to manifest new temporal stabilities. In other words, *nothing perishes*, matter simply metamorphosizes into new constellations carrying within itself a rich material history.

³ Definition of “Prototype” by the Oxford English Dictionary: “The first or primary type of a person or thing; an original on which something is modelled or from which it is derived; an exemplar, an archetype.”

⁴ Thing Theory and Object-Oriented Ontology are two examples on the one side versus various strains of New Materialism on the other. Some thinkers, Jane Bennett for instance, are interested in a synthesis between these two schools of thought.



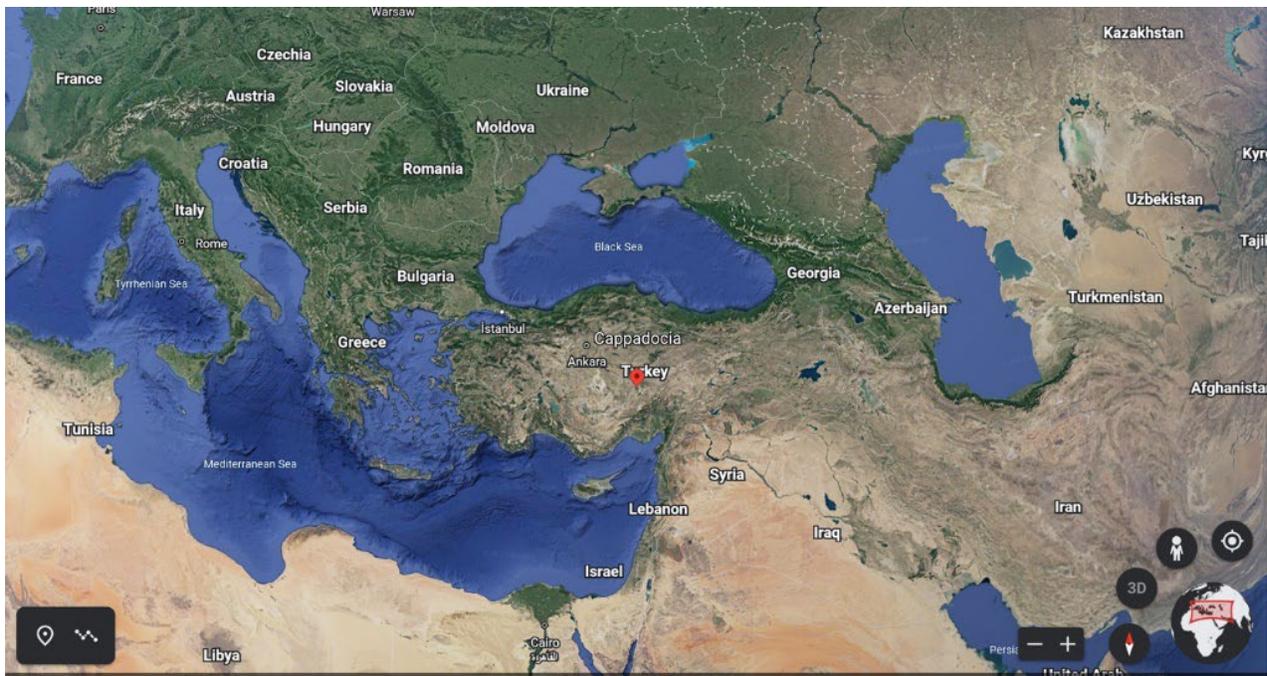
Early Byzantine Rock Church in Cappadocia, Turkey

FORMAT

Preferably, students will work in teams of two. The initial phase of the project will include an in-depth study of the geology of the site, its cultural history, and the different types of rock-dwellings and their construction methods. Prior to the studio trip, students will also familiarize themselves with the different modeling and representational techniques that will be deployed in the design process. No preliminary software knowledge is required beyond what has been taught in the MArch core. Studio-specific methodologies and techniques will be introduced by the critic and taught by the assistant instructor in customized workshops. Studio sessions are scheduled for Mondays and Wednesdays, with any exceptions being announced in advance.

TRAVEL

The studio will travel first to Istanbul and then to Cappadocia and visit various sites, buildings, and landmarks. The trip is scheduled during official travel week (Feb. 18-24). Students will be responsible to check and fulfill all visa and passport requirements based on their individual circumstances. The complete travel itinerary will be shared at the beginning of the semester. Most travel-related expenses, including airfare, hotel accommodations, and transportation in Cappadocia will be covered by the Weitzman School and the GAD Foundation, co-sponsors of our Turkey studios for the past five years. Students will be required to cover daily expenses such as meals, museum entrance fees, etc.



Location Maps of Cappadocia, Turkey.

SPONSOR

This studio is supported and co-sponsored by GAD Foundation Istanbul.⁵ GAD was formed by the renowned Turkish architect Gökhan Avcıoğlu and is dedicated to the domestic and international exchange of ideas in the field of design, theory, and practice with a particular focus on bringing together students with practitioners and professional experts. GAD's Gökhan Karakuş will serve as an external consultant to the studio and join us on the trip. Mr. Karakuş will share his expertise in the architectural history of the region through a presentation and ad hoc conversations with the students during the trip.

