

Type of Course: ARCH 51000 Advanced Studio
Class Meetings: M/TH 2:00-5:50pm
Office Hours: Tue 10am-12pm
Instructor: Professor Ahu Aydogan
Location: Room 325, some sessions on Zoom (<https://ccny.zoom.us/j/83454399632>)
Semester/Year: Fall 2021

Weaving the Double Skin III



Aydogan Advanced Studio, 2019

Studio Overview:

To develop next-generation building systems for sustainable environments, interdisciplinary knowledge across different scales need to be performed. Our design thinking must be expanded to include a broad range of disciplines and scales. I believe architectural design is enriched by incorporating scientific, natural, organic elements, and artistic values within them. Innovative design solutions, no longer rely on drawings and patterns. They are holistic approaches where the emphasis is on the design process and methodology by analyzing, evaluating, comparing, and proposing alternative solutions to architectural problems.

How and what we think during the design process in architecture is influenced by the knowledge we gain through science, engineering, and artworks that conceive ecology. Our goal is to transfer this design knowledge we will gain through this semester creatively to our current and future projects. Transition and transformations from traditional techniques to research (science and art) based technologies are challenging but not impossible. To make this change, multi-scale design thinking needs to be implemented. I like to challenge the way we observe, the way we think, and the way we solve problems from a cross-disciplinary point of view.

The studio focuses on designing research-based technologies and their performances in building-integrated applications. In this studio, you will design a building-integrated **shading system** inside the double-skin façade of the “xxxx” Building in xxxx. This shading design needs to respond to and benefit from environmental factors. Two different studio topics will be explored to shade the façade: (1). Spider Webs and (2). Vertical Weed. Students will work in teams (groups of two). During the development of the design, quantitative and qualitative solar radiation, shading and natural ventilation, lighting, illumination strategies will be examined through the given case study.

a. Spider Webs:

“Spiders, we now understand, have given us a model of which the present is a simulacrum, though not just the technocratic, seemingly intangible future-present of life online but also the real-world urgency of environmental relationships and their fragility.” (David Toop, Filament Drums: the Endless Instrument, in Cosmic Jive: The spider Sessions, 2014)

Tomas Saraceno, an artist working with large-scale, interactive installations and floating sculptures, made us aware of three-dimensional form geometry of spider webs. His studies have opened our eyes in the direction of comparative studies in mathematics, engineering, arachnology, art and architecture. In this studio, from an architecture point of view, spiders will be used to create webs to form organic shading elements in the double skin façade to save energy by shading the facade. This project is not biomimicry, designing artificial webs by observing spiders, it is making spiders work in the direction of the simulation analysis of the environmental parameters. During the development of the design, quantitative and qualitative solar radiation, shading and natural ventilation, lighting, illumination strategies will be examined through the given case study.



b. Vertical Weed:

“Cannabis is remarkably safe. Although not harmless, it is surely less toxic than most of the conventional medicines it could replace if it were legally available. Despite its use by millions of people over thousands of years, cannabis has never caused an overdose death.” (Lester Grinspoon, Associate Professor of Psychiatry, Emeritus at Harvard Medical School)

The use of medical weed is getting allowed more widely and treated federally legal under controlled circumstances around the world. While hemp was previously regulated as an illegal substance, is now federally legalized under the Agriculture Improvements Act of 2018. It has been used to produce industrial, food, and medicinal products. Marijuana, on the other hand, is still treated as [federally illegal](#) under the Controlled Substance Act. While people have used it as an herbal remedy for centuries, nowadays people use it to relieve symptoms and treat various diseases.



Growing weed requires a large area and volumes since they are planted horizontally. Since urban environments get denser with limited spaces/lots available horizontally, why we as architects not taking advantage of the buildings (already built) and integrate our designs in the vertical surfaces. *In this studio, double skin of the building (box windows) will be used to design a building-integrated system for **growing a modular medical cannabis system to shade the office building to reduce overall cooling loads.***

Research:

This studio is focusing on designing building-integrated shading element in the double skin façade of “Turk Telekom” Building, Ankara/Turkey. Two topics as **spider web** and **vertical weed** will be explored to shade this façade. We will seek to navigate between multiple scales and across disciplines to find alternative solutions for the building skin. Material selection, performance, movement, scalability, ease of assembly, and maintenance are the important parameters to start the design with. The main goal of this design research project is to decrease the energy consumption of the building by creating shading elements to minimize solar radiation. Quantitative and qualitative analyses will be explored during the design process.

