# Fall 2020 – ARCH 510 042 – Special Topics in Visual and Digital Media

# Critical Algorithms for Architectural Data

Day and Time: Tuesday 10:00 AM - 12:50 PM

Instructor: Matthew Allen

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Matthew's writing and CV: https://matthewallen.academia.edu/research

Office Hours: by appointment (please email)

## Territorial Acknowledgement

We acknowledge that the School of Architecture is located on the traditional territory of the Neutral, Anishinaabeg and Haudenosaunee peoples. The University is situated on the Haldimand Tract, the land promised to the Six Nations that includes 10 kilometres on each side of the Grand River. (see references here: https://uwaterloo.ca/engineering/about/territorial-acknowledgement)

## Course Description

As architectural production has gone digital, databases and archives of various sorts have become a focus of design experimentation. The field of critical algorithm studies offers crucial methods for seeing the biases, assumptions, stereotypes, and injustices that lurk within digital practices. This course examines the techniques, theories, and historical resonances of a particular branch of contemporary architecture that is obsessed with collecting, scanning, aggregating, sampling, mining, hoarding, searching, sorting, assembling, recombining, and heaping (among other things). Throughout the course, students will explore current theories, relevant historical genealogies, and cases studies of recent practices, and they will engage in workshops on relevant computational techniques. A final project will ask students to produce and evaluate their own assemblages, heaps, and aggregations.

**Theory**. A theoretical basis will be provided from (1) thing theory and speculative realism; (2) big data and digital preservation; (3) critical algorithm studies; and (3) classics of avant-garde experimentation, medium specificity, and post-structuralism. **History**. Students will learn about the history of architectural collecting, dada assemblages, algorithmics and organization theory, the computational turn in abstract art and formalist architecture in the mid-twentieth century, and the more recent digital and post-digital culture in architecture. These topics will be situated in their cultural contexts of global architectural practices. **Practice**. Techniques will be presented beginning with early-twentieth century formalism, proceeding through mid-century serial/algorithmic art, and into contemporary workflows involving

programming and software. Unusual data and algorithms will be sought out and treated as found objects for architectural design. These databases of elements may be digital or physical; algorithmic techniques may be computational or analog. Computational hardware matters less than the mindset involved.

Class sessions will feature presentations by the instructor, group case study presentations, tutorials of design techniques using databases and algorithms, and guided discussions. The case study may be either an in-depth presentation of a technique or project and its context OR a re-enactment of a design technique using digital methods. The final project will be a design project (in the form of a proposal for a building, space, or sculpture) based on techniques learned through the semester, which will be accompanied by a report presenting its historical precedents, theoretical context, and design rationale.

## Learning Objectives

By the end of the course, students will be able to:

1. Understand the role of archives and algorithms in contemporary architectural culture.
2. Develop and exercise critical judgment; identify and critically assess various positions in digital architecture.
3. Develop, articulate and support a critical position in relation to themes in contemporary architecture and in relation to their individual creative agendas.
4. Develop and exercise research skills; collect, analyze and synthesize information from multiple sources.
5. Prepare a research document with attention to clarity, conciseness, and rhetorical effectiveness.
6. Conceive, develop, and present a creative project based on techniques related to archives/collections.

## Required Texts

All course texts will be made available as PDFs.

## Course Requirements and Assessment

Note: a more comprehensive description of these deliverables (including evaluation criteria, submission procedures, etc.) will be shared in another document when the projects /assignments are formally issued.

### Participation

Weighting: 10%

Active participation in class is essential to learning. The participation grade includes attendance in class sessions and participation in discussions.

### Case Study Presentation

Weighting: 15%

Due date: variable (Weeks 4 – 11)

Group presentation of case studies selected in consultation with the instructor. The presentation should describe the cases themselves as well relevant precedents, theories, and techniques involved. The presentation should be approximately 45 minutes; it can be accompanied by a slideshow of images, videos, etc. Slides are due to the instructor on the presentation day.

### Final Project Prospectus

Weighting: 15%

Due date: Week 7, October 27

Proposal for a final creative project. This should describe the techniques to be used, relevant theories and precedents, and the projected outcome. This will allow students to begin thinking in detail about their Final Project.

### Final Project Draft Presentation

Weighting: 15%

Due date: Weeks 11 and 12, November 24 and December 1

Students will “pin-up” a digital draft of their Final Project for feedback.

Final Project and Report

Weighting: 45%

Due date: December 21

The **Final Project** is a generative/creative work, which can take a few forms. It may be digital or analog. Students are encouraged to use techniques or material related to other projects they are pursuing. The basic idea is to take some material (the data) and create something with it using a method (an algorithm).

(1) A project: create a work using a "database" of material and a method (an algorithm). This is not meant to be a complete architectural project, but rather a creative exploration of proto-architectural techniques.

