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Introduction

“The problem with buildings is that they look desperately static. It seems almost impossible to grasp them as movement, as flight, as a series of transformations. Everybody knows—and especially architects, of course—that a building is not a static object but a moving project, and that even once it is has been built, it ages, it is transformed by its users, modified by all of what happens inside and outside, and that it will pass or be renovated, adulterated and transformed beyond recognition.”

Bruno Latour and Alben Yaneva

As architects, drawing and representation is one of our primary mediums. We draw futures that don't exist, spaces that haven't been changed yet. We draw and visualize and represent and render new possibilities, new futures, new kinds of spaces, new imaginations. The tools we use to design, architecture, shape our understanding of what architecture is. Drawing and representation are not just ways of putting our thoughts into the world. They are also ways of shaping our thoughts of our beliefs, and in turn, what we decide to design and in turn, what architecture we believe should be designed.

What is the role of architectural drawing and representation in relation to our built environment? What are the tools that are used to draw and represent? How have they and will they shape the way we draw and design architecture? How can we find ways of drawing that can enable us to be thoughtful and exploratory designers?

Architectural Drawing and Representation 2 is a class about drawing and representation, and it's also a class about thinking about drawing and representation. The ultimate goal of ADR2 is to incubate your personal relationship with drawing, representation, and architecture by considering **drawing as a practice**. You are invited to develop your own style, and to invent your own drawing tools and representational processes. ADR2 is our opportunity to play, explore new methods of representation, consider diverse points of view, test alternative outcomes, and to experiment with how our methods of representation shapes our relationship to architecture.

On Computation and Representation

In ADR2, we will also focus on computation and code as a conceptual and technical lens to think about architectural representation.

Computation is a way of thinking and operating in terms of input / process / output. Each computation has an input, a process that modifies this input, and the output that results from this process. An example of a computation might be a Rhino command that takes a circle, extrudes it, and returns a cylinder. An oven that takes in dough, bakes it, and returns a loaf of bread could also be said to be a computation.

We will be examining computation in ADR2 because our modes of drawing and representation are *already computational*. We are already computationally drawing and representing architecture, whether it is through the tools we use, or whether it's by thinking in terms of inputs, outputs, processes, commands, versions, layers, files, copy and pasting. We use 'Computer Aided Drawing', 3D modeling, pixel graphics, vector graphics, laser cutting, 3d printing, 2d printing.

What does this mean for design processes, for representations of architecture? Through this course, we will actively explore *computation as a way of drawing and representing architecture*. We will play with and debate over computational design as a way to actively discuss and confront the fact that since AD+R1, you have already been computational designers of architecture. Through a mix of in-depth computation workshops, tutorials, and drawing experiments, students will learn and experiment with drawing methods including mapping, coding, and scripting. Thinking and understanding computation will enable us to better understand formal and spatial ordering systems, and how they inform our designs.

Many different *matters of concern* are already part of our work: spatial form, climate justice, social inequity, sustainability, emotion, bodily movement, social relationships, engineering coordination,

building performance. Every architecture, building, and site is generated by this complexity as well as already generates this complexity. All of these complex factors can be manifested as data, and by working with information and data, we can work with these factors as architects.

Representation itself can be seen as a computation: a way of converting a formal space into a data space.

Lastly: sometimes the right kind of computational approach is to not to use computation in the first place. Part of learning computation is to know when to not use it. We look forward to critical discussions and playful debate, experimentation with tools and representational strategies around the role of computation in architecture and design in the future.

Three Themes

The semester is divided into three sections, each addressing three central themes. These themes exist as shared points of discussion to be tested, challenged, and debated throughout the semester:

1. Representation is a mode of *observing and understanding*.

How we think about space *through* representation? How does our representational mods shape how we observe and understand architecture and the built environment?

2. Drawing is a *tool for exploration*.

What do we discover when we invent our own drawing tools and languages? How do the constraints of a medium affect creative processes?

3. Drawings and representation are *actions and performances*.

How does the drawing engage with a social context and a discourse? How does the drawing operate, hold agency, speak into a public forum, perform, act?

Semester Schedule

Section 1:

Drawing and representation as observing & understanding

WEEK 1 (1/21)

Due: Nothing

Assigned:

1A: Drawing Codes

Deliverable: 1 Drawing (24"x24")

Due: Week 3

Summary: Pick a space, spend at least two hours in it, and document at least 3 codes that shape phenomena or behavior. See assignment sheet for details.

Format: Lecture + In-Class Exercises

Topics: Code, Data, Bias, Objects, Notation

Tools: Pen + Paper

WEEK 2 (1/28)

Due: **1A In Progress**

Assigned:

1B: Encoding Codes

Deliverable: 2 Drawings (24"x24")

Due: Week 5

Summary: Return to your space, identify an object / phenomenon of which there are more than 20 instances, and catalog them in an excel spreadsheet. Create an image-based taxonomy of the instances you found, and use Grasshopper to make a drawing using the data you captured.

