

Pandaemonium Architecture

Scott Benzel Spring 2022 Monday 4-6 PM; Special Faculty lab instructor Dongpu Ling 6-6:50 PM

“...rituals of reversal.. "rewire" the crucial connections in the social structure by providing symbolic statements of traditional social imperatives and basic categories of...world view.” – Evon Z. Vogt, *Rituals of Reversal as a Means of Rewiring Social Structure*

Pandaemonium Architecture was introduced at the 1958 *Mechanisation of Thought Processes* symposium as an early pattern recognition model. Named for the demon-inhabited city in Milton's *Paradise Lost*, the *Pandaemonium Architecture* assemblage employs 'daemons' – bits of information or code – that 'scream' in order to ascend a hierarchy of algorithmic hurdles. The metaphorical implications were not lost on the early innovators of AI.

Evon Vogt's *Rituals of Reversal as a Means of Rewiring Social Structure* examines the annual Highland Maya Zinacanteco rituals invoking the reversal of social, gender, and even species roles as a means of “rewiring” the social structure of the community. Contemporary social structures are being radically “rewired” with ever-increasing speed by largely invisible machine-learning algorithms and predictive processes. Netflix's, Amazon's, and Facebook's algorithms are the best-known examples of an increasingly pervasive methodology quietly remaking society while crypto is remaking political-economy.

This course posits that artists employing machine learning, generative algorithms, predictive models and other technics can make art – employing these tools of what Deleuze labelled “*The Societies of Control*” – that is evocative, powerful, critical, and perhaps socially transformative. To this end the course examines the history, development and sociopolitics of Machine Learning and AI, including precomputational wargaming, cybernetics, game theory, neocybernetics, the so-called *Californian Ideology*, *The Silicon Ideology*, et al.

The course will examine the history of philosophical thought informing Machine Learning and AI, including the work of the Churchlands, Sellars, Chalmers, and Negarastani. Critical perspectives including Levine's *Surveillance Valley* – uncovering the roots of the internet in military counterinsurrection, Delanda's examination of Realist Social Ontology and Modeling and Simulation, Columbia and Sandifer's critical analyses of AGI and crypto, Barad's *Agential Realism*, and Roden's 'demonology' will be examined.

AI and ML can be applied to any digital artistic medium, including video, sound, text, still images, and 3d modeling and printing. Further, ML can be 'trained' on almost any digital information, making it a powerful tool in the artist's arsenal. Generative Adversarial Nets, a currently popular form of ML, combine generative and adversarial operations and function as rapidly iterated critique, analogous to artistic critique or hyperspeed natural selection, quickly evolving its objects to high levels of complexity. Predictive Analytics employs game theory, statistical analysis, data analysis, scenario planning, and Modeling and Simulation to create accurate predictive models for different aspects of the future. Social Engineering operates on individuals and masses to 'create' this future. These are the tools of the technocracy. Artists should consider picking them up as well.

Participants in the course will explore and employ basic Artificial Intelligence and Machine Learning, including simple app-based generative and Alife algorithms, online toy AI's, languages like *Core ML* and *Python*, and applications including *GANS (Generative Adversarial Nets)*, and other neural networks to make art. Crypto, ETH, “smart contracts”, and NFTs will be examined. The course will explore tactics

and strategies employed by the technocracy and hackers including SE or Social Engineering, OSINT, and Obfuscation, and consider ways in which they might be put to use by artists. Labs will demonstrate the use of tools and resources to research and create ML-based artworks and will allow time for participants to focus on Final Projects.

Conceptual skills, computer literacy, and basic programming skills are required. Advanced coding will not be necessary, however, advanced coders are encouraged to participate.

Grading will be based on class and lab participation and completion of a project, individual or collaborative. *Readings* are recommended but not required. *Additional Reading/Primary Documents* are provided for additional context and investigation.