(2) Re-enactment: re-create a historical or contemporary project using updated methods.

(3) Technical memorandum: put together a detailed exploration of a database and an algorithmic method and its possibilities for architecture.

The **Report** is a research document describing the history and theory relevant to the Final Project. This is meant to be a foundation for advanced work in architecture. The Report may take the form of a research paper or a booklet. Students must identify and assesses claims about architecture, cite sources, and use the tools of critical analysis and writing.

The relative weight of the Final Project and the Report will differ from student to student. In other words, more focus may be placed on the research aspect or on the generative aspect, depending on student inclination.

## Topics & Schedule

**Week 1**

*September 8*

No class because of charette. Please do the readings for next week.

**Week 2: Collecting / Data / Preservation**

*September 15*

Outline of the history of collecting in architecture and the central problematic of the seminar: archives, collections, preservation, data-mining, and algorithms. Introduction to the philosophy of object-orientation and its connection to the theories of avant-garde architecture. Introduction of techniques of digital preservation relevant to architects.

*Groups for case study presentations assigned*

*Project Prospectus assigned*

Readings: 1. Jane Bennett, "The Force of Things: Steps toward an Ecology of Matter"

2. Alois Riegl, "The Modern Cult of Monuments: Its Character and Its Origin"

Supplements: - John Pinto, "Piranesi's 'Speaking Ruins'"

- Martien de Vletter, "Don't Be Afraid of the Digital"

- Paul Edwards, from *A Vast Machine*

**Week 3: Junk / Assemblage**

*September 22*

The destruction of war and its effect on the culture of collecting, historiography, and architecture. The malign influence of accumulations of the past. Dada, futurism, and the early-twentieth century avant-garde. Climate change and the need for a new neo-dada.

Readings: 1. Walter Benjamin, "On the Concept of History"

2. Anna Dezeuze, "'Neo-dada:' 'Junk Aesthetic' and Spectator Participation"

3. from Donna Haraway, *Staying with the Trouble: Making Kin in the Chthulucene*

4. Jennifer Borland and Louise Siddons, "From hoarders to the Hoard: giving disciplinary legitimacy to undisciplined collecting"

Supplement: - Tristan Tzara, "Dada Manifesto"

**Week 4: The Modernist Database / Generative Algorithms**

*September 29*

Presentation: Group 1

*Dossier Outline assignment handed out*

The dream of the perfect classification system and the all-encompassing library. The problem of information overload. Searching and sorting. Early computation and business machines. Library and museum building types. Efforts to map the evolution of elements, techniques, and effects of art (and architecture) culminating in the theory of medium specificity. Implicit databases of formal elements. Generative algorithms for creating new modernist artworks and the motivation of early computer art.

Cases: totalizing libraries, museums, and collections (e.g., The Mundaneum and the Library of Bael); big collections and what's in them (e.g., the Library of Congress, the Svalbard Global Seed Vault); generative geometrical abstraction (e.g., Michael Noll, Frieder Nake, Vera Molnar); architectural orders

Readings:
1. Clement Greenberg, "Modernist Painting"
2. John Summerson, from *The Classical Language of Architecture*
3. Jorge Luis Borges, "The Library of Babel"
4. Alex Wright, from *Cataloguing the World: Paul Otlet and the Birth of the Information Age*

Supplements:
- Vannevar Bush, "As We May Think"
- Paul Stephens, "Vanguard Total Index: Conceptual Writing, Information Asymmetry, and the Risk Society"
- Roland Barthes, "The Activity of Structuralism"
- Christoph Klutsch, "Information Aesthetic and the Stuttgart School"

**Week 5: Post-Modernism Databases / Subcultures / Virtuosity**

*October 6*

Presentation: Group 2

Databases of formal elements from different cultures. Post-structuralism. The classical language of architecture and the first parametric architectural software. The emergence of virtuosity as a value in computational architecture. The internet and the rise of personal digital collections. The New Aesthetic and archives of affinities. Architectural vernaculars. Glamour, advertising, and the attention economy. Hoarding.

Cases: postmodernist languages of architecture (e.g. Charles Moore, Charles Jencks, Michael Graves, Robert Venturi); vernacular languages of architectural form; digital architectural collections (e.g. Archive of Affinities)

Readings:
1. Lev Manovich, "Database"
2. from Hiroki Azuma, *Otaku: Japan's Database Animals*
3. Matthew Crawford, "Attention as a Cultural Problem"
4. William J. Mitchell, "Vitruvius Computatus"

Supplement:
- Charles Jencks, "Semiology and Architecture"
- Conversation with Sam Jacob and Pablo Bronstein, "Play it Again"
- Andrew Kovacs interview, "The Archive"

https://www.koozarch.com/abstractions/archive-of-affinities/

- Mark Foster Gage, “Deus Ex Machina: From Semiology to the Elegance of Aesthetics”

**READING WEEK – NO CLASS**

*October 13*

**Week 6: Critical Algorithm Studies**

*October 20*

Presentation: Group 3

Introduction to critical algorithm studies. Biases in algorithms. Algorithms and culture / space.

