

Caleb Chandler

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EDUCATION

Northeastern University

Expected May 2027

Master of Science, Complex Network Analysis

- GPA: 3.9/4.0
- Courses: Fundamentals of Complex Networks; Analyzing Complex Network Data; Complex Social Systems; Financial and Economic Networks; Advanced Tools for Complex Network Analysis

Utah State University

Aug 2024

Bachelor of Science, Economics & Sociology (Dual Major)

- Institutional Certificate of Proficiency - Law and Society Area Studies
- Huntsman Scholar
- Dean's List (Fall 2021 and 2022)
- National Society of Leadership and Success

RESEARCH INTERESTS

- *Social Evolution*: The impact of metabolic and information-theoretic constraints on the long-term development of social structure and the scaling relationships observed in human social systems
- *Collective Computation*: How groups of locally-interacting elements process, distribute, and store information and make inferences about their environment to solve collective problems
- *Network Science*: Emergence and evolution of structure in real-world networks, how this process can be accurately modeled, and how such models might be used to infer general classes or properties of systems by analyzing the topological histories of their networks

RESEARCH EXPERIENCE

Graduate Research Assistant

Northeastern University

Social Urban Networks Lab

Feb 2026 – Present

PI: Prof. Esteban Moro

Project: Which factors are most responsible for the shape of the visit-dependency network between urban locations (POIs)?

- **Built custom link prediction pipeline** in Python from ground up, including mechanism for matching distance distribution of negative edge samples to isolate non-geographic factors
- Found that POI-level network topology is overwhelmingly dominated by geographic distance, with node embeddings providing only slight predictive power when controlling for proximity
- Discovered community structure to be largely redundant with census-block groups, suggesting that shared legal/physical boundaries are reflected in the dependency network's topology
- Independently designed and executed a coordinate-descent hyperparameter sweep across runs, finding evidence that prediction performance (AUC) is bottlenecked by available structural signal rather than mismatched parameter values
- Constructed “coarse-grained” network by aggregating nodes of individual POIs to tract–category combination nodes, improving distance-controlled link prediction AUC from ~0.59 to ~0.75 and demonstrating that non-geographic factors act on a higher level than that of individual POIs
- Clearly communicated results and discussed strategy in weekly meetings

Independent Research

Northeastern University

Network Science Institute

Dec 2025 – Present

Advisors: Prof. Iacopo Iacopini and Sagar Kumar

Project: Is command hierarchy a requirement for efficient scaling of collective computation in human societies?

- **Identified gap in literature** from personal reading; formulated precise, tractable research design to address it using DeGroot consensus on a set of model societies varied along two orthogonal axes representing different dimensions of hierarchy
- Independently sought out faculty advisors and organized weekly meetings to discuss progress and direction
- **Designed and programmed simulation** and analyzed results in Python
- Discovered efficient scaling of coordination cost (consensus time) under each tested condition, contradicting long-standing theory
- Authored research paper and formatted in line with standards of target journal
- Submitted and was accepted to present at Conference on Complex Systems
- **Personally owned and oversaw entire process from end-to-end**, including conception, literature review, implementation, writing, and revision.

Undergraduate Research Fellow – Energy and Environment

Center for Growth and Opportunity

Utah State University

Aug 2022 – May 2024

- Collected data on state-level capacity growth for solar and wind energy and utilized **fixed effects regression modeling** to support article on disparate market-design schema as potential culprit for differential capacity growth in renewables between states
- Conducted state-by-state writeup of regulatory frameworks and presented findings to senior researcher to assist in development of policy paper calling for clarification of property rights to geothermal resources
- **Independently formulated research project** focused on identifying policy solutions to threat of long-term critical mineral scarcity, diagnosing culprit as mismatched short-vs-long-term incentives and suggesting tax breaks/subsidies for geological surveys
- Assisted Prof. Lucas Rentschler and his team by organizing logistics and recruitment for experimental laboratory studies on game theory and behavioral economics

PROFESSIONAL EXPERIENCE

LiveFree Emergency Response

Data Analyst (Internship)

Pocatello, ID, USA

May – Aug 2025

- **Led internal study** comparing quality of leads procured by lead providers, resulting in more profitable lead-acquisition strategy and significant improvement in sales ROI
- Reverse-engineered missing keys to connect calls with customer payment records
- Engineered cohesive data model in Power BI by integrating and transforming large-scale datasets, including calls, payments, and customer records, to uncover initial trends and establish key performance indicators through exploratory analysis
- Efficiently cleaned, validated, and standardized records across multiple unstructured data sources within Power Query
- Wrote Python script to streamline importation of raw customer accounts data into SQL Server

Outlier

AI Trainer - Statistics

Remote

Aug 2024 - May 2025

- Evaluated performance of LLMs on a range of pre-specified tasks designed to test and improve their ability to interpret statistical data, read charts, graphs and tables, and understand spatial relationships
- Continually strived to improve quality and reliability of work product by adhering to standards and implementing feedback from performance evaluations

ACADEMIC PROJECTS

Financial Contagion in the Between-Country Investment Network

Feb - Apr 2026

Loose replication of Dette et al. (2021) with modern data, examining web of country-level financial entanglements and relative systemic impact of hypothetical collapse/crisis in various countries

- Obtained raw data from IMF, converted to edgelist
- Extended original paper by adapting Battiston et al.'s “DebtRank” mathematical formula – originally developed for banks – to the inter-country context.
- Discovered nested core-periphery structure with vast majority of risk coming from Western countries, as well as

an outsized impact from otherwise-minor nations acting as “offshore financial centers”

Network of Events

Oct 2025 - Mar 2026

Collaborative soccer/football analytics project exploring prospect of encoding teams in matches as “event networks,” where events (shot, pass, etc) are nodes and links represent chronological succession between them

- Utilized deep learning model to obtain match-level embeddings by “disguising” adjacency matrices as images and processing them through a vision transformer
- Computed distances between embeddings and aggregated them to uncover distinct team signatures
- Created visualizations and presented results to wider research group

College Football Talent Acquisition Network

Oct 2025 - Jan 2026

Network analysis concerning system of player recruitment and transfer in collegiate American football

- Obtained data from API and converted into network
- Used Python to execute range of network analysis techniques, including community detection, bipartite projection, and bespoke null modeling
- Tracked progress with Git and regularly pushed to public repository
- Used LaTeX editor to document results
- Wrote algorithm to impute missing attributes, resulting in **~50% improvement in coverage**
- Developed and computed a set of original metrics to represent roster churn and team recruitment strategy
- Communicated results in blog post on personal website

SKILLS & CERTIFICATIONS

Technical: *Python, Git, Jupyter Notebook, Excel, SQL, Power Query, Power BI, LaTeX*

Analytical: *Graph Theory, Machine Learning, Calculus, Probability and Statistics*

Certifications: *Microsoft Office Specialist: Excel Associate (March 2021)*

LEADERSHIP & ACTIVITIES

Filmmaking Club

Utah State University

Vice President

Aug 2022 - May 2024

- In charge of coordinating and managing club activities, including scheduling production meetings, resource allocation, and maintaining regular mass-email correspondence with club members
- Engaged in marketing and outreach activities on campus
- Led weekly collaborative workshops on various aspects of filmmaking to develop members' technical and creative skills

HOBBIES & INTERESTS

Philosophy, Science, Philosophy of Science, Art/film, Punk/hardcore music, Wall-staring, Writing about self