Overall, the aim of this studio is to design modular vertical solutions and provide several fundamental advantages to the building (energy, thermal benefits, visual quality etc.). This project will use these modular systems to shade the building by creating parametric solutions through the double skin façade. During the development of the design, quantitative and qualitative solar radiation, shading and natural ventilation, lighting, illumination strategies will be examined through the given case study.

Research activities in the studio will investigate following topics during different phases of design:

Week 1: Introduction

Week 2-4: Precedents, Literature Review and Building Analysis

Week 5-7: Environmental Analysis and Schematic Design

Week 8-10: Design and Experimental Process

Week 11-15: Design Development

Program and Building:

The program of this studio is to design organic and synthetic shading elements in the double-skin façade by considering solar radiation. The design of this shading element is critical in this studio because it will affect the thermal performance of the building. After several experimental and simulation-based trials, the optimal solution to the performance will be achieved through the design process.



Turk Telekom Headquarters, Ankara/Turkey (Architect: A Architectural Design)

The building for this studio project is Turk Telekom Headquarters, which is a new symbol on main transportation axis in Ankara, Turkey. There are two components in this building design. First one is the office tower (working stations are settled) and the second one is the horizontal block where conference hall, technical system halls, network operation center and data centers are located. During the design phase, transparency, open office systems, use of interior gardens as social spaces and double skin facade were the major focuses. Double skin façade is used to control the space temperature better, to ventilate the offices naturally and to create a barrier to noise and pollution. In addition, motorized elements were designed at the exterior facade for outdoor air circulation through the space. This studio design will focus on double skin façade, to optimize the thermal performance of the headquarters.

Bibliography:

- Drake, Scott. *The Elements of Architecture: Principles of Environmental Performance in Buildings*. Earthscan Publications Ltd., 2009.
- Alread, Jason; Leslie, Tom and Whitehead, Robert. *Design-Tech: Building Science for Architects*. Routledge, 2014.
- Schittich, Christian. *Building Skins: New enlarged edition*. Detail. Birkhauser Edition, 2006.
- Heusler, Winfried; Lieb, Rolf-Dieter ; Lutz, Martin and Oesterle, Eberhard. *Double-Skin Facades*. Prestel, 2001.
- Aksamija, Ajla. *Sustainable Facades: Design methods for Building envelopes*. John & Wiley and Sons. 2013.
- DeKay, Mark, and G. Z. Brown. *Sun, Wind & Light: Architectural Design Strategies*. 3rd ed. Wiley, 2014.
- Ander, Gregg. *Daylighting Performance and Design*, Second Edition. Wiley, 2003.
- Dahl, Torben. *Climate and Architecture*. Routledge, 2011.
- Deplazes, Andrea. *Constructing Architecture: Materials, Processes, Structures*. Birkhäuser Architecture, 2008.
- Hawkes, Dean. *The Environmental Tradition: Studies in the Architecture of Environment*. Taylor & Francis, 1996.
- Hawkes, Dean, Wayne Forster, and Arup Associates. *Architecture, Engineering and Environment*. London: Laurence King Pub. in association with Arup, 2002.
- Lally, Sean. *The Air from Other Planets*. Lars Muller Publishers, 2014.
- Lovell, Jenny. *Building Envelopes: An Integrated Approach*. Princeton Architectural press, 2010.
- Solar Enclosure for Water Reuse. Dyson, A. H., Vollen, J., Mistur M., Stark P., Malone K., Gindlesparger M. (2015) U.S. Patent No. 9090486B2.
- Matalucci, B., Phillips, K., Walf, A. A., Dyson, A., & Draper, J. (2017). An experimental design framework for the personalization of indoor microclimates through feedback loops between responsive thermal systems and occupant biometrics. *International Journal of Architectural Computing*, 15(1), 54-69.
- Su, I., Qin, Z., Saraceno, T., Krell, A., Mühlethaler, R., Bisshop, A., & Buehler, M. J. (2018). Imaging and analysis of a three-dimensional spider web architecture. *Journal of the Royal Society, Interface*, 15(146), 20180193. <https://doi.org/10.1098/rsif.2018.0193>
- Engelmann, S. (2016). Social spiders and hybrid webs at Studio Tomás Saraceno. *cultural geographies*, 24(1), 161-169. doi:10.1177/1474474016647371
- Wattolik, E. (2019). Tomás Saraceno's Art Work "In Orbit" (2013) against the Backdrop of Space Architecture. *Arts*, 8(1), 13-undefined. doi:10.3390/arts8010013

WEEKLY SCHEDULE, M/TH 2:00-5:50pm

Note: schedule below is subject to revision through the duration of the semester.

