

Abhinav Gupta

Curriculum Vitae

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RESEARCH INTERESTS

I study cognitively grounded natural language processing, combining probabilistic and neural models of human language understanding with human-centric evaluation of social reasoning and perceptual grounding, and developing language technologies for social good.

EDUCATION

- University of Southern California** Los Angeles, CA
B.S. Computer Science, B.A. Cognitive Science Honors, AI Applications Specialization May 2026
- **Major GPA:** Computer Science 3.72, Cognitive Science 3.81
 - **Relevant Coursework:** Natural Language Processing, Machine Learning, Linear Algebra, Probability and Statistics, Language and Mind, Human Language and Technology, Cognitive Processes

RESEARCH EXPERIENCE

- Undergraduate Researcher, Interaction Lab** December 2024 – Present
University of Southern California Advisor: Dr. Maja Matarić
- Investigating whether large language models can infer human actions and latent motives in strategic decision making, benchmarking against human behavioral data and statistical baselines
 - Evaluating model prediction performance in the Social Prediction Game (SPG) and Inspection Game (IG), where LLMs observe simulated agents with rule-based motives such as greed and risk aversion
 - Found that LLMs fail to adapt predictions over time unlike humans who develop mental models based on opponents' move patterns, revealing gaps in cross-game generalization that suggest fundamental differences in theory of mind reasoning
 - Co-authored "Can Large Language Models Infer Human Actions and Motives in Strategic Decision Making," which has been submitted to AAAI 2026.

- Undergraduate Researcher, Language Development Lab** December 2023 – Present
University of Southern California Advisor: Dr. Toben H. Mintz
- Designed and led a behavioral study with 250+ participants examining sensorimotor associations for pseudowords across eleven perceptual and motor modalities
 - Constructed a controlled pseudoword stimulus set using Wuggy generation and computational model-based sensorimotor projections to isolate sublexical sound–meaning cues
 - Performed statistical modeling and visualization, with preliminary results suggesting humans and models align on interoceptive and auditory modalities but diverge strongly on olfactory and haptic dimensions
 - Investigating sound–meaning mapping; paper in preparation to be submitted to ACL 2026

- Undergraduate Researcher, GLAMOR Lab** August 2023 – Present
University of Southern California Advisor: Dr. Jesse Thomason
- Developed SENSE (Sensorimotor Embedding Norm Scoring Engine), a system mapping embeddings (Word2Vec, GloVe, BERT CLS) into the 11-dimensional Lancaster sensorimotor norms
 - Benchmarked grounding across embeddings using baseline, KNN, and neural architectures, revealing that distributional embeddings encode gustatory information more reliably than other modalities
 - Applied SENSE to downstream tasks including emoji grounding, revealing that emoji embeddings capture sensorimotor dimensions beyond visual similarity
 - Presented this work at the Southern California NLP Symposium 2024

Undergraduate Researcher, CAIS++
USC & Universidad Nacional de Colombia

September 2022 – December 2023
Advisor: Dr. Robin Jia

- Partnered with the Muysccubun revitalization group to build NLP resources for Muisca (Chibcha), an Indigenous language with no prior digital corpus
- Created the first parallel Muisca–Spanish corpus of 6,000 sentence pairs from colonial manuscripts using custom scraping, parsing, and alignment algorithms tailored to handle historical orthographic variations
- Fine-tuned mT5 for low-resource machine translation, outperforming other endangered language MT systems despite using a smaller corpus, demonstrating the effectiveness of our preprocessing methods
- Built an interactive web-based educational tool to support community-led language revitalization and presented this work at the Southern California NLP Symposium 2023

Research Assistant, SAIL

University of Southern California

August 2021 – May 2022

Advisor: Dr. Shrikanth Narayanan

- Developed preprocessing pipelines and annotated multimodal video datasets combining facial, audio, and textual signals for emotion recognition experiments
- Reproduced baseline emotion recognition models and ran ablation experiments on bias mitigation techniques
- Identified lower accuracy for certain demographic subgroups, revealing bias patterns stemming from training data sourced from American television shows with limited demographic diversity

