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:**
  - **Computer Science:** Deep Learning for Computer Vision, Theoretical Machine Learning, Applied Machine Learning, Computational Photography, Artificial Intelligence, Mobile Robotics, Algorithms, Numerical Methods, Database Systems
  - **Statistics:** Linear Algebra, Statistics & Probability, Statistical Analysis, Statistical Programming Methods
  - **Psychology:** Decisions and Judgment, Personality Psychology, Brain and Cognition, Human Performance and Cognition

Awards

Outstanding SPIN Intern Award *Awarded May 2025*

- Recognized as an outstanding undergraduate researcher by the National Center for Supercomputing Applications.

Computer Science Ambassador & Research Scholar *Awarded August 2022*

- Selected as an ambassador for broadening participation in computer science research and recognized for outstanding research.
- Chosen as a member of a committee to improve sense of belonging for underrepresented groups 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.

Publications

[C1] Geoffrey L. Herman, **Kajal Patel**, Chinedu Emeka, Craig Zilles, and Matthew West. 2025. *Frequent Testing vs. Second-chance Testing: An Exploration.* In *Proceedings of the 2025 ACM Conference on International Computing Education Research V.1 (ICER '25).* Association for Computing Machinery, New York, NY, USA, 354–366. doi:10.1145/3702652.3744210.

[C2] **Kajal Patel**, Mariana Silva, Geoffrey L. Herman, Jim Sosnowski, and Matthew West. 2026. *Understanding the Impact of Test Anxiety on Study Behavior.* To appear in the *ASEE Annual Conference & Exposition.*

[C3] **Kajal Patel**, Mariana Silva, and Geoffrey L. Herman. 2026. *Measuring the Effects of Structured Roles in Digital Collaborative Learning.* To appear in the *ASEE Annual Conference & Exposition.*

[J1] **Kajal Patel**, Chinedu Emeka, Geoffrey L. Herman, and Lucas Flygare. *Second-Chance Testing Policy and Retake Behavior in Engineering Education.* In preparation for submission to *Journal of Engineering Education.*

[J2] Fethiye Irmak Doğan, Yuval Weiss, **Kajal Patel**, Jiaee Cheong, and Hatice Gunes. *Investigating Biases in Affective Inter-Model Communication of Large Generative Models.* Under review at *Journal of Artificial Intelligence Research.* arXiv preprint arXiv:2601.22093.

Research and Work Experience

Computer Vision Research Intern *May 2025 – Present*
Affective Intelligence and Robotics Laboratory, Cambridge University *Remote*

- **Project:** Investigating Biases in Affective Inter-Model Communication of Large Generative Models [J2]
- **Advisors:** Dr. Fethiye Irmak Doğan, Prof. Hatice Gunes
- Analyze GradCAM activations to examine vision-language models' attention to affective regions for emotion recognition.
- Design statistical tests of region activations to assess category-driven attention and biases across protected attributes.
- Evaluate captioning accuracy across categories to assess when models follow human cues versus rely on localized features.

Computing Education Research Assistant *May 2025 – Present*
Siebel School of Computing and Data Science, University of Illinois Urbana-Champaign *Urbana, IL*

- **Project:** Understanding the Impact of Test Anxiety on Study Behavior [C2]
- **Advisors:** Prof. Mariana Silva

- Conduct statistical and temporal analysis on how test anxiety influences student learning and exam preparation timing.
- Implement regression models to assess state and trait anxiety effects on preparation behavior and test performance.
- Analyze survey data with behavioral log data to evaluate predictors of question-level performance and time allocation.

Computing Education Research Assistant *May 2025 – Present*
Siebel School of Computing and Data Science, University of Illinois Urbana-Champaign *Urbana, IL*

- **Project:** Measuring the Effects of Structured Roles in Digital Collaborative Learning [C3, P1]
- **Advisors:** Prof. Mariana Silva
- Conduct statistical analyses of group submissions to evaluate how role assignments influence student preparation behavior.
- Apply nonparametric methods (e.g., Mann–Whitney tests) and other statistical methods to assess cluster-level differences.

