

Jevon Lipsey - September 13 2026

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SUMMARY

Computer Science Ph.D. student at Colorado School of Mines (MIRRORLab, advised by Dr. Tom Williams) researching Human-Robot Interaction to design equitable, community-grounded social robotic systems. Background in published neurosymbolic AI (AAAI-25, PMLR 2025), computational redistricting, and full-stack software engineering, with an undergraduate career marked by high honors (3.92 GPA, Steven Janke Award, Euclid Scholar). Dedicated to deconstructing computational bias and engineering technology that amplifies marginalized voices.

EDUCATION

2026 – 2031 (Exp.)	Colorado School of Mines , Golden, CO Ph.D. in Computer Science <i>Focus: Human-Robot Interaction (MIRRORLab)</i>	
2022 – 2026	Colorado College , Colorado Springs, CO Bachelor of Arts in Computer Science <i>Awards: Steven Janke Award for Outstanding Achievement in CS, Euclid Scholar, Dean's List (all semesters)</i> <i>Relevant Coursework: Software Design (Agile), Data Structures & Algorithms, Theory of Computation, Computer Organization, Applied Python, Ubiquitous Computing, Generative Art, Robot Ethics, Linear Algebra, Probability & Statistics, Discrete Mathematics</i>	GPA: 3.92 / 4.00
2018 – 2022	Wichita South High School , Wichita, KS <i>Valedictorian, National Honors Society</i>	GPA: 4.00 / 4.00

PUBLICATIONS

- Collins, S., Morris, N. C., Diamond, M., Wills, M., **Lipsey, J.**, & Williams, T. (2027). Sweepless Dreams: Envisioning Social Robots to Support the Unhoused. *Proceedings of the 2027 ACM/IEEE International Conference on Human-Robot Interaction (HRI '27)*, Silicon Valley, CA. (Under Review).
- Zhang, Y., White, Y., Clark, D., Sanchez, J., **Lipsey, J.**, Hirst, A., & Heflin, J. (2025). High Quality Embeddings for Horn Logic Reasoning. In H. Gilpin, L. Giunchiglia, E. Hitzler, P., & van Krieken, E. (Eds.), *Proceedings of The 19th International Conference on Neurosymbolic Learning and Reasoning*, volume 284 of *Proceedings of Machine Learning Research*, pp. 116–129. PMLR. <https://proceedings.mlr.press/v284/zhang25a.html>
- White, Y., **Lipsey, J.**, & Heflin, J. (2025). An Evaluation of Approaches to Train Embeddings for Logical Inference (Student Abstract). *Proceedings of the AAAI Conference on Artificial Intelligence*, 39(28), 29527–29528. <https://doi.org/10.1609/aaai.v39i28.35313>

RESEARCH EXPERIENCE

Undergraduate Researcher | MCURE Program, Colorado College June 2026 - July 2026

- Formulated Total Community Preservation (TCP), an HHI-adapted metric quantifying community of interest (COI) fractures in redistricting; proved TCP models the pairwise probability of two community members sharing a district.
- Built a Python geospatial pipeline (GeoPandas) intersecting Census VTDs with citizen-submitted (Representable.org) and administrative COI maps to generate demographic-weighted dual graphs.

- Simulated 20m+ MCMC steps (GerryChain ReCom) across three legislative chambers in Colorado to evaluate metric trade-offs against Shannon Entropy and binary split metrics.
- Discovered that optimizing for unvetted COI collections can swing congressional partisan balance by 5% (0.43 seats), demonstrating significant gameability in redistricting criteria.
- Co-authored working paper and delivered final cohort presentation to faculty and peers.
- Presented research findings as a poster at the 2027 Joint Mathematics Meetings (JMM) in Chicago highlighting the implications of COI-based redistricting on electoral fairness and representation.