Introductory Readings

James Bruseau, *Deleuze's Postscript on the Societies of Control...for Big Data and Predictive Analytics*
Slavoj Žižek, *Boringly postmodern and an ideological fantasy: Slavoj Žižek reviews Matrix Resurrections*

Additional Reading/Primary Documents

Gilles Deleuze, *Postscript on the Societies of Control*
Tiqun, *The Cybernetic Hypothesis*

1. January 24 *A grin without a cat* "Information does not exist, it is a useless notion in biology It is a useful notion for design for understanding systems that are very well specified, you may describe relations in these terms but living systems do not operate in those terms." – Humberto Maturana

A cybernetic system (cat trips out); Pronomianism v. Antinomianism, "smart (social) contracts"; exit cyberutopia: extremely online v. "The Cathedral"; A grin without a cat, the Chesire in Cryptovoxels, Decentraland, and Decentralization; Memesis and Thought Contagion; Charles Stross' Very Slow AIs to algorithmic value extraction devices; A grin without a cat: social, platforms, the Netflix Prize, crypto, NFTs, ML, and AI; Lulzsec to Nulzsec and stochastic terror

The Mechanisation of Thought Processes *Cybernetic Serendipity*, Jasia Reichardt, Gustav Metzger, and the DARPA pill; Kurt Gödel and Incompleteness, Alan Turing's "*Computing Machinery and Intelligence*" and the Imitation Game to ELIZA, et al; Weiner's *Cybernetics* and *The Human Use of Human Beings*, the Gun Controller, and the Whitney brothers; "*Feedback Mechanisms and Circular Causal Systems in Biological and Social Systems*" or The Macy Conferences; Claude Shannon, "*A Mathematical Theory of Communication*," Information Theory, Theseus, Labyrinth, and Minotaur; Crypto-intelligence; *The Mechanisation of Thought Processes* symposia, Milton's *Paradise Lost*, O.G. Selfridge, and *Pandaemonium Architecture* ; the AI Winter, the ML Spring; Neural Nets, Recursion, and Backpropagation; Ensemble Learning, Supervised, Unsupervised, and Reinforcement Learning, Simple vs. Deep Learning

The Game of Life John von Neumann and Stanislaw Ulam, game theory, cellular automata, and self-replicating machines; John Conway's *Game of Life*, a brief history of alife and CA; First to Second Order Cybernetics, von Foerster, Matarana, Varela, Luhmann, et al; *Sozialeplastik, Neuroplastique, Abstraction, and the Hack*, Joseph Beuys, Socialplastic, Catherine Malabou, Neuroplastic; McKenzie Wark, *Abstraction and the Hack*; Hacking v. Central Processing; *Matrioshka Brain as metaphor*: levelism, Felix Guattari's IWC (Integrated World Capitalism) , and abstract machines

Lab MacOS and iOS-based online generative algorithms: *alife*, *Golly*, *Wolframtones*, *Wotja*; *Toy AIs*: *Muglife*, *Reface*, *Deepdream*, et al.

Readings

McKenzie Wark, from *A Hacker Manifesto*

Catherine Malabou, from *What should we do with our Brain?*

Additional Reading/Primary Documents

O.G. Selfridge, *Pandemonium: A Paradigm For Learning*

Martin Gardner, *Mathematical Games...John Conway's new solitaire game "life"*

Robert Bradbury, *Matrioshka Brains*

2. January 31 *Statistical Personae, a Basilisk* The Hollerith Tabulator, et al; Arpanet, the birth of the Internet in Counterinsurgency; Golumbia's *Great White Robot God*, *The Californian Ideology*, *The Silicon Ideology*; Big Data, abstraction, extraction; Basilisks – Reza's to Roko's to Sandifer's

Ghost protocol "*bene visit qui ben latuit*" – Francis Bacon

How to Disappear Completely

Thucydides' Nooscope: A Brief History of Strategy, Inference, Prediction, and modelling; Thucydides' Melian Dialogue, Sun Tzu, Machiavelli, Napoleon, Clausewitz, Weber and Rationalization, Game Theory, Predictive Algorithmics, von Neumann; Simulmatics; Scenario Planning and Prediction Markets; Implicit vs. Explicit Models, Modelling for Explanation or Prediction, SEAS VIS, Palantir, and World Simulation, Modeling and Simulation, and the Nooscope; Prediction, Precrime, and Intervention

Lab introduction to Runway

Readings

Jean Baudrillard, *The Precession of Simulacra*

David Golumbia, *The Great White Robot God*

Additional Reading/Primary Documents

Joshua M. Epstein, *Why Model? Journal of Artificial Societies and Social Simulation*