W1

Th 08.26

**LOTTERY via ZOOM @ 12pm, followed by first studio meeting, including Hour SSA
INTRODUCTION I Weaving Double Skin Façade III
Convocation @ 5:30pm**

W2

Mon 08.30

Studio

Th 09.02

Studio

Precedents, Literature Review and Building Analysis

W3

Mon 09.06
Th 09.09

College Closed (Labor Day), no classes scheduled

Studio (REMOTE) | DMU x CCNY Anti-Racism Teach-In (remote/TBD) 2pm-5pm

W4

Mon 09.13
Th 09.16

Studio Presentation: Precedents, Literature Review and Building Analysis

No classes scheduled

W5

Mon 09.20
Th 09.23

Environmental Analysis and Schematic Design

Studio

Studio

W6

Mon 09.27
Th 09.30

Studio

Studio (REMOTE) Workshop I: Fenestra Pro: Analysis of thermal performance, solar heat gain, and natural daylight for streamlined façade design.

W7

Mon 10.04
Th 10.07

Studio

Studio Presentation: Schematic design and thermal and daylight analysis

W8

Mon 10.11
Th 10.14

Design Evaluation and Experimental Process

College Closed (Columbus/Indigenous Peoples' Day); no class

Studio (REMOTE)

W8

Mon 10.18
Th 10.21

Studio

Mid-semester assessments & Hour SSA

W9

Mon 10.25
Th 10.28

Studio

Studio (REMOTE)

W10

Mon 11.01
Th 11.04

Studio

Studio: **MID-REVIEW**

W11

Mon 11.08
Th 11.11

Design Development

Studio

ADVANCED STUDIO SHARING via Zoom, @ 2:00-3:30pm; Studio

W12

Mon 11.15
Th 11.18

Studio

Studio Workshop II: Fenestra Pro: Analysis of thermal performance, solar heat gain, and natural daylight for streamlined façade design.

W13

Mon 11.22
Th 11.25

Studio

College Closed (Thanksgiving); no class

W14

Mon 11.29
Th 12.02

Studio

Studio (REMOTE)

W15

Mon 12.06 Studio

REVIEWS

Wed 12.08 **FINAL REVIEW: Advanced Studio reviews, session 1**
Fri 12.10 Advanced Studio reviews, session 2
Tu 12.14 End of Semester Assessment (faculty only)

FINALS

Th 12.16 Final Class Meeting, **Exit interviews**
Mon 12.20 Student Portfolios due for: SSA/CCNY Archive, etc. as directed by instructor

Mon 12.27 Final Grade Submission Deadline

FINALS WEEK

Mon 12.14 Final Class Meeting, **Exit interviews**
Th 12.17 Student Portfolios due for: SSA/CCNY Archive, etc. as directed by instructor

GRADING/ATTENDANCE POLICIES AND STUDIO CULTURE

Course Expectations:

- That students will develop a high level of independent thought and rigor and a willingness to go beyond both basic project requirements and their own perceived limits and abilities.
- That students will successfully complete all project requirements. No make-up or postponed project submissions will be accepted except in the case of medical emergencies or other extraordinary circumstances. Excused absences and project delays must be officially cleared by professor in advance to be considered valid.

Community Agreement:

- During the first full studio meeting, the professor will make time for an *Hour SSA* session for a supportive open discussion among students.
- Studio members will work *together* to create a community agreement for interacting together over the semester. Definition: "A consensus on what every person in our group needs from each other and commits to each other in order to feel safe, supported, open, productive and trusting... so that we can do our best work." <https://www.nationalequityproject.org/tools/developing-community-agreements>
- *Hour SSA* will be repeated at the middle of the semester.

Methods of Assessment:

- Attendance and participation in class discussions and other activities: 10%
 - Project development in response to semester schedule: 60%
 - Project presentation, level of completion and resolution: 30%
- Note: The research component of the studio will be weighed more heavily in assessment of graduate student work and class performance, in cases where graduate students are enrolled in the studio.*

Key areas of Grading Assessment:

- **Studio performance & work habits:** Ability to respond to studio discourse & feedback in a consistent & clear manner throughout the semester as demonstrated in the evolution and development of design work.
- **Clarity of representation & mastery of media:** Ability to utilize both digital and manual drawing and model-making techniques to precisely and creatively represent architectural ideas.
- **Pre-design:** Ability to prepare a comprehensive program for an architectural project that includes such tasks as: an assessment of client and user needs; an inventory of spaces and their requirements; an analysis of site conditions (including existing buildings); a review of the relevant building codes and standards, including relevant sustainability requirements, and an assessment of their implications for the project; and a definition of site selection and design assessment criteria.
- **Research:** Understanding of the theoretical and applied research methodologies and practices used during the design process.
- **Integrated evaluations and decision-making design process:** Ability to demonstrate the skills

associated with making integrated decisions across multiple systems and variables in the completion of a design project. This demonstration includes problem identification, setting evaluative criteria, analyzing solutions, and predicting the effectiveness of implementation.

