



## FNAR 712 - Visual Epistemologies

This course provides a historical survey on contemporary practices of “image-making” across a range of disciplines to allow students to have hands-on experience with new visualization techniques. The goal is to study different types of visual systems—from paintings to real-time visualizations, drone images, and computer games—that are used to create and disseminate knowledge that shape our social, cultural and political discourses.

Since 1960s, visual culture has been profoundly transformed by representation and visualization techniques that capture systems-centric and relational modes of thinking. From new forms of cartography to diagrams, and data-driven visualizations, we witness a wide variety of techniques that allow us to depict abstractions, relations, processes, transformations and translations that produce new forms of knowledge beyond images, trees, graphs, tables, charts and maps. Diagrams and other visualization systems not only organize information in terms of networks, hierarchies, or systems of spatio-temporal relations, but also function as conceptual devices that render the thinking behind cybernetics to quantum physics, synthetic biology, and digital humanities.

We will be interested in exploring new types of contemporary visual artifacts both as tools/instruments for researching, documenting, and representing complex processes, performances, effects, and systems that exist in a given context, as well as art/design works with new kinds of agency that push the boundaries of representation and contribute new functions to the visual culture by foregrounding their materiality.

## **Student Response & Expectations**

Students are expected to respond to course material in the following ways:

Option 1: Art/Design Project + Précis

Option 2: Short Critical Essay

### **Designing Visual Epistemologies**

You are expected to develop and execute a visual research project that can demonstrate a creative and critical response to designing visual epistemologies. You can choose to respond one of the workshop themes or pursue a different concept that engages with generative, relational, underspecified, or indexical systems. It is important that the work will ground itself in the historical and theoretical discourse discussed in the first-half of the semester. While you are encouraged to use a computational tool introduced in the class your designs can be medium-independent. However, the final output has to have an exhibition-quality output that can be presented in public settings such as representations, animations, videos, sculpture, installations, software, or interactive systems.

### **Writing Visual Epistemologies**

You are expected to produce a written text that will accompany the visual work, and which develops an argumentative framing of the visual research. This should take two forms:

1. A short précis of about 300-500 words, which can accompany the work in exhibition that operates as a thesis (manifesto) and description at once. It should summarize your final project by advancing a position through a clearly formulated argument, centered not just on a description of the final form, the research and methodology undertaken, the techniques and technologies deployed, and the experiments made, but on its grounding in a disciplinary issue or context.
2. A short critical essay of 1500-2000 words, which concisely and synthetically describes the visual research—its scope, parameters, hypotheses, methods of inquiry, and results. The text should synthesize a statement of intention with a disciplinary awareness of the terrain within which a specific disciplinary position is advanced (design approach, mode of practicing, theoretical paradigm, etc.). The visual research work should be framed as a clearly defined problem, investigated by a set of questions, translated by research methodologies and techniques into lines of research or investigation, and evidenced by the outcomes.

Just as with the visual work, the written texts must instigate a stake in both knowledge and technique: your text operates not just to describe your work (method, technique, medium, technology, deliverable), but also to situate it within the discourses and disciplines it represents (knowledge). Thus, the critical essay must advance a disciplinary position (which might be interdisciplinary, transdisciplinary, or multi-disciplinary), which must include historical genealogies, whether composed of other texts, other projects, or specific argument threads.

The structure of the essay must be designed, principally through the outline or précis—persuasion is a design problem, a problem of argument that deploys both textual and visual knowledge systems. (Your critical essays should include visual materials in them)

## Calendar

Week 1 – 1/13

### **Introduction to Visual Epistemologies**

Building Visual Knowledge Systems  
Images Beyond Representation

Week 2 – 1/20

### **Diagrammatic Thinking (Then and Now)**

Human vs. The Eye of the Machine

#### **Readings**

Trevor Paglen. Invisible Images (Your Pictures Are Looking at You). New Inquiry. Accessed Dec. 8, 2016.

Nikolaus Gansterer. Drawing a Hypothesis: Figures of Thought : A Project. Wien; New York: Springer, 2011.

Stan Allen, "Diagrams Matter," Any 23: Diagram Work, Guest Editors Ben van Berkel & Caroline Bos (New York: 1998)

#### **Reference**

Manuel DeLanda, "Deleuze, Diagrams, and the Genesis of Form," Any 23: Diagram Work, Guest Editors Ben van Berkel & Caroline Bos (New York: 1998)

Gilles Deleuze, Francis Bacon: The Logic of Sensation, trans. Daniel Smith (Minneapolis: University of Minnesota Press, 2002): "Diagrams"

Peirce, Charles S, and Justus Buchler. *Philosophical Writings of Peirce*. New York: Dover, 1955.