Michael Bazzell, from *Extreme privacy, what it takes to disappear*

Elizabeth Sandifer, from *Neoreaction, a Basilisk*

3. February 7 *Degrade the Threads – Bored Apes* "*In the past this information has been suppressed/But now it can be told/Every man, woman, and mutant/On this planet shall know the truth of de-evolution*"
Devo

NFTs, Bored Apes, mutation, devolution

The Social Construction of Reality "*Nothing proceeds from itself. Nothing is Given. All is constructed.*"
– Gaston Bachelard

Edward Bernays, *Propaganda*, and *Public Relations*, Jacques Ellul's *Propaganda*; wartime disinfo, Gregory Bateson and "*black propaganda*", Operation Mincemeat and the XX Committee; counterintelligence and James Jesus Angleton's "Wilderness of Mirrors"; Cambridge Analytica/SCA, OCEAN, Facebook and Captology; Philip K. Dick, Jean Baudrillard, *Simulacra and Simulation*; Simulationism in Art; Ed Fredkin, Manuel Delanda, *Digital Simulation*; Cellular Automata, Stephen

Wolfram's *A New Kind of Science* and Simulation; Nick Bostrom, Sabine Hossenfelder, the Simulation Hypothesis and its discontents

Theorycels v. Operators: Based, Pilled, Cringe, NPC, Theorycels; D&D/RPGs to MUDs to MMORPGs, SF, SE, ARGs (Alternate Reality Games) to IRL/ARGs; Luther Blissett, Q, and Wu Ming, 54, ong's hat, the beast, ilovebees, Year Zero to Cicada 3301, Q; /b, chans, and Algorithmic Radicalization; Parasociality and Disinformation; *Operators:* Pentesting, APTs (Advanced Perceived Threat groups), SE (Social Engineering), and Gamified Realpolitik; Redteaming, blackhat/grayhat/whitehat, 'malicious hacker' to 'offensive security'; APTs: Fancy Bear, Molerats, et al.; TAO (Tailored Access Operations); CA/SCL (CambridgeAnalytica/SCL), IRA (Internet Research Agency), Black Cube, Psygroup, Palantir, Academi, Qanon; Anonymous, Wikileaks, Resistbot, et al. ; Bernard Suits, C. Thi Nguyen, *Games, Agency as Art*

Lab explore Opensea, Rarible, Foundation, et al., NFTs

Readings

Manuel DeLanda, *Introduction to Philosophy and Simulation, The Emergence of Synthetic Reason*
C. Thi Nguyen, from *Games, Agency As Art*

Additional Reading/Primary Documents

Joseph Matheny, *The Incunabula Papers*, original scan
Sabine Hossenfelder, *No, we probably don't live in a computer simulation*
Angela Nagle, *The New Man of Achan*

4. February 14 *The Circumverse v. the Cybernetics of Self* "*The world circumscribing us [the "circumverse"] aims to have stable circuits, equal cycles, the expected repetitions, and trouble-free compatibility. It intends to eliminate all partial impulses and immobilize bodies. Parallel to this, Borges discussed the anxiety of the emperor who wanted to have such an exact map of the empire that he would have to go back over his territory at all its points and bring it up to scale, so much so that the monarch's subjects spent as much time and energy detailing it and maintaining it that the empire 'itself' fell into ruins to the exact extent that its cartographical overview was perfected -- such is the madness of the great central Zero, its desire to immobilize bodies that can only ever 'be' as representation.*" – Jean-Francois Lyotard, *Libidinal Economy*, quoted in Tiqqun's *Cybernetic Manifesto*

Guy Debord, Hardt and Negri, Spectacle, and Empire; Gregory Bateson, *The Cybernetics of Self*, Jean-Francois Lyotard, *Libidinal Economy*, and the Circumverse; Tiqqun; Mark Fisher, '*Acid Communism*', and '*Psychic Infrastructure*'; Wholly Parasocial Relations

Backpropagation Recursion in art and nature, The Varieties of Neural Net, Deep vs. Simple Learning, ANNs, Sigmoid neurons, feedforward nets, convolutional nets, recurrent nets, long short-term memory (LSTM) nets, and autoencoders