Undergraduate Researcher | Lehigh University REU

June 2024 - Aug 2024

- Optimized neurosymbolic backward-chaining reasoners via embedding model tuning, reducing computational waste (mean nodes explored) by up to 99% compared to standard brute-force reasoners (results published at AAAI-25 and PMLR 2025).
- Developed and implemented a data preparation pipeline using the Grosz et al. algorithm to translate complex Description Logic (OWL/RDF) axioms from real-world Knowledge Bases (2008 Olympics, Nobel Prize) into Datalog rules, enabling training on realistic data. Addressed translation limitations for constructs like negation and cardinality restrictions.
- Led extensive benchmarking experiments on embedding model performance based on training data volume (70K, 200K, 800K, 1.3M triplets), identifying optimal performance (200K triplets for Olympics dataset) and diagnosing performance degradation at larger scales as potential 'embedding space crowding'.
- Proposed and evaluated solutions to embedding space crowding, including increasing embedding dimensions (from 50 to 100) and enhancing triplet generation density (from 3 to 10 triplets per anchor atom), observing improved performance in some configurations.
- Investigated and refined embedding model training techniques, including: (1) implementing balanced triplet generation (easy/medium/hard examples based on structural mutations); (2) increasing sampling of repeated-term atoms (RTAs); (3) implementing hard negative mining strategies; (4) exploring pairwise-distance vs. cosine distance triplet loss functions.
- Presented research progress and findings in two formal 40-minute presentations to REU faculty, graduate students, and peers. Contributed significantly to methodology and results sections for subsequent publications.

Editor-in-Chief Research Assistant | Oxford University Press

May 2025 - Aug 2025

- Supported Dr. Heidi R. Lewis's research on Midwestern U.S. Hip Hop subculture, analyzing regional identity, sound evolution, and socioeconomic indicators using intersectional feminist and Critical Race Theory lenses.
- Compiled and analyzed diverse primary sources (lyrics, music videos, social media interactions, artist interviews) and secondary sources (peer-reviewed scholarship, census data) to challenge dominant narratives of the Midwest as "fly-over country."
- Identified and characterized distinct Midwestern subgenres (e.g., Chopper Rap, Detroit Trap/Flint Flow, Chicago Drill/Bop, St. Louis Bounce, Milwaukee Lowend) and their connection to local environments, histories of segregation, and socioeconomic realities (poverty, unemployment rates).
- Compared lyrical themes, sonic features, and socioeconomic data of Midwest Hip Hop against East Coast, West Coast, and Southern regions to identify unique characteristics and regional resistance narratives.
- Contributed research findings, literature reviews, and data analysis summaries to Oxford's Women & Gender Studies Bibliography.
- Conducted fieldwork and cultural analysis during a research trip to Berlin, Germany, particularly examining Hip Hop's global diffusion, local adaptation, and role in diasporic communities through an intersectionalist lens.

ADDITIONAL EXPERIENCE

Math and CS Grader | Colorado College

Dec 2024 - May 2026

Grading assignments and providing detailed feedback for 100-300 level computer science and mathematics courses (including DSA, Software Design, Applied Python, Probability & Statistics, Calculus 1).

Interdisciplinary House Assistant | Colorado College

Sep 2025 - May 2026

Assisting Interdisciplinary Studies department: designing and distributing posters, supporting faculty, aiding in event programming, maintaining department house space.

Creative Designer and Videographer | Freelance

Aug 2021 - Present

- Designed 2D/3D logos, branding packages, motion graphics, and digital/print assets for 30+ clients, managing all client communications, project scoping, contract negotiation, finances, scheduling, and final asset delivery.
- Shot, directed, and edited music videos, promotional trailers, short films/documentaries, event recaps, and other digital media content using professional camera equipment and Adobe Creative Suite.
- Served as lead cinematographer and editor for multiple collaborative college short film productions, managing creative vision and post-production workflow.

Electronics Sales Associate | Walmart

Mar 2020 - June 2024

Managed high volume of customer inquiries, technical support requests, and sales transactions daily in a fast-paced retail environment; handled high-value inventory management, order processing, and departmental audits. Developed strong communication and problem-solving skills.

PROJECTS

Pocket8 (iOS App)

[GitHub Repository](#)

JavaScript, Vue.js, Swift, Capacitor, WebAssembly, Git

Built an officially licensed PICO-8 mobile companion app in collaboration with Lexaloffle Games, achieving over 6,000 total downloads. Engineered a custom iOS wrapper, modifying the Emscripten boot sequence to bridge the WebAssembly engine with iOS file systems. Developed quicksave functionality using compressed memory snapshots and designed a responsive interface with custom haptic controls.

