Amirhossein Sarkaboudi

Master of Science in Psychology

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Profile

A second-year M.S. student at Arizona State University with a background in physics and experience in complex systems. Working with Dr. Ben Falandays, I use agent-based models, Bayesian learning, and large-scale simulations to study how culture, communication, and social networks co-evolve. My research investigates how social pressure and communication dynamics create feedback loops between cultural transmission and social organization, with applications to consensus formation and collective intelligence in digital communities.

Research Interests: Cognitive Science • Bayesian Models • Network Science

Education

Arizona State University — Tempe, USA

M.S., Psychology (Cognition, Behavior and Information) — 2024 – 2026

- Supervisor: J. Benjamin Falandays, Ph.D.
- Committee: Thomas Morgan, Ph.D.; Derek Powell, Ph.D.
- Thesis: Network Structure and Language Evolution: From Coordination to Cumulative Culture

Shahid Beheshti University — Tehran, Iran

B.Sc., Physics — 2019 – 2023

- Supervisor: G. Reza Jafari, Ph.D.
- Relevant Coursework: Complex Systems, Statistics, Probability and Analysis of Data, Stochastic Processes, Foundations of Numerical Simulations, Artificial Intelligence

Research Experience

Co-evolution of Language and Networks through Agent-Based Modeling

Advisor: J. Benjamin Falandays, Ph.D. — Aug 2024 – Present

- Developing large-scale agent-based simulation exploring how communicative success shapes social network structure and linguistic convergence using the Naming Game and Potion task framework.
- Implemented dynamic network mechanisms including preferential attachment and triadic closure for realistic social network evolution.
- Designed metrics for measuring complexity, stability, and alignment in evolving 2D Gaussian speech categories.
- Presented results from this project as a poster at **CogSci 2025** [Poster Link].

Wealth Perception in Inequality: Digital Trace Data

Advisor: Hilke Brockmann, Ph.D. — Jun 2025 – Present

- Built multimodal AI pipeline (Florence-2, GPT-4o, OCR) to detect wealth cues in Instagram posts.
- Performed sentiment analysis of captions and comments, and applied topic modeling to audience discourse.
- Automated large-scale analysis of elite digital self-presentation and public reception.

Community Detection in Political Twitter Networks

Advisor: G. Reza Jafari, Ph.D. — Jul 2023 – Sep 2023

- Detected opinion communities in Iranian election Twitter discourse using Python and network analysis algorithms.
- Visualized large-scale network structures and analyzed polarization patterns using Gephi and adjacency matrix methods.

Conferences

1. **Sarkaboudi, A.**, & Falandays, J.B. (2025). *Network dynamics in language evolution: Agent-based modeling of coordination games and cumulative culture*. Poster presented at the 47th Annual Meeting of the Cognitive Science Society. [Link]
2. Brockmann, H., Piñeyrúa, F., **Sarkaboudi, A.**, & Smaldone, F. (2025). *The Super-Rich Within Reach? Self-Presentation and Common Reception of Wealth in Cyberspace*. Paper presented at the 5th ISA Forum of Sociology, Rabat, Morocco. [Link]

Teaching Experience

Arizona State University | Tempe, USA 2024 – 2026

- Teaching Assistant: Behavioral Data Science II (Spring 2026, upcoming)
- Teaching Assistant: Behavioral Data Science I (Fall 2025)
- Course Assistant: Research Methods in Psychology (Fall 2025)
- Course Assistant: Learning and Motivation (Summer 2025)

Shahid Beheshti University | Tehran, Iran 2022 – 2023

- Teaching Assistant: Complex Systems (Fall 2023)
- Head Teaching Assistant: General Physics II - Electromagnetism (Spring 2023)
- Head Teaching Assistant: General Physics I - Mechanics (Fall 2022)

Technical Skills

Computational Modeling: Agent-based modeling (Agents.jl, NetLogo), Bayesian inference, stochastic processes, Monte Carlo methods

Programming & HPC: Julia, Python, R; Bash scripting, parallel and distributed computing

Data Science & Network Analysis: Pandas, NumPy, Tidyverse, statistical modeling, NetworkX, MetaGraphs.jl, Gephi

Machine Learning & AI: Neural networks and deep learning fundamentals; multimodal analysis (Florence-2, GPT-4o), sentiment analysis, computer vision, OCR, LLMs

Summer Schools

Constructor University Bremen Bremen, Germany

Wealth Data Science Summer School 2024

- Intensive program on computational social science methods for studying economic inequality through digital trace data.

Institute for Research in Fundamental Sciences (IPM) Tehran, Iran

School of Evolutionary Dynamics of Cells and Viruses 2023

- Focused on mathematical biology and evolutionary game theory, drawing on Martin A. Nowak's *Evolutionary Dynamics* .

Selected Bachelor Projects

Monte Carlo Simulation of the 2D Ising Model with Finite-Size Scaling [Link] 2023

ABM Flocking Model Simulation [Link] 2023

Simulation of Disease Spread on Random Networks [Link] 2023

Prey–Predator Population Dynamics Simulation in Python [Link] 2023

Markov Chain Simulation: Hitting Probabilities and Stationary Distributions [Link] 2023

Fractal Image Generation and Box-Counting Dimension Analysis [Link] 2023