Feedforward– Cybernetic Capitalism and Post-biological Evolution David Roden, *Speculative Posthumanism*, Felix Guattari, *Asignifying Semiotics*, the IWC, and '*signaletic matter*'; Steven J. Dick, *Post-biological Cultural Evolution*; ex-CCRU, *Machinic Desire v. Postcapitalist Desire*

Lab introduction to CoreML

Readings

David Roden, from *Posthuman Life, Philosophy at the Edge of the Human*

Matt Colquhoun, *No More Miserable Monday Mornings* (introduction to Mark Fisher's *Postcapitalist Desire*)

Additional Reading/Primary Documents

David E. Rumelhart, *Learning representations by backpropagating errors*

Gary Genesko, *Asignifying Semiotics*

Steven J. Dick, *Cosmic Evolution from Cosmos and Culture*

FEBRUARY 21 NO CLASS, PRESIDENT'S DAY

5. February 28 *Subject v. Swarm v. Protean Ooze* The Varieties of Agents, David Roden, Manuel Delanda, Realist Social Ontology, Assemblages, Karen Barad, Agential Realism; Lynn Hershman, Roberta Breitmore, Lil Miquela, the Brud; Swarm intelligence: social insects, SO (self-organization), and stigmergy; the protean ooze

Polybius by Sinneslöschen Arcadia, Polybius' *Histories* against laodogmatika, Polybius square and fire signals; Polybius by Sinneslöschen; Psyop, Rumortech, Vaporware – Why Polybius Matters

Edge Detector – Perceptrons and linearly separable problems Minsky, Papert, Scalars, Vectors, Sets, Training, Sorting, Decision Trees, Leaf nodes, Entropy splits; the *Edge Detector* zine

Lab experiments.withgoogle, OpenAI, GPT-3, et al

Readings

Karen Barad, *Agential Realism* from *Meeting the Universe Halfway*

Additional Reading/Primary Documents

Eric Bonabeau et al, from *Swarm intelligence from natural to artificial systems*

Minsky and Papert, from *Perceptrons, an Introduction to Perceptual Geometry*

6. March 7 *Eliminative Materialism and Neurophilosophy* The Churchlands, Sellars, Chalmers, et al; P-zombies, Sentience, Sapience, Geist; Hegel, Brandom, Negarestani, Kanzi, et al.; Hoffman's *Interface Theory of Perception*

Hypocognition v. Hypercognition distraction, hypocognition, amplifiers and suppressors, capture, addiction maximizers, parasocial/media relations; SF, information gathering, communication modeling, elicitation, preloading, pretexting, human buffer overflow, microexpressions, persuasion, framing, manipulation, mitigation

Digital Philosophy, Digital Physics, Quantum Philosophy Edward Fredkin, Stephen Wolfram, Rudy Rucker, David Deutsch, et al.

Lab. introduction to Python, Colab, Tensorflow

Readings

Reza Negarestani, from *Intelligence and Spirit*

Additional Reading/Primary Documents

Paul M. Churchland, from *Eliminative Materialism and the propositional attitudes*

Edward Fredkin, *Finite Nature, A New Cosmogony*

Stephen Wolfram, from *A New Kind of Science*

7. March 14 Minimax/Maxout/Supermax, Analogy and Computation "if you look at the monopolistic firm as an example of a maximum system, you can connect up its structural relations with those that prevail for an entropy- maximizing thermodynamic system...absolute temperature and entropy have to each other the same conjugate or dual relation that the wage rate has to labor or the land rent has to acres of land." Samuelson

The Anasazi model Sugarscape, MaiseScape, "Life with the Artificial Anasazi," problematics of analogy

Gradient descent, Information Hierarchies ML algorithms: Linear and Polynomial Regression, Logistic Regression, k- Nearest Neighbors, Support Vector Machines, Decision Trees, Random Forests, Ensemble methods; "walled gardens": warez (k) IP, et al, JSTOR, journals, Substack, Patreon, et al; data silos, desiloing, and fusion centers

Lab explore ANNs and other ML algorithms

Readings

Jared Diamond, "Life with the Artificial Anasazi"

Additional Reading/Primary Documents

Ian J. Goodfellow, et al. *Maxout Networks*

8. March 21 Generative Adversarial Nets 'The generative model can be thought of as analogous to a team of counterfeiters, trying to produce fake currency and use it without detection, while the discriminative model is analogous to the police, trying to detect the counterfeit currency. Competition in this game drives both teams to improve their methods until the counterfeits are indistinguishable from the genuine articles.' Ian J. Goodfellow, et al.