Case: the biases in the algorithms of big tech companies (Facebook, Google, Apple, Microsoft, Alibaba, et. al.)

Readings: 1. Andrew Goffey, “Algorithm”

2. Ted Striphas, “Algorithmic Culture”

3. Nigel Thrift and Sean French, “The Automatic Production of Space”

Supplement: - Critical Algorithm Studies: A Reading List:

https://socialmediacollective.org/reading-lists/critical-algorithm-studies/

**Week 7: Simulation / Heaps / Stacks**

*October 27*

Project Prospectus due

Presentation: Group 4

*Final Project assigned*

The agenda of stacking and the counter-agenda of heaping. Stacks and layers of information; layers of infrastructure in post-digital world. Looseness/informality as a virtue. Simulation – can architecture be grown instead of designed?

Case: informal piles in art and architecture (entropy in Robert Smithson, MOS, forlessfinder, “the informal”); informal urbanism and mega-stacks (Kowloon Walled City, Constant’s New Babylon, Tsutomu Nihei’s *BLAME!*)

Readings: 1. Stan Allen, “From Object to Field”

2. Michael Meredith, “After After Geometry”

3. Benjamin Bratton, “The Stack”

4. Darren Jorgensen and Laetitia Wilson, "The Utopian Failure of Constant’s New Babylon”

Supplements: - Yve-Alain Bois, “The Use Value of Formless”

- Sherry Turkle, “Simulation and its Discontents”

**Week 8: Data-Mining / Pattern-Seeing**

*November 3*

Presentation: Group 5

The uniqueness of human vision and the hard problems of artificial intelligence. Data-mining and distant reading.

Case: early approaches to artificial intelligence; data-mining architectural and urban form (Andrew Witt); data-mining literature (Franco Moretti); human vision and “pattern seeing”

Readings: 1. Franco Moretti, from *Distant Reading*

2. Andrew Witt, “Cartogramic Metamorphologies; or, Enter the RoweBot”

3. Philip Steadman, from *Why are Most Buildings Rectangular?*

Supplements: - Reinhold Martin, “Pattern-Seeing”

- Daniel Roseberg, “Data before the Fact”

**Week 9: Machine Learning / Post-Theory**

*November 10*

Presentation: Group 6

Post-theory world and the consequences of machine-learning for architecture and art.

Case: the potentials of AI / machine learning for art and architecture (Stanislas Chaillou, Memo Akten, and many more); theory vs. post-theory

Readings: 1. Geoffrey Bowker, “The Theory/Data Thing”

2. Mario Carpo, “Breaking the Curve”

3. Stanislas Chaillou, “AI & Architecture: An Experimental Perspective”

4. Memo Akten interview, “Machine Learning Art”

https://www.artnome.com/news/2018/12/13/machine-learning-art-an-interview-with-memo-akten

**Week 10: Critical Algorithm Studies part 2: Surveillance**

*November 17*

Presentation: Group 7

Surveillance and bias in urban systems and on the internet. Intersectionality and ways of fighting oppression. Solidarity.

Case: Problems and biases of surveillance software; artists and architects taking a critical view of surveillance (Diller + Scofidio, Trevor Paglen, and many more); smart cities and their problems (Songdo, Sidewalk Labs & Toronto)

Readings: 1. Michael Lesk, "Big Data, Big Money, Big Brother"

2. Kevin Haggerty and Richard Ericson, "The Surveillant Assemblage"

3. Orit Halpern et. al., "Test-Bed Urbanism"

Supplement: - list of surveillance artists on vice:

https://www.vice.com/en_us/article/z4q8yw/visual-dictionary-michael-kerbow-defines-surveillance-art

**Week 11: Work-in-Progress Presentations 1**

*November 24*

Final Project work-in-progress presentation

Students will "pin-up" and present a digital draft of their Final Project for feedback.

**Week 12: Work-in-Progress Presentations 2**

*December 1*

Final Project work-in-progress presentation

Students will "pin-up" and present a digital draft of their Final Project for feedback.

**Week ??**

*December 21*

Final Project and Report due

## Remote Course Delivery Platforms & Communication

During remote learning, we will be using additional platforms to deliver, organize and share course content, learning and work. Here is a breakdown of tools we will use in this course:

**LEARN** – Virtual Hub for the course. Used for organizing course documents and activities. Official communication, work submission, and grade recording and release.