Week 3 – 1/27

### **Generative Systems I**

Instructions, Algorithms, Rules and Grammars

#### **Reading**

Mario Carpo, *The Alphabet and The Algorithm* (Cambridge, Mass.: MIT Press, 2011): "Variable, Identical, Differential" chapter.

Benjamin Bratton. Excerpts. *The Stack: On Software and Sovereignty*. Cambridge, MIT Press, 2015.

Eric C.H. De Bruyn, "Beyond the Line, or a Political Geometry of Contemporary Art" in *Greyroom 57*.

#### **Reference**

William J. Mitchell, *Computer-Aided Architectural Design* (John Wiley & Sons, 1977): 27-64

George Nicholas Stiny, "Computing with Form and Meaning in Architecture," *Journal of Architectural Education* Vol. 39, No. 1, 7-19. Autumn, 1985

C. E. B. Reas, "Process/Drawing," in *Programming Cultures* "Art and Architecture in the Age of Software, AD special issue

Week 4 – 2/3

### **Generative Systems II**

Agency, Simulation, and Autonomy

## Reading

Neri Oxman, "Performative: Toward a Post-Formal Paradigm in Architecture," *Taboo, Perspecta* 43 (2010)

Michael Batty, *Cities and Complexity: Understanding Cities with Cellular Automata, Agent-Based Models and Fractals* (Cambridge, Mass.: MIT Press, 2005): Introduction

Gabriele Gramelsberger, "The Epistemic Texture of Simulated Worlds," in *Simulation: Presentation Technique and Cognitive Method* (Birkhauser, 2008)

## Reference

Manuel Delanda, *Philosophy and Simulation: The Emergence of Synthetic Reason* (London: Continuum, 2011): esp. Chapter 2

Sherry Turkle, *Simulation and its Discontents* (Cambridge, Mass.: MIT Press, 2009): esp. section 1

Nataly Gattegno & Jason Johnson, "Models" in *Dirt*, eds. Furjan et. al. (Cambridge/Philadelphia: MIT/viaBooks, 2012)

## Week 5 – 2/10

### **Generative Systems Workshop**

Foundations for Rule-based systems, Programs, Computation

## Resources

<http://natureofcode.com>

<http://conwaylife.com>

## Week 6 - 2/17

### **Relational Systems I**

Map, Tree, Graph, Visualization

## Reading

James Corner, "Agency of Mapping," in Denis Cosgrove, *Mappings* (London: Reaktion, 1999)

Alberto Toscano and Jeff Kinkle, "Capitalism and Panorama" in *Cartographies of the Absolute* (London: Zero Books, 2015).

Kurgan, By (author) Laura. *Close Up at a Distance: Mapping, Technology, and Politics (Zone Books) (Hardback) - Common*. ZONE BOOKS, n.d.

## Reference

Manuel Lima, *Visual Complexity: Mapping Patterns of Information* (New York: Princeton Architectural Press, 2011): pp.1-96

Nader Vossoughian and Otto Neurath, *Otto Neurath: The Language of The Global Polis* (NAi/D.A.P, 2011)

Peter Hall, "Critical Visualization," in *Design and the Elastic Mind* ed. Paola Antonelli (New York: The Museum of Modern Art, 2008)

## Week 7 – 2/24

### **Relational Systems II**

Network, Timeline, Diagram

## Reading

Anthony Vidler, "Diagrams of Diagrams: Architectural Abstraction and Modern Representation," *Representations* 72 (Summer 2000): 1-20

Neil Spiller, "Spatial Notation and the Magical Operations of Collage in the Post-Digital Age," *The Diagrams of Architecture* (AD Reader), Ed. Mark Garcia (2010): 178-185  
Alexander Galloway & Eugene Thacker, "Protocol, Control, and Networks," *Grey Room* 17 (2004): 6-29

#### Reference

Peter Eisenman, *Diagram Diaries*, (London: Thames & Hudson, 1999)  
Sanford Kwinter, "The Complex and the Singular," in *Architectures of Time* (Cambridge, Mass.: MIT Press, 2002)  
Mei-Po Kwan, "Feminist Visualization: Re-envisioning GIS as a Method in Feminist Geographic Research," *Annals of the Association of American Geographers* 92, no. 4 (December 1, 2002): 645-661  
Anthony Grafton & Daniel Rosenberg, *Cartographies of Time: A History of the Timeline* (New York: Princeton Architectural Press, 2010)

#### Week 8 - 3/3

**Relational Systems Workshop** (by Burak Arikan)  
Data-Driven Representations, Maps & Visualizations

#### Resources

graphcommons.com

#### Week 9 - 3/10

**\*Spring Break\***

#### Week 10 - 3/17

**\*No class\***

(Class content will be rescheduled to another day)

#### Week 11 - 3/24

##### **Underspecified Systems I**

Open vs. Closed Systems, Agency revisited

#### Reading

Metahaven. *Black Transparency: The Right to Know in the Age of Mass Surveillance*. Berlin: Sternberg Press, 2015.