StyleGAN, et al, GANs, models, goals, training, crawling, sets

Art, Sapience, Critique Kant and aesthetic judgement, de Duve, *Kant after Duchamp*

Hidden Layers, Reciprocal Panopticism Arcana Imperii, Secretum, Mysterium; The Mechanical Turk, ReCAPTCHA, Amazon Mechanical Turk, and hidden labor; hidden layers in neural nets, paywalls, and encrypted comms; social media and reciprocal panopticism; Reddit, karma, and sage, 4chan, degraded threads; social, political, economic hidden layers; OSINT, Bellingcat, OWL, et al.

Defining Your Project, goals, tools, areas of research, accessing and allocating resources

Lab StyleGAN, GANs, et al.

Readings

Ian J. Goodfellow, et al., *Generative Adversarial Nets*

Additional Reading/Primary Documents

Andrew Brock, Karen Simonyan, et al, *Large Scale Gans, High Fidelity Natural Image Synthesis*

Chris Donahue, Julian McAuley, Miller Puckette, *Adversarial Audio Synthesis*

Bellingcat, *First Steps...in Open Source Research* and *A Beginner's Guide to Social Media Verification*

MARCH 28, NO CLASS, SPRING BREAK

9. April 4 *Hodling* cryptography to cryptocurrency, Caesar cipher to Enigma and Turing's bombs, David Chaum, "*Blind Signatures for Untraceable Payments,*" and DigiCash; Tim May, "*Crypto Anarchist Manifesto,*" Hashcash, BitGold, *Cryptonomicon*, AZX, MT.GOX, Satoshi Nakamoto, et al., the Blockchain; Columbia's *Software as Rightwing Extremism*: Austrians, goldbugs; altcoins, stablecoins, shitcoins, Doge and memecoins, Number go up!

Dark Pools, Lit Markets – a brief history of fintech, defi, et al. Quants, HFT, dark pools; Jim Simons, NSA, MIT, the Chern-Simons Invariant, to RenTech; Robert Mercer: "*A Maximum Likelihood Approach to...Speech Recognition*" to RenTech to Breitbart, Cambridge Analytica, et al.; defi, DAOs, fractionalization; Robinhood, WallstreetBets, Gamestop, et al.

On (Surplus) Value In Art Seth Siegelau's *Artist's Reserved Rights Transfer and Sale Agreement*, NFTs, crypto, and art, second-order use value and surplus extraction in the age of digital scarcity

Project proposals

Lab Ether, Remix, Solidity, Metamask

Reading

Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System*

Diedrich Diederichsen, *On (Surplus) Value In Art*

Additional Reading/Primary Documents

Shiing-Shen Chern, James Simons, *Characteristic Forms and Geometric Invariants*

Frederick Jelinek, Robert Mercer, et al, *A Maximum Likelihood Approach to...Speech Recognition*

David Golumbia, from *Bitcoin, Software as Rightwing Extremism*

10. April 11 *Black Ice for the Metaverse* "Art is a lie that helps us see the truth." – Picasso

XR/SF, Cyberspace/meatspace in *Neuromancer*, The metaverse/burbelaves in *Snow Crash*, The oasis/the stacks in *Ready Player One*, *The Matrix*, *Dark City*, *Meta*, et al.

Illuminating Abstractions "Abstraction reflected the economic mechanization of consciousness" – Meyer Shapiro

Girard, Meta, and Mimetic Violence; the Lotka-Volterra ecosystem model, Kermack-McKendrick epidemic equations; Kant's 'antinomies of pure reason'; Levelism: epistemological, ontological, methodological

Art as Abstract Machine “Any piece of flotsam or jetsam within our grasp should be considered as a precipitate of our desire.” – Andre Breton

Deleuze and Guattari, abstract machines, Zepke’s Art as Abstract Machine

Lab introduction to the Metaverse

Readings

Geoff Shullenberger, *Mimesis, Violence, and Facebook*, Peter Thiel’s *French Connection*
Stephen Zepke, *Art as Abstract Machine*

