Kajal Patel

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Education

University of Illinois Urbana-Champaign *August 2022 - May 2026*

Bachelor of Science in Computer Science, *Minor in Statistics, Minor in Psychology*

- **GPA:** 3.97/4.00
- **Relevant Coursework:** Deep Learning for Computer Vision, Theoretical Machine Learning, Applied Machine Learning, Computational Photography, Artificial Intelligence, Mobile Robotics, Algorithms, Numerical Methods, Database Systems, Linear Algebra, Statistics & Probability, Decisions and Judgment, Personality Psychology, Brain and Cognition

Research and Work Experience

Research Assistant *May 2025 – Present*

Affective Intelligence and Robotics Laboratory, Cambridge University *Remote*

- **Project:** Investigating Biases in Affective Inter-Model Communication of Large Generative Models
- **Advisors:** Dr. Fethiye Irmak Doğan, Dr. Hatice Gunes
- Conduct activation map analyses using Grad-CAM to investigate how vision-language models attend to faces, bodies, and contextual regions when interpreting images across emotion and activity categories.
- Design statistical comparisons of region-specific activations to assess category-dependent patterns of model attention, revealing systematic biases in protected attributes.
- Evaluate captioning success rates across categories to determine when models align with human-interpretable cues versus when reliance on localized features limits performance.
- Integrate quantitative activation metrics with visual evidence to create a robust multi-modal evaluation of interpretability.
- Co-authoring a journal paper reporting these findings, highlighting implications for model bias, interpretability, and responsible deployment of vision-language systems.

Research Assistant *May 2025 – Present*

Siebel School of Computing and Data Science, University of Illinois Urbana-Champaign *Urbana, IL*

- **Project:** Measuring How Student Test Anxiety Affects Studying Behavior
- **Advisors:** Dr. Mariana Silva, Dr. Matthew West, Dr. Jim Sosnowski, Dr. Craig Zilles, Dr. Geoffrey Herman
- Lead statistical and temporal analysis for a research initiative investigating how test anxiety affects student learning behavior and exam preparation timing.
- Design and implement regression models to assess the influence of state and trait anxiety on preparation behaviors and test performance outcomes.
- Merge and analyze survey data with behavioral log data to evaluate predictors of question-level performance and time allocation.
- Collaborate with a multidisciplinary faculty team (CS, ATLAS, MechSE) to support the creation of anxiety-aware instructional practices through a SIIP grant.
- Authoring a journal paper based on this work, focusing on behavioral signatures of anxiety in academic testing environments.

Research Assistant *May 2025 – Present*

Siebel School of Computing and Data Science, University of Illinois Urbana-Champaign *Urbana, IL*

- **Project:** Collaborative Learning's Impact on Student Sense of Belonging
- **Advisors:** Dr. Mariana Silva, Dr. Matthew West, Dr. Geoffrey Herman
- Conduct statistical analyses of submission timing to evaluate how collaborative role assignments influence student preparation behavior.
- Apply nonparametric methods (e.g., Mann–Whitney tests) and other statistical methods to assess cluster-level differences.
- Contribute to an NSF-funded initiative (Award #2121412) investigating how structured collaboration affects student engagement, preparation timing, and learning outcomes.

Research Assistant   *October 2024 – Present*
Siebel School of Computing and Data Science, University of Illinois Urbana-Champaign   *Remote*

- **Project:** Understanding the Impact of Second-Chance Testing Policies on Student Behavior
- **Advisors:** Dr. Geoffrey Herman
- Analyze second-chance testing regimens using student performance data to assess learning, retention, and course experience.
- Apply statistical analysis and survey data to assess student performance trends and perceptions of testing methods.

Research Intern   *August 2024 – May 2025*
National Center for Supercomputing Applications, University of Illinois Urbana-Champaign   *Urbana, IL*

- **Project:** Open-Vocabulary Scene Graph Generation using Vision-Language Models
- **Advisor:** Dr. Ismini Lourentzou
- Researched Scene Graph Generation to overcome limitations of closed vocabularies and biases toward frequent objects.
- Integrated Large Vision-Language Models with query transformers and a Hungarian matching algorithm to enhance prediction.
- Refined relation prediction and conducting ablation studies to further improve model performance and generalization.

Research Intern   *May 2024 – August 2024*
Center for Exascale-enabled Scramjet Design, National Center for Supercomputing Applica-   *Urbana, IL*
tions

- **Project:** Graphical Tracing and Optimization of Lazy Evaluation
- Investigated array-based program transformations and optimizations in high-performance computing applications.
- Traced and unpack computations through directed acyclic graphs mapping static control programs with array input.