FeatherWeight (Senior Capstone)

[GitHub Repository](#)

Python, Vue.js, FastAPI, SQLite, Playwright, Docker, eBird API, Git

Architected a full-stack, fully dockerized web application for a client (Dr. Steve Getty) to rank birding hotspots and predict bird sightings based on weighted observation likelihood. Developed a robust backend pipeline using FastAPI, Python, and Playwright to scrape and aggregate historical eBird data into a SQLite database. Designed a dynamic Vue.js frontend for users to filter, rank, and visualize sighting probabilities, removing the need for users to understand the underlying statistical methods.

Twitter Community Detection

[GitHub Repository](#)

Python, NetworkX, Pandas, Infomap, Matplotlib, Git

Implemented the Infomap (flow compression/Map Equation) algorithm from scratch in Python as primary contribution to a team Data Structures & Algorithms project comparing community detection methods. Benchmarked my implementation against the official Infomap library on SNAP Twitter dataset subgraphs (200 nodes) focused on political news accounts (CNN, Fox News, New Yorker), achieving a strong modularity score of 0.55. Analyzed results alongside team's from-scratch Leiden (modularity optimization) build to identify potential echo chambers.

Ocean Sweep: Ubiquitous Computing Game

[GitHub Repository](#)

JavaScript, Three.js, HTML/CSS, Micro:bit (MicroPython), Google MediaPipe, Git

Co-developed a 3D web game in a team for Ubiquitous Computing course to raise awareness of ocean plastic pollution. Implemented core game mechanics, boat physics, dynamic trash/animal spawning system, and environmental effects using Three.js. Integrated multiple ubiquitous inputs: keyboard, custom Micro:bit steering wheel controller (accelerometer + radio communication via Web Serial API), and AI-driven hand gesture recognition (Google MediaPipe Hand Landmarker via webcam) for trash collection.

Chicago Redlining & Environmental Disparity Analysis

[GitHub Repository](#)

GIS, Python, Data Visualization, Statistical Analysis

Analyzed correlations between 1930s HOLC redlining maps and modern environmental/health outcomes in Chicago using GIS tools in Social Justice course. Mapped and statistically compared disparities in tree canopy cover, life expectancy, poverty rates, racial composition, and PM 2.5 levels across historical neighborhood grades using data from US Census Bureau and CDC.

Poverty and Arts Participation Statistical Analysis

[GitHub Repository](#)

R, ggplot2, Statistical Analysis (t-tests), Data Cleaning

Investigated relationship between US state-level poverty and public arts participation using R in Statistics course. Cleaned and merged datasets from 2012 NADAC Survey and NCES Free/Reduced Lunch eligibility data. Conducted two-sample t-tests comparing participation rates across high vs. low-poverty states for various art forms. Visualized findings using ggplot2.

SKILLS

Languages	Python (Proficient), Java, C#, C, SQL, R, JavaScript, HTML/CSS
Concepts	Machine Learning (Supervised Learning, Embeddings, Triplet Loss), Neurosymbolic AI, Logical Inference (Horn Logic, Datalog, Description Logic), Knowledge Representation (OWL/RDF), Data Mining, Community Detection (Infomap), Algorithm Design & Analysis, Statistical Analysis (Hypothesis Testing, T-tests), Agile Methodologies, Object-Oriented Programming, Data Structures, Human-Computer Interaction (HCI) Principles, Critical Race Theory
Frameworks & Libraries	PyTorch, Scikit-learn, GeoPandas, GerryChain, Pandas, NumPy, NetworkX, Matplotlib, ggplot2, Flask, Three.js, Google MediaPipe, SMAPI (Stardew Valley Modding), Harmony, Unity, LaTeX
Tools & Methodologies	Git/GitHub, MCMC Ensembles, Performance Benchmarking, Experimental Design, Embedding Model Tuning & Evaluation, Data Translation, Cleaning, Aggregation & Visualization, Algorithm Implementation, Model Evaluation & Validation, Qualitative & Quantitative Analysis Methods, Mathematical Proofs, GIS/Geospatial Analysis, Microcontroller Programming (Micro:bit, Arduino), Adobe Creative Suite, Figma