Gökhan Karakuş Bio: Gökhan is an Istanbul-based designer, curator, historian, architecture critic, consultant and theorist who focuses on the indigenous in modern architecture and design. He studied architectural history and theory at Vassar College and Columbia University in New York. He is the founder and director of Emedya Design, an interactive and environmental design studio that produces design projects, exhibitions, publications, and research in the areas of environmental graphic design, architecture, computational design, craft and design history. Today, Gökhan's area of focus includes architecture in stone, computational design, digital fabrication, spaces for wellness and biophilic design. He has been a long-time business consultant to the Turkish Exporters Assembly focusing on manufacturing industries such as natural stone and ceramics.

BIBLIOGRAPHY OF RELEVANT TEXTS

Timothy Morton. Ecology without Nature: Rethinking Environmental Aesthetics. Harvard University Press, 2009.

Timothy Morton. Hyperobjects. University of Minnesota Press, 2013.

Jane Bennett. Vibrant Matter: A Political Ecology of Things. Duke University Press, 2010.

Jane Bennet. The Enchantment of Modern Life. Princeton University Press, 2001.

Diane Cole & Samantha Frost. New Materialisms. Duke University Press, 2010.

Manuel DeLanda. A Thousand Years of Nonlinear History. Zone Books, 2000.

Bernhard Zenger. The Luwian Civilization. Zerobooksonline, 2016.

Leo Marx. The Machine in the Garden. Oxford University Press, 1967.

David Nye. American Technological Sublime. MIT Press, 1996.

OTHER RELEVANT SOURCES

Video on the Anthropocene: <https://www.youtube.com/watch?v=ZZ845voIiOE>

Text on Cappadocia Geology <https://link.springer.com/article/10.1007/s42990-019-00015-3>,

https://www.researchgate.net/publication/286924689_Volcanism_and_evolution_of_the_landscapes_in_Cappadocia

History of Site (<https://www.britannica.com/place/Seleucid-Empire>), (<https://www.cappadociahistory.com/about>).

On Cave Houses (<https://www.atiner.gr/journals/history/2015-1-1-2-Yildiz.pdf>).

Earth, Movie, 2019 (Nikolaus Geyrhalter).

Manufactured Landscapes, Movie, 2006 (Jennifer Baichwal).

Anthropocene, Photography Series/Book, 2018 (Edward Burtynsky).

⁵ <https://www.gadfoundation.com/>



701 Kolatan Studio Samples, Weitzman School of Design, 2022.

EVALUATION AND GRADING

Evaluation in this course will adhere to the University guidelines as outlined in the student handbook. Grades will be given in relation to the student's ability to meet the course deadlines, deliverables, and course objectives. Final grades will be given by the course instructor and the letter grades are understood to mean the following, with + and – understood as qualifiers. A Excellent, B Good, C Marginal, F Fail
Numerical values are, A+=4.0, A=4.0, A-=3.7, B+=3.3, B=3, B-=2.7, C+=2.3, C=2.0, C-=1.7, F=0.

SCHEDULE

WEEK	DAYS	CLASS
1	Wed, Jan 17	Studio Lottery
2	Mon, Jan 22 Wed, Jan 24	First Studio Day, Studio Introduction FK/CE Studio/Crit FK
3	Mon, Jan 29 Wed, Jan 31	Workshop 01 CE Studio/Crit FK
4	Mon, Feb 5 Wed, Feb 7	Pinup Workshop 01 Results FK/CE Studio/Crit FK
5	Mon, Feb 12 Wed, Feb 14	Studio/Crit FK Workshop 02 CE
6	Mon, Feb 19-23	Travel Week, Istanbul, Cappadocia
7	Wed, Feb 28 Fri, Mar 1	Studio/Crit CE Midterm Review
8	Mon, Mar 4-8	Spring Break
9	Mon, Mar 11 Wed, Mar 13	Studio/Crit FK/CE Studio/Crit FK
10	Mon, Mar 18 Wed, Mar 20	Studio/Crit FK Workshop 03 CE
11	Mon, Mar 25 Wed, Mar 27	Pinup Workshop 03 Results FK/CE Studio/Crit FK
12	Mon, Apr 1 Wed, Apr 3	Studio/Crit FK/CE Studio/Crit FK
13	Mon, Apr 8 Wed, Apr 10	Studio/Crit FK/CE Studio/Crit FK
14	Mon, Apr 15 Wed, Apr 17	Studio/Crit FK/CE Studio/Crit FK
15	Mon, Apr 22 Wed, Apr 24	Studio/Crit FK/CE Studio/Crit FK
16	Mon, Apr 29 Wed, May 1	Studio/Crit FK/CE No Class
17	Mon, May 6	Final Review