Additional Reading/Primary Documents

Luciano Floridi, *The Method of Levels of Abstraction*

11. April 18 Cognitive Hierarchies, Heterarchy, Rhizomatics Heterarchy: “an emergent organizational form with distinctive network properties ... and multiple organizing principles.” (Stark) , “a partially ordered level structure implicating a rampant interactional complexity.” (Kontopolous) , “Rhizomatic”(Deleuze and Guattari)

A Cognitive Hierarchy Model Of Games, Cognitive asymmetry, et al.

Lulzsec to Nulzsec Digital Activism, The Shadow Network– CNP, chans, Q, social, CA/SCL, and the rise of rightist “metapolitics”; Anonymous, Wikileaks, AnonOps, LOIC (Low orbit ion cannon), Lulzsec, Sleeping Giants, Bellingcat, et al.

Chaff Obfuscation, False tells, MAI (making analysis inefficient), Babble tapes, Operation Vula, Quote stuffing, Hydras, Vortex, “Bayesian flooding”and“unselling”, FaceCloak, likefarming; Understanding information asymmetry

Lab Your Project

Readings

Finn Brunton, Helen Nissenbaum, from *Obfuscation, a User's Guide for Privacy and Protest*

Additional Reading/Primary Documents

Carole L. Crumley, *Heterarchy*

Colin F. Camerer, Teck-Hua Ho, et al., *A Cognitive Hierarchy Model Of Games*

GNET Report, *Fogging And Flooding Countering Extremist MisDisinformation After Terror Attacks*

12. April 25 Assymetric Likewar Psyop to Likewar: Assymetry and 4GW; The “Wilderness of Mirrors” to the “Strategy of Tension” to Tailored Access Operations, JTRIG, SMISC, Trapwire, Social Credit, Palantir, et al; Affect Recognition and pseudoPSY; FUD; Fogging, Flooding, and Surfacing, Amplification, Inhibition, Wiping; *Trojanz, (Mal)warez*: Promis,Stuxnet, Wannacry, NotPetya, Whispergate

Rewiring Social Structures Vogt's *Rituals of Reversal as a Means of Rewiring Social Structure*; always already rewiring; social media and social structure; Algorithmic Austerity v. Profundity; Algorithmic value capture devices: Netflix, Meta, Uber, et al., reprise; Stuart Candy et al., *Mapping Possibility Space*

A Thorough Rugging The Big Ruggpull, blockchain scepticism

Lab Your project

Readings

Evon Z. Vogt, *Rituals of Reversal as a Means of Rewiring Social Structure*

David Gerard, from *Attack of the 50 Foot Blockchain*

Additional Reading/Primary Documents

J. Michael Waller, *Weaponizing Ridicule*

Stuart Candy, *Mapping Possibility Space* from *The Futures of everyday life...the design of experiential scenarios*

SecDev Group, *Tracking GhostNet, investigating a cyber espionage network*

13. May 2 Parasites Lost, Daemontology "I must Create a System, or be enslav'd by another Mans / I will not Reason and Compare; my business is to Create" – William Blake

"...the cortical homunculus is malleable when embodied in virtual spaces, and I felt at that moment as if all capital and data had become extensions of my body, high dimensional ley lines, digital theomorphism." – Zero HP Lovecraft

Parasites Lost/Paradise Lost, Selfridge, and A.I.; David Roden's *Posthuman Life and Subtractive-Catastrophic Xenophilia*; Daemontology; Zero H.P. Lovecraft and online horror; Lobster AI's, Norman, and Cthulu AI; Claire Colebrook's *In Praise of the Flat Earth and counterethics*; *Zoe v. Bios*

Touch Grass Laruelle's *Nonstandard Philosophy*, China Mieville's *On Social Sadism*; George Dyson's *Analogia*; Touching grass

Readings

David Roden, *Subtractive-Catastrophic Xenophilia*

Additional Reading/Primary Documents

Zero HP Lovecraft, *The Gig Economy*

Claire Colebrook, *A Globe of One's Own, In Praise of the Flat Earth*

China Mieville, *On Social Sadism*

Present your Project