

# Abhinav Gupta

Curriculum Vitae

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## RESEARCH INTERESTS

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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

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**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

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**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

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- **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. Dukkupati, **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

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**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***USC Viterbi School of Engineering*

January 2022 – December 2024

*Los Angeles, CA*

- 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***Viterbi Impact Program*

September 2021 – January 2022

*Los Angeles, CA*

- 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

**INDUSTRY EXPERIENCE**

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**Software Development Engineering Intern***Amazon Inc.*

May 2023 – August 2023

*Culver City, CA*

- Designed an internal automation tool using Java, Python, and AWS
- Reduced recurring manual workload by 10 hours per week through end-to-end automation

**Full Stack Developer & AI Engineer***Bacpoint, Inc.*

May 2022 – December 2022

*Los Angeles, CA*

- Built the full mobile application stack for *Ethos*, a mindful consumption app
- Led a team of five engineers developing a predictive AI model to estimate alcohol intake from facial signals

**TECHNICAL SKILLS**

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- **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**

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**Software Developer & Volunteer***Code the Change*

September 2022 – July 2024

*Los Angeles, CA*

- 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

**Curriculum Lead & Project Member***USC Center for AI in Society (CAIS++)*

September 2021 – January 2024

*Los Angeles, CA*

- 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