

Andrew Belz

pbelz@byu.edu—(805) 624-4436—LinkedIn—GitHub—Personal Website

Education

Bachelor of Science: Applied & Computational Mathematics

Brigham Young University (GPA: 3.93/4.0)

Expected Graduation: April 2028

Provo, UT

Relevant Coursework: Network Theory (Python), Multivariate and Functional Data Analysis (R), Algorithms and Optimization (Python), Multivariable Calculus, Differential Equations, Linear Algebra (Python), Data Structures (C++), Analysis of Variance (R), Applied R Programming (R), Mathematical Analysis (Python).

Bachelor of Science: Data Science

Brigham Young University—Idaho (GPA: 4.0/4.0)

August 2023 - December 2024

Rexburg, ID

Relevant Coursework: Intermediate Statistics, Applied Linear Regression (R), Data Science Programming (Python), Introduction to Databases (MySQL)

Experience

Undergraduate Research Assistant (Python & C++)

Department of Mathematics—Brigham Young University

May 2025 - Present

Provo, UT

- Designing and implementing topological community detection methods for complex networks and abstract simplicial complexes.
- Engineering algorithms in Python and C++ to efficiently compute and analyze topological characteristics of networks.
- Identified statistically significant higher-order structure in functional partitions of the brain of *C. elegans*.
- Presented at BYU's 2026 Student Research Conference. Abstract: *Homology of Colored Graphs: A Framework for Type-Aware Network Topology*.
- Advised by Dr. Benjamin Webb and Dr. Curtis Kent.

Skills

- **Programming Languages:** Python, C++, R, SQL
- **Methods & Methodologies:** Network Analysis, Linear Models, Simulation, Multivariate Statistical Inference, Topological Data Analysis, Functional Data Analysis
- **Software Tools:** Git, L^AT_EX, MySQL, Markdown

Projects

Persistent Homology of Archaeological Similarity Networks (Python)

June 2026 - Present

- Packages and tools: Python, Pandas, NumPy, SciPy, Ripser.
- Implemented persistent homology to study archaeological similarity networks (ASNs).
- Identified topologically significant differences between geographic topology and cultural topology for sites in the American Southwest.
- Preparing manuscript for journal submission.

Graph Dynamical Systems Simulator (Python)

December 2025

- Packages and tools: NumPy, NetworkX, Matplotlib.
- Architected a simulation framework for discrete dynamical systems on graphs to model non-linear node-state evolution across complex network topologies.
- Optimized state-update algorithms utilizing SciPy sparse matrix operations, reducing computational complexity from $O(|V|^2)$ to $O(|E|)$.

Competitive Chess Network Analysis (Python)

November 2025

- Packages and tools: NumPy, Pandas, sqlite, igraph, NetworkX, Matplotlib.
- Engineered an efficient data pipeline using SQLite and Pandas to construct an undirected network model of 500,000 players from 9 million matches.
- Implemented community detection algorithms (e.g. greedy modularity maximization) and computed centrality measures and heuristics (e.g., Eigenvector, Betweenness, Core-periphery) using igraph to extract latent player clusters and hierarchies.