- **Attendance:** Consistent level of preparation and on-time presence for each studio class and scheduled evening lectures.
- **Portfolio:** Completion of final portfolio or collection of studio work as directed by instructor and/or coordinator and attendance at all scheduled portfolio related events.

Grading Criteria:

- A (+/-)** Work meets all requirements and exceeds them. Presentations are virtually flawless, complete, and finely detailed. Work exhibits professional, “museum quality” level of craft. Student has developed an individual design process that shows a high level of independent thought and rigor. Work shows evidence of intense ambition and effort to go beyond expectations, and beyond the student’s own perceived limits of their abilities.
- B (+/-)** Work meets all requirements. Presentations are complete and finely detailed. Work exhibits professional level of craft. Student has developed an individual design process that shows a high level of independent thought and rigor.
- C (+/-)** Work meets minimum requirements. Deadlines are missed. While presentations may be somewhat complete, student has struggled to develop an individual design process and/or is lacking in craft or design resolution.
- D** Work is below minimum requirements. Presentations are incomplete, student has struggled to develop an individual design process and/or is lacking in craft or design resolution.
- F** Work is well below minimum requirements. Student does not develop adequate design process, and/or does not finish work.
- INC** Grades of “incomplete” are not given under any circumstances unless there is evidence of a medical or personal emergency. In such cases, instructor and student develop a contract to complete work by a specified date, as per CCNY policy. Classes and/or work missed due to illness must be explained with a physician’s note.

Notes:

C is the lowest passing grade for M. Arch I and M.S. Arch students. D is the lowest passing grade for B. Arch students. No C- or D grades may be given to graduate students.

Working in teams does not guarantee the same grade for each team member; grades are based on a range of criteria for each individual student.

For more information on grading guidelines and other CCNY policies and procedures, consult the current CCNY academic bulletins: <https://www.ccny.cuny.edu/registrar/bulletins>

Office Hours:

Each studio faculty member schedules 30 regular office hours over the semester, as posted at the top of the syllabus. If a student needs to speak in private with a studio critic, they should ask or email in advance to request a specific meeting time. Students may seek office hour appointments to discuss any matters of concern including personal, private matters and general inquiries about course related work, grading, assessment and content.

Probation & Dismissal: for program specific information related to grades, academic standing, probation and dismissal, please see your program academic advisors:

Undergrad: Michael Miller mmiller@ccny.cuny.edu
Amy Daniel adaniel@ccny.cuny.edu
Graduate: Hannah Borgeson hborgeson@ccny.cuny.edu

Studio Culture:

Working collaboratively and respectfully on studio assignments, with and alongside others, is an expectation in studio. Studio culture is an important part of an architectural education, and it extends to expectations for Faculty and the School's Administration as well. Please see the Spitzer School of Architecture Studio Culture Policy, which can be accessed on the SSA website here: <https://ssa.ccny.cuny.edu/about/policies/>.

Absence & Lateness:

Arriving more than ten minutes late to class will constitute an absence. Two unexcused absences will result in a whole letter grade deduction from a final grade; more than four will result in a failing grade. It is expected that all students will participate in all scheduled working, midterm and final reviews and contribute constructively to the discussions.

Absences due to Religious Observances:

Students who will miss any class sessions, exams, presentations, trips, or the like due to a religious observance should notify the instructor at the beginning of the semester so that appropriate adjustments for observance needs can be implemented. This could include an opportunity to make up any examination, study, or work requirement that is missed because of an absence due to a religious observance on any particular day or days.

Readings & Journals:

Students are expected to keep a journal or sketchbook throughout the duration of studio to document their thought process & take notes of any texts, books, terms or references that are mentioned by either the studio critic or fellow classmates and to selectively follow up on these and any other assigned readings before the next class.

Academic Integrity:

As a student you are expected to conduct yourself in a manner that reflects the ethical ideas of the profession of architecture. Any act of academic dishonesty not only raises questions about an individual's fitness to practice architecture, but also demeans the academic environment in which it occurred. Giving or receiving aid in examinations, and plagiarism are a violation of an assumed trust between the school and the student.