PUBLICATIONS & PRESENTATIONS

- A. Gupta, J. Thomason, T. H. Mintz. “Inferring Sensorimotor Meaning from Sublexical Form: A Computational and Human Study.” *In preparation for ACL 2026*
- K. Shrestha, H. Dukkipati, A. Gupta, Z. Shi, M. Matarić. “Can Large Language Models Infer Human Actions and Motives in Strategic Decision Making?” *Submitted to AAAI, 2026.*
- A. Gupta, J. Thomason. “Extracting Sensorimotor Associations of Phrases.” *Southern California NLP Symposium, 2024.*
- A. Gulati, L. Moreno, A. Gupta, A. Kumar. “Endangered Language Preservation using Machine Translation.” Second-best poster award, *USC ShowCAIS Research Showcase, 2023.*
- A. Gulati, L. Moreno, A. Kumar, A. Gupta. “Creating a Parallel Corpus for a Low-Resource, Indigenous Language: Muisca-to-Spanish.” *Southern California NLP Symposium, 2023.*

HONORS, SCHOLARSHIPS & AWARDS

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| • USC Renaissance Scholar Distinction | November 2025 |
| • USC Dornsife Continuing Student Scholarship | August 2025 – Present |
| • Center for Undergraduate Research in Viterbi Engineering Fellowship | May 2025 – August 2025 |
| • USC Cognitive Science Honors | August 2024 – Present |
| • USC Provost Fellowship | May 2024 – August 2024 |
| • Undergraduate Research Associates Program Scholar | August 2023 – May 2024 |
| • Second-best poster presentation, USC ShowCAIS | April 2023 |
| • Dean’s List (Dornsife College) | Spring 2022, Fall 2022, Fall 2024, Spring 2025 |
| • Dean’s List (Viterbi School of Engineering) | Fall 2021, Spring 2022, Fall 2022, Fall 2024 |

TEACHING & MENTORING EXPERIENCE

Math Peer Mentor

USC Viterbi MESA Program

August 2025 – Present
Los Angeles, CA

- Mentor first-year students in calculus, supporting problem-solving skills and effective study habits
- Conduct program outreach through social media, classroom visits, and collaboration with student orgs

Course Producer & Peer Mentor <i>USC Viterbi School of Engineering</i>	January 2022 – December 2024 <i>Los Angeles, CA</i>
<ul style="list-style-type: none"> Supported CSCI 270, CSCI 170, and CSCI 102 through tutoring, office hours, and technical guidance Mentored more than 100 students and contributed to inclusive learning in large-enrollment courses Assisted with designing assignments, curating assessments, and refining instructional materials 	
Computer Science Tutor <i>Viterbi Impact Program</i>	September 2021 – January 2022 <i>Los Angeles, CA</i>

<ul style="list-style-type: none"> Taught foundational programming concepts to middle school students and teachers in community STEM programs Led curriculum discussions and coordinated with program instructors to improve lesson flow
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INDUSTRY EXPERIENCE

Software Development Engineering Intern <i>Amazon Inc.</i>	May 2023 – August 2023 <i>Culver City, CA</i>
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<ul style="list-style-type: none"> Designed an internal automation tool using Java, Python, and AWS Reduced recurring manual workload by 10 hours per week through end-to-end automation
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Full Stack Developer & AI Engineer <i>Bacpoint, Inc.</i>	May 2022 – December 2022 <i>Los Angeles, CA</i>
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<ul style="list-style-type: none"> Built the full mobile application stack for <i>Ethos</i>, a mindful consumption app Led a team of five engineers developing a predictive AI model to estimate alcohol intake from facial signals

TECHNICAL SKILLS

- Research Methods:** Experimental design, human subject studies, statistical modeling, psycholinguistic analysis, behavioral data analysis, data visualization
- Machine Learning & NLP:** PyTorch, TensorFlow, Hugging Face, spaCy, scikit-learn, representation learning, LLM evaluation, sequence modeling
- Programming:** Python, R, Java, C++, JavaScript, SQL
- Data & Tools:** NumPy, pandas, Jupyter, Git, Docker, Linux, LaTeX
- Web Development:** React, Node.js, Django, AWS

SERVICE & LEADERSHIP

Software Developer & Volunteer <i>Code the Change</i>	September 2022 – July 2024 <i>Los Angeles, CA</i>
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<ul style="list-style-type: none"> Developed software for non-profit partners focused on accessibility, safety, and community support Contributed as a full-stack developer to a community platform for assault survivors, applying computing to sensitive social challenges
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Curriculum Lead & Project Member <i>USC Center for AI in Society (CAIS++)</i>	September 2021 – January 2024 <i>Los Angeles, CA</i>
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<ul style="list-style-type: none"> Led a team of seven students designing and teaching a semester-long curriculum on AI and machine learning for social good Provided technical mentorship to NLP project teams, including work that was later presented to the broader USC and SoCal AI communities Participated in interdisciplinary discussions on aligning AI systems with social impact
