

# Coen D. Needell

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## Education

- 2019 – 2021 **Master of Arts in Computational Social Science**, *University of Chicago*, Chicago, IL,  
GPA: 3.83.  
Thesis on Deep Learning and Human Memory. In Progress.
- 2015 – 2019 **Bachelor of Arts in Economics and Physics**, *Washington University in St. Louis*, St. Louis, MO,  
GPA: 3.41.  
Minor in the Philosophy of Science

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## Experience

- 2020 – 2021 **Research Assistant**, *University of Chicago: Brain Bridge Lab*, Chicago, IL..  
Researched the efficacy of deep learning techniques to estimate the probability that a subject will remember an image. Used these models to create a better understanding of the features of an image that are common among highly memorable images. Future work may include working with novel deep learning methods.
- 2020 – 2021 **Research Assistant**, *University of Chicago: Memory Lab*, Chicago, IL..  
Developed an online experiment to generate pilot data for the development of a computer assisted testing program for cognitive decline. Built in JSPsych and tested on prolific and a selection of older adults through a partnership with Rush University, the experiment is designed to see if sufficient information about one's cognitive state can be extracted with a minimal amount of memory and cognitive tests in a number of domains
- 2019 **Freelance Data Scientist**, *Upwork*, St. Louis, MO and Chicago, IL..  
Offered freelance data analysis services to companies. Projects include building systems for automatic time-series analysis, data visualization and analysis, natural language processing analysis of surveys, and consulting on larger projects. **Jobs Include:**
- Interviewing Potential Full-Time Data Scientists
  - Building Statistical Learning Tools
  - Natural Language Processing Analysis
  - Machine Learning Development and Deployment
- 2018 **Programmer/Data Scientist (Internship)**, *Washington University in St. Louis: Alumni and Development*, St. Louis, MO.  
Continued development of previous non-scientific automation. Created new data models for donor identification. Other data analysis and visualization projects.
- 2017 **Real Estate Analyst (Internship)**, *Kairos Investment Management*, Rancho Santa Margarita, CA.  
Wrote automation programs for data processing, and constructed a model for optimal rent estimation. Built data mining programs for continued use by analysts.
- 2016 – 2017 **Economics Simulation Programmer**, *Washington University in St. Louis: Department of Economics*, St. Louis, MO.  
Built macroeconomic simulations for teaching of Economics 4121. Wrote simulations in Mathematica for the ISLMFE model, the Solow-Swan model, and permutations thereof.

## Selected Projects

### 2020 – Deep Learning and Computer Vision for Memorability.

A project to create a better computer vision model for predicting the memorability of an image. This started with investigating the current standard MemNet, and has moved beyond into developing new models.

### 2020 – Computational Rupahistory.

An ongoing side project to see how agent based simulations of territory-controlling groups interact in a simulated world. Currently on the back-burner, though some progress has been made in creating a cellular automata to generate a world map on a hex-grid.

### 2020 Bandcamp Album Covers.

A project to investigate how indie musicians use visual signs to indicate their subgenre. Leverages Natural Language Processing techniques like Latent Dirichlet Allocation to analyze color usage in album cover images.

### 2019 – 2020 Ongaku.

A system for creating musical playlists based on feature analysis. Leverages gammatone cepstral coefficients (a system for mimicking neural signals from the ear to the brain) and manifold learning techniques to create a psuedo-euclidean space for musical tracks. Shapes in the song-space can then be drawn to define playlists.

### 2019 Fluxx for Robots.

An Artificial Intelligence Learning environment for the tabletop card-game Fluxx by Looney Labs. Has both a human-motivated interface and a machine-motivated interface. Intended for research on machine learning methods for complex and incomplete-information games.

## Conference Precedings

**Coen D. Needell, Wilma A. Bainbridge**, *Embracing New Techniques in Deep Learning for Predicting Image Memorability*, Annual Meeting of the Vision Sciences Society, 2021.

Poster, Submitted

## Skills

Econometric Models

Systems Analysis

Advanced Mathematics

Physics

Philosophy of Science

Data Visualization

Machine Learning

Natural Language Processing

Data Mining

Data Scraping

Network Analysis

Statistics and Statistical Learning

Epistemology

Sociology

Deep Learning

## Languages, Packages, and Frameworks

Python

JavaScript

Julia

Linux

Fortran

OpenCL

Tensorflow

PyTorch

Sci-kit Learn

Git

Numpy

Pandas

R

Stata

Mathematica

JSPsych

SQL

C-Family (esp. C99)