Applied Machine Intelligence R&D Intern   *August 2023 – June 2025*
Sandia National Laboratories, Department of Energy   *Albuquerque, NM*

- Designed a 3D reconstruction pipeline leveraging differentiable Gaussian splatting to enable view synthesis from X-ray projections.
- Integrated neural radiance field-based tomography to enhance sparse-view 3D reconstruction, improving fidelity with limited data.
- Formulated novel exhaustive evaluation framework for DOE-funded climate research RAG-based large language model.
- Experimented with natural language processing and metrics like latent dirichlet allocation to measure similarity in corpora of text.

Software R&D Intern   *May 2023 – August 2023*
Sandia National Laboratories, Department of Energy   *Albuquerque, NM*

- Restructured the queuing and processing mechanism for satellite data streams, ensuring handling without overloading.
- Designed CI/CD version control pipeline to generate live changelogs in a conventional commit structure upon changes to a repository.

Research Assistant   *March 2023 – December 2023*
Siebel School of Computing and Data Science, University of Illinois Urbana-Champaign   *Urbana, IL*

- **Advisor:** Dr. Matthew Caesar
- Spearheaded research and implementation of knowledge graph attention networks for academia-focused recommender systems.
- Held weekly team meetings and delivered progress reports to project managers and advisors.

Research Assistant   *August 2022 - October 2024*
Siebel School of Computing and Data Science, University of Illinois Urbana-Champaign   *Urbana, IL*

- **Project:** Frequent Testing vs. Second-chance Testing: An Exploration
- **Advisor:** Dr. Geoffrey Herman
- Compare different exam structures across courses to evaluate trade-offs between frequency, second chances, and stress levels.
- Investigate strategies for optimizing assessments, balancing retrieval practice, remediation, and student well-being.
- Used statistical analysis tools like ANOVA with Tukey post-hocs, Item Response Theory, and t-tests.

Publications

Frequent Testing vs. Second-chance Testing: An Exploration   August 2025

Geoffrey Herman, **Kajal Patel**, Chinedu Emeka, Craig Zilles, and Matthew West

Proceedings of the 2025 ACM Conference on International Computing Education Research (ICER '25)

[10.1145/3702652.3744210](#) ↗

Poster Presentations

Dennis Dean Undergraduate Research and Creative Scholarship Conference   April 2025
Virginia Polytechnic Institute and State University
Invited Presenter

NCSA Student Research Conference   April 2025
National Center for Supercomputing Applications
Presenter

Denman Undergraduate Research Forum   March 2025
The Ohio State University
Invited Presenter

Center for Undergraduate Opportunities Symposium   April 2024
University of Georgia
Invited Presenter

Illinois Scholars Undergraduate Research Symposium   April 2024, April 2025
University of Illinois Urbana-Champaign
Presenter

University of Illinois Undergraduate Research Symposium   April 2023, April 2024
University of Illinois Urbana-Champaign
Presenter

Awards

Outstanding SPIN Intern Award   *Awarded May 2025*

- Recognized as an outstanding undergraduate researcher for work on open-vocabulary scene graph generation by the National Center for Supercomputing Applications.

Computer Science Ambassador & Research Scholar   *Awarded August 2022*

- Selected as an ambassador for minorities in computer science research and recognized department-wide for outstanding research contributions.
- Led efforts to improve minority sense of belonging, including spearheading a committee on toxic environments within the department.

Stamps Scholar   *Awarded April 2022*

- Received most prestigious and selective scholarship (four-year full-ride) at the University of Illinois at Urbana-Champaign.
- Selected on basis of leadership, academics, and service from among 475,000+ applicants.

Teaching Experience

STAT 400: Statistics & Probability I   Spring 2024 – Present
Course Assistant   *University of Illinois Urbana-Champaign*

CS 357: Numerical Methods   Spring 2024 – Present
Course Assistant   *University of Illinois Urbana-Champaign*

Girls Who Code   August 2022 - Present
Lead Facilitator   *University of Illinois Urbana-Champaign*

CS 173: Discrete Structures   August 2023 – August 2024
Course Assistant   *University of Illinois Urbana-Champaign*

Skills

Technical: Python, Java, C++, SQL, R, C, Numpy, Neo4J, MongoDB, Tensorflow, Pytorch, Matplotlib, Pandas, Scipy, JavaScript

Spoken languages: English, Hindi, Spanish, Gujarati