J. Burnham, "Systems Esthetics" *Artforum* 7, no. 1 (1968): 30-35

Luke Skrebowski, "All Systems Go: Recovering Hans Haacke's System's Art," *Grey Room* 30 (2008): 54-83.

#### Reference

Anthony Wilden, *System and structure: Essays in Communication and Exchange* (Tavistock, 1980)

Soojin Jun, Miso Kim, and Joonhwan Lee "The System Diagrams: Shifting Perspectives." *Design Issues* 27 (2011): 72-89.

John Rajchman, "The Virtual House," in *Constructions* (Cambridge, Mass.: MIT Press, 1999): pp. 114-121

#### Week 12 - 3/31

##### **Underspecified Systems II**

Real-time, Interactive, Responsive Systems

### Reading

William J Mitchell, *Me++: The Cyborg Self and the Networked City*, (Cambridge, Mass.: MIT Press, 2003)

Orkan Telhan, "Sensor Narratives," in *Writing Cities* ed. Suzanne Hall, et al. (London: The London School of Economics and Political Science, vol. 1, 2010): 106-115.

Philip Beesley and Omar Khan, *Situated Technologies Pamphlets 4: Responsive Architecture, Performing Instruments*. (The Architectural League of New York, 2009)

### Reference

From John Frazer, *An Evolutionary Architecture*, Architectural Association Publications, Themes VII, copyright John Frazer and the Architectural Association 1995.

Calabrese, F., and C. Ratti. "Real time rome." *Networks and Communication studies* 20, no. 3-4 (2006): 247-258.

### Week 13 – 4/7

#### **Underspecified Systems Workshop:**

Images by and of Artificial Intelligence

### Week 14 – 4/14

#### **Indexical Systems**

Ecology, Land, Environment as Representation

### Reading

Offenhuber, D. and Telhan Orkan. 'Indexical Visualization – designing meaning without data' in *Ubiquitous Computing, Complexity and Culture*, eds. Ulrik Ekman et al., Routledge, London, 2015.

Robert Smithson: *The Collected Writings*. Jack Flam (ed.). University of California Press: 1996.  
Krauss, Rosalind. "Notes on the Index," in *The Originality of the Avant Garde, and Other Modernist Myths*: MIT Press, 1985.

### Reference

Paul Virilio, Raymond Depardon, Diller Scofidio & Renfro, Mark Hansen. *Native Land: Stop Eject*. Foundation Cartier: 2008.

Rheinberger, Hans-Jörg. *Toward a History of Epistemic Things: Synthesizing Proteins in the Test Tube*. Stanford, Calif.: Stanford University Press, 1997.

### Week 15 – 4/21

#### **Indexical Systems Workshop:**

Images with Living Matter

### Week 16 – 4/28

#### **Final Review/Presentation**

## General Policies

- Attendance is mandatory. Missing three classes without medical excuse will default to a failing (F) grade.
- Participation in all classes and critiques is expected.
- Students may not submit identical work for more than one class or instructor.
- A student attempting to submit the same work to different instructors may fail each assignment involved and will be referred to the Office of Student Conduct.
- Work produced in courses at the School of Design is the property of the student. By participating in a course each student grants the School of Design a non-exclusive right and license to use, copy, distribute, display, and perform such work in any and all media for educational, programmatic, and/or promotional purposes. The School of Design will exercise care with respect to student-created materials submitted in conjunction with a course; however, the School of Design does not assume liability for their loss or damage.

In keeping with the Penn Design Grading System, the grading policy will be as follows:

A+ & A	4.0 (excellent)
A-	3.7
B+	3.3
B	3.0 (very good)
B-	2.7
C+	2.3
C	2.0 (average)
C-	1.7
D+	1.3
D	1.0 (below average)
F	0.0 (failed)

### Student Grade Distribution

20%	Weekly image submissions
30%	Presentation/report
50%	Final Project