Format: Short Lecture + In-Class Workshop + Pin-Up **1A**

Topics: Symbol, Index, Icon, Cognitive Dimensions

Tools: Grasshopper, Excel

Digital Primer (2/2)

Tools: Grasshopper

WEEK 3 (2/4)

Due: **1A, early ideas for 1B**

Assigned: Nothing

Format: Pin-up + In-Class Workshop (tentative)

WEEK 4 (2/11)

Due: Nothing

Assigned: Nothing

Format: Lecture/Panel + In-Class Demo+ Desk-Crits 1B

Topics: Measurement, Bias, Social Data, Case Studies

Tools: Grasshopper

WEEK 5 (2/18)

Due: 1B

Assigned: Nothing

Format: Section Review 10-2pm

Section 2:

Drawing and representation as tools for exploration

WEEK 6 (2/25)

Due: Nothing

Assigned:

2A: Algorithmic Exquisite Corpse

Deliverable: 1 digital drawing uploaded to tumblr

Due: Week 7

Summary: In Grasshopper, create a script that represents or embodies the verb assigned in class, such that the script consumes curves, and outputs curves. Upload your script to google drive, and choose 5 of your classmates' scripts; stitch them together into one new definition, and upload this to google drive, and the visual results it produces to tumblr.

Format: Lecture + In-Class Exercise

Topics: Algorithms, Creativity, Agency, Constraints, Input, Loops

Tools: Processing, Pen, Paper

WEEK 7 (3/3)

Due: 2A

Assigned:

2B: Designing a Machine for Drawing

Deliverable: 1 interactive drawing machine: digital, mechanical, or hybrid

Due: Week 8

Summary: In partnership with another student, brainstorm on the conceptual material you've worked with so far: spaces, phenomena, verbs, systems. Select at least two systems that interest you, and begin to craft a system / machine / tool to make drawings about these systems and their relationships, using a combination of digital and physical media as you see fit.

Format: Lecture + In-Class Workshop

Topics: History of Drawing Machines, Conceptual Exchange between Architecture + Technology, Ideology

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Tools: Processing, Pen, Paper

WEEK 8 (3/10)

Due: 2B

Assigned:

2C: Drawing with a Machine

Deliverable: 4 Drawings (24"x24") and your Interactive Drawing Tool from 2B

Due: Week 10

Summary: Continue to revise and improve the drawing machine you created for assignment 2B, and use it to craft 4 presentation drawings. These drawings should stand on their own without reference to the machine you created, but you will present both at review.

Format: Lecture + Pin-up or Desk Crits

Topics: Recursion, Cybernetics, Strange Loops, Form/Content, Emergence

Tools: Grasshopper, Anemone, Processing

WEEK 9 (3/17)

SPRING BREAK

WEEK 10 (3/24)

Due: 2C

Assigned: Nothing

Format: Review 2B + 2C 10-2pm

Section 3:

Drawing and representation as performance and action

WEEK 11 (3/31)

Due: Nothing

Assigned:

3A: Manifold Manifestos

Deliverable: A critical hybrid manifesto of text & drawing that articulates your representational politics, polemics, and yearnings. The text of your manifesto should be from 3 sentences to a page. Your manifesto will be used for the creation of a future drawing.

Due: Week 12

Summary: Write a manifesto for drawing that contains your personal aims and directions for representation in the form of a manifesto.

Format: Lecture + In-class Exercise + In-class demo/workshop

Topics: Representation as Advocacy and Activism, Branding, Manifestos

Tools: Graph Analysis, Writing Implements

WEEK 12 (4/7)

Due: 3A

Assigned:

3B: Drawing As Interface

Deliverable: A representation or drawing. The drawing may and should take any format. The drawing should articulate your manifesto through its interface.

Summary: Create a drawing that is also an interface. What is an argument your manifesto wishes to speak? What is a spatial change you would like to see? Create a representation that is meant to be interacted with – viewed, distributed, disseminated, read, played – that advocates for a spatial change. The drawing may take any format; the format is for you to design as well.

Format: Lecture + In-class Exercise

Topics: Interface, Control Systems, Systems of Image Dissemination

Tools: Grasshopper, Pen + Paper, ??

WEEK 13 (4/14)

Due: 3B First Draft

Assigned: Nothing

Format: Pin-up

WEEK 14 (4/21)

Due: 3B Progress

Assigned: Nothing

Format: Pin-up

WEEK 15 (5/5)

Due: 3B

Assigned: Nothing

Format: Final Review 10-2pm

Class Schedule

ADR2 will have a strong computational aspect to the course. Students will be expected to become adept or familiar with several computational technologies, including Grasshopper, GIS, and p5.js / Python, through a mix of lectures, workshops, tutorials, and TA lab sessions.

Tuesday Morning Lectures / Workshops (Tues. 9am - 11am, Wood Auditorium or 500N studios)

- Lectures or Workshops are scheduled in the morning half of the course on every other week. (See schedule for exact dates.)
- In companion to each or workshops, a short recommended reading or reading excerpt may be assigned.
- The workshops will be structured as in-class, hands-on workshop time in the 500N studio.