Plagiarism, i.e. the presentation as one's own work of words, drawings, ideas and opinions of someone else, is as serious an instance of academic dishonesty in this context as cheating on examinations. The submission of any piece of work (written, drawn, built, or photocopied) is assumed by the school to guarantee that the thoughts and expressions in it are literally the student's own, executed by the student. All assignments must be the student's original work. Any copying, even short excerpts, from another book, article, or Internet source, published or unpublished, without proper attribution will result in automatic failure of the entire course.

The CCNY Academic Integrity Policy: <https://www.ccny.cuny.edu/about/integrity>

For citations, the Chicago Manual of Style is recommended:
http://www.chicagomanualofstyle.org/tools_citationguide.html

AccessAbility Center (Student Disability Services):

The AccessAbility center (AAC) facilitates equal access and coordinates reasonable accommodations, academic adjustments, and support services for City College students with disabilities while preserving the integrity of academic standards. Students who have self-identified with AAC to receive accommodations should inform the instructor at the beginning of the semester. (North Academic Center 1/218; 212-650-5913 or 212-650-6910 for TTY/TTD). For further information, go to <http://www.ccny.cuny.edu/accessability/> or email disabilityservices@ccny.cuny.edu

Health And Wellness Support:

City College's Office of Health and Wellness Services offers free and confidential counseling. Contact: Health and Wellness Services, Marshak Science Building, room J-15: counseling@ccny.cuny.edu.

Gender Based Violence Resources

City College has resources to support you if you have experienced sexual violence, intimate partner/domestic violence, gender-based discrimination, harassment or stalking. For confidential support, you can contact the Student Psychological Counselor: Confidential Advocate at (212) 650-8905 or the Gender Resources Program at (212) 650-8222. If you would like to report sexual misconduct, you can contact the Chief Diversity Officer and Title IX Coordinator, Diana Cuzzo, at 212-650- 7330 or dcuzzo@ccny.cuny.edu. If there is an emergency on campus,

you can call Public Safety at 212-650-777 and off campus call 911. <https://www.ccny.cuny.edu/affirmativeaction>

Library:

The school's library is a shared resource that is necessary supplement to all research and design work. Please direct questions to the library staff or the Architecture Librarian Nilda Sanchez-Rodriguez:

nsanchez@ccny.cuny.edu

NAAB (National Architectural Accrediting Board):

The National Architectural Accrediting Board (NAAB) is the sole agency authorized to accredit US professional degree programs in architecture. Since most state registration boards in the United States require any applicant for licensure to have graduated from a NAAB-accredited program, obtaining such a degree is an essential aspect of preparing for the professional practice of architecture. While graduation from a NAAB-accredited program does not assure registration, the accrediting process is intended to verify that each accredited program substantially meets those standards that, as a whole, comprise an appropriate education for an architect.

More specifically, the NAAB requires an accredited program to produce graduates who: are competent in a range of intellectual, spatial, technical, and interpersonal skills; understand the historical, socio-cultural, and environmental context of architecture; are able to solve architectural design problems, including the integration of technical systems and health and safety requirements; and comprehend architects' roles and responsibilities in society.

The following student performance criteria from the 2014 NAAB Conditions are addressed in this course:

Realm B: Building Practices, Technical Skills, And Knowledge. Graduates from NAAB-accredited programs must be able to comprehend the technical aspects of design, systems, and materials and be able to apply that comprehension to architectural solutions. In addition, the impact of such decisions on the environment must be well considered.

B.1 Pre-Design: ability to prepare a comprehensive program for an architectural project that includes an assessment of client and user needs; an inventory of spaces and their requirements; an analysis of site conditions (including existing buildings); a review of the relevant building codes and standards, including relevant sustainability requirements, and an assessment of their implications for the project; and a definition of site selection and design assessment criteria.

Realm C: Integrated Architectural Solutions. Graduates from NAAB-accredited programs must be able to demonstrate that they have the ability to synthesize a wide range of variables into an integrated design solution.

C.1 Research: understanding of the theoretical and applied research methodologies and practices used during the design process.

C.2 Integrated Evaluations and Decision-Making Design Process: ability to demonstrate the skills associated with making integrated decisions across multiple systems and variables in the completion of a design project. This demonstration includes problem identification, setting evaluative criteria, analyzing solutions, and predicting the effectiveness of implementation.

Students should consult the NAAB website www.naab.org for additional information regarding student performance criteria and all other conditions for accreditation.

CONTACT INFORMATION:

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