**WEB-EX** – Class-wide virtual meetings and office hours meetings.

## Course Time Zone

All dates and times communicated in the document are expressed in Eastern Time (Local time in Waterloo Ontario, Canada). From September 8 – October 24 2020 times are indicated in Eastern Daylight Time (EDT, UTC—4:00) and from October 25 – December 31 2020, times are indicated in Eastern Standard Time (EST, UTC—5:00)

## Fall 2020 COVID-19 Special Statement

Given the continuously evolving situation around COVID-19, students are to refer to the University of Waterloo's developing information resource page (https://uwaterloo.ca/coronavirus/) for up-to-date information on academic updates, health services, important dates, co-op, accommodation rules and other university level responses to COVID-19.

## Student Notice of Recording

The course's official *Notice of Recording* document is found on the course's LEARN site. This document outlines shared responsibilities for instructors and students around issues of privacy and security. Each student is responsible for reviewing this document.

Live lectures and discussions will only be recorded for evaluation purposes. They will not be made available to students. This is to best ensure free and open discussion.

Please have your video on whenever possible. This facilitates a feeling of class togetherness which is crucial for your education.

## Late Work

Assignments that are handed in late will receive an initial penalty of 20% on the first calendar day late and a 5% penalty per calendar day thereafter. After 5 calendar days, the assignment will receive a 0%.

Only in the case of a justified medical or personal reason will these penalties be waived, and only if these have been officially submitted to the Undergraduate Student Services Co-Ordinator and accepted by the Undergraduate Office.

Students seeking accommodations due to COVID-19, are to follow Covid-19-related accommodations as outlined by the university here: (https://uwaterloo.ca/coronavirus/academic-information#accommodations).

## Mental Health Support

All of us need a support system. We encourage you to seek out mental health supports when they are needed. Please reach out to Campus Wellness (https://uwaterloo.ca/campus-wellness/) and Counselling Services (https://uwaterloo.ca/campus-wellness/counselling-services).

We understand that these circumstances can be troubling, and you may need to speak with someone for emotional support. Good2Talk (https://good2talk.ca/) is a post-secondary student helpline based in Ontario, Canada that is available to all students.

## Equity, Diversity and Inclusion Commitment

At the School of Architecture, we are committed to foster and support equity, diversity and inclusion. We recognize however, that discrimination does occur, sometimes through an isolated act of discrimination, but also through practices and policies that must be rewritten. If you ever experience discrimination and need to report on instances of micro-aggressions and other forms of racism, sexism, discrimination against LGBTQ2S+, or disability, please note that there are different pathways to report these instances:

A) if you feel comfortable bringing this up directly with the Faculty or person who has said or done something offensive, we invite you, or a friend, to speak directly with this person.

B) If you do not wish to bring this up with this person directly, you are invited to reach out to either the undergraduate (Donna Woolcott or Maya Przybylski) or graduate office (Nicole Guenther, Lola Sheppard, or Jane Hutton). If you contact any of these people in confidence, they are bound to preserve

your anonymity and will be able to follow up on the report. Alternatively, you may always reach out to director Anne Bordeleau directly, and she will protect your identity and follow up on the report.

C) Finally, you may also choose to report centrally to the Equity Office. The Equity Office can be reached by emailing equity@uwaterloo.ca. More information on the functions and services of the equity office can be found here: https://uwaterloo.ca/human-rights-equity-inclusion/about/equity-office.

## Academic integrity, grievance, discipline, appeals and note for students with disabilities

**Academic integrity**: In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. [Check the Office of Academic Integrity for more information.]

**Grievance:** A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70, Student Petitions and Grievances, Section 4. When in doubt, please be certain to contact the department's administrative assistant who will provide further assistance.

**Discipline:** A student is expected to know what constitutes academic integrity to avoid committing an academic offence, and to take responsibility for his/her actions. [Check the Office of Academic Integrity for more information.] A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course instructor, academic advisor, or the undergraduate associate dean. For information on categories of offences and types of penalties, students should refer to Policy 71, Student Discipline. For typical penalties, check Guidelines for the Assessment of Penalties.

**Appeals:** A decision made or penalty imposed under Policy 70, Student Petitions and Grievances (other than a petition) or Policy 71, Student Discipline may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72, Student Appeals.

**Note for students with disabilities:** AccessAbility Services, located in Needles Hall, Room 1401, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with AccessAbility Services at the beginning of each academic term.

**Turnitin.com:** Text matching software (Turnitin®) may be used to screen assignments in this course. Turnitin® is used to verify that all materials and sources in assignments are documented. Students' submissions are stored on a U.S. server, therefore students must be given an alternative (e.g., scaffolded assignment or annotated bibliography), if they are concerned about their privacy and/or security. Students will be given due notice, in the first week of the term and/or at the time assignment details are provided, about arrangements and alternatives for the use of Turnitin in this course.

It is the responsibility of the student to notify the instructor if they, in the first week of term or at the time assignment details are provided, wish to submit the alternate assignment.