Afternoon Desk crits / Pinups / Sessions (Tues. 11am – 1pm, various locations)

- In the afternoons, the class will have weekly desk crits/pinups/reviews.
 - These will be run by your assigned course instructor. This time will be comprised of desk crits or pinups in response to the specific needs of the class as deemed by the individual instructors.
 - When lectures are not held in the morning, pinups will start at 9am.

The various locations reserved for ADR2 are:

- 113 Avery, 300 Buell North, 505 Avery, 323M Fayerweather

TA lab sessions

- The TAs will hold a lab session during the week where they can review workshop concepts, or provide one-on-one feedback with each student. TAs will also operate as technical support as well. Consider your TA as a helpful resource – as a peer and teacher who can provide one-on-one guidance.

Schedule

Week 1	1/21/2020	1. observing & understanding	1A			
Week 2	1/28/2020			1B		
Digital Primer	2/2/2020			Due		
Week 3	2/4/2020					
Week 4	2/11/2020					
Week 5	2/18/2020			Due	Review	
Week 6	2/25/2020	2. tools for exploration	2A			
Week 7	3/3/2020			Due	2B	
Week 8	3/10/2020				Due	2C
Spring Break	3/17/2020					
Week 10	3/24/2020				Due	Review
Week 11	3/31/2020	3. performance & action	3A			
Week 12	4/7/2020			Due	2B	
Week 13	4/14/2020					
Week 14	4/21/2020					
Week 15	5/5/2020				Due	Final Review

Code of Conduct / Intention

Every social environment, including a university or a class setting, has a culture and a series of social norms, whether created consciously or unconsciously. As the instructors, one of our goals is to set the boundaries and tone of the class, and to actively create a space that is supportive, safe, respectful, experimental and playful.

In ADR2, we will create a culture of experimentation, play and risk-taking. Deep and engaged learning best flourishes in a supportive environment. In the class, we will prioritize learning over performance, and experimentation over success.

Together, ADR2 is a space where we will be:

- absolutely free of any form of harassment, including unwanted sexual attention, deliberate misgendering, offensive comments about gender, gender identity and expression, sexual orientation, disability, mental illness, neuro(a)typicality, physical appearance, body size, race, or religion
- respectful, positive, and thoughtful
- supportive and generous of each others' work
- actively listening, and giving space to others to speak
- crediting each other for their work
- comfortable with silence
- grateful about valuable mistakes
- excited about risky ideas.

Grades

Following GSAPP's grading policy, students will receive a P (pass) grade for an acceptable level of work, LP (low pass) for work that meets only minimal standards, and HP (high pass) for a superior level of work. For further information please consult GSAPP's grading policy:

<https://www.arch.columbia.edu/grades>.

In our belief, at their best, grades offer a mildly helpful metric to each student for how much change and progress they have achieved in a semester. At their worst, grades help generate a risk-averse system where exploration and curiosity are left unrewarded or punished.

In ADR2, we will place a strong focus on taking risks and being curious (relative to each student), in addition to project depth and class participation. A risky and difficult drawing experiment through which we learn is more valuable than a well-executed drawing that is very familiar.

Grading is done by these four factors:

- 1) Class listening & participation
- 2) Project execution
- 3) Growth (relative to each student)
- 4) Amount of risk taken (relative to each student).

Each of those factors are equally weighted to each other. Instructors will try our best to grade projects relative to each student's personal direction. These grading factors hold an intention to support students that participate, share and listen with others, are curious to try new experiments, and who work on a project that you find fascinating, interesting.

Partial Bibliography

Resources and references will be posted here:

[ADR2 2020 - Process, Research, References:](#)

<https://www.are.na/gsap-adr2/adr2-process-research-references>

[ADR2 2020 - Extended readings & Bibliography:](#)

<https://www.are.na/gsap-adr2/adr2-2020-extended-readings-bibliography>

- Give me a Gun and I will Make All Buildings Move : An ANT's View of Architecture, Bruno Latour and Albena Yaneva
- The Alphabet and the Algorithm, Mario Carpo
- Architectural Intelligence, Molly Wright Steenson
- A City is not a Computer, Shannon Mattern
- Scripting Cultures, Mark Burry
- Visual Explanations, Edward R. Tufte
- [Fabricating Architecture: Digital Craft as Feminist Practice, Shelby Doyle and Leslie Forehand](#)
- Field Conditions, Stan Allen
- On Software, or the Persistence of Visual Knowledge. Wendy Hui Kyong Chun
- [Where Gender Inequity Persists in Architecture: the Technology Sector](#)

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- Computational Drawing, Carl Lostritto
- The Projective Cast, Robin Evans
- Aranda, Benjamin; Lasch, Chris; Kwinter, Sanford; Balmond, Cecil. Pamphlet Architecture 27: Tooling . 2005.
- May, John. Signal Image Architecture .
- Clifford, Brandon. 2017. The Cannibal's Cookbook: Mining Myths of Cyclopean Constructions. Boston, MA: Matter Publishing.
- [Beyond the Blob—Digital Technology in Columbia's Graduate School of Architecture, Planning and Preservation](#)