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

- **Project:** Second-Chance Testing Policy and Retake Behavior in Engineering Education [J1, P4, P5]
- **Advisors:** Prof. Geoffrey Herman
- Analyze second-chance testing regimens using performance data to assess student retake behavior and exam performance.
- Compare student response to two second-chance testing regimens, relating them to student perception of risk and reward.

Computer Vision Research Intern *August 2024 – May 2025*
National Center for Supercomputing Applications *Urbana, IL*

- **Project:** Open-Vocabulary Scene Graph Generation using Vision-Language Models [P2, P3]
- **Advisor:** Prof. Ismini Lourentzou
- Designed scene graph generation methods to address limitations in closed vocabularies and low-tail object distributions.
- Integrated Large Vision-Language Models with Query Transformers and a Hungarian matching algorithm.
- Refined relation prediction and conducted ablation studies to further investigate model performance and generalization.

High-Performance Computing Research Intern *May 2024 – December 2024*
Center for Exascale-enabled Scramjet Design, National Center for Supercomputing Applications *Urbana, IL*

- **Project:** Graphical Tracing and Optimization of Lazy Evaluation
- **Advisor:** Matthew Smith
- Led 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 Research & Development Intern *August 2023 – June 2025*
Sandia National Laboratories, Department of Energy *Albuquerque, NM*

- Designed a 3D reconstruction pipeline with differentiable Gaussian splatting for view synthesis from X-ray projections.
- Integrated neural radiance field tomography to enhance sparse-view 3D reconstruction, improving limited-data fidelity.
- Formulated novel exhaustive evaluation framework for DOE-funded climate research RAG-based large language model [P6].
- Used natural language processing methods like Latent Dirichlet Allocation to measure similarity in text corpora.

Software Research & Development 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 as conventional commits to a 300+ person repository.

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

- **Project:** PeopleWeave: Graph-Based Modeling of Research Collaborations
- **Advisor:** Prof. Matthew Caesar
- Explored knowledge graph attention networks for academic collaborator recommendation using SIGCOMM data.
- Conducted literature review and analyzed collaboration and publication patterns to inform model design and evaluation.

Computing Education 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 [C1, P7, P8, P9, P10]
- **Advisor:** Prof. Geoffrey Herman
- Compare different exam structures across courses to evaluate trade-offs between exam frequency and retake opportunities.
- 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.

Poster Presentations

[P1] American Society for Engineering Education Annual Conference & Exposition
"Collaborative Learning's Impact on Student Sense of Belonging" — *June 2026*
NSF Grantee Presenter — Charlotte, North Carolina

[P2] Dennis Dean Undergraduate Research and Creative Scholarship Conference
"Advancing Open-Vocabulary Scene Graph Generation Using Vision-Language Models" — *April 2025*
Invited Presenter — Virginia Polytechnic Institute and State University

[P3] NCSA Student Research Conference
"Advancing Open-Vocabulary Scene Graph Generation Using Vision-Language Models" — *April 2025*
Presenter — National Center for Supercomputing Applications

[P4] Illinois Scholars Undergraduate Research Symposium
"Assessing Second-Chance Testing Policies: Implications for Performance and Study Behavior" — *April 2025*
Presenter — University of Illinois Urbana-Champaign

[P5] Denman Undergraduate Research Forum
"Assessing Second-Chance Testing Policies: Implications for Performance and Study Behavior" — *March 2025*
Invited Presenter — The Ohio State University

[P6] Sandia National Laboratories Research Symposium
"Evaluating Retrieval Augmented Generation-Based Large Language Models for Climate Science" — *July 2024*
Presenter — Albuquerque, New Mexico

[P7] Center for Undergraduate Opportunities Symposium
"Frequent Testing vs. Second-Chance Testing: An Exploration" — *April 2024*
Invited Presenter — University of Georgia

[P8] University of Illinois Undergraduate Research Symposium
"Frequent Testing vs. Second-Chance Testing: An Exploration" — *April 2024*
Presenter — University of Illinois Urbana-Champaign

[P9] Illinois Scholars Undergraduate Research Symposium
"Frequent Testing vs. Second-Chance Testing: An Exploration" — *April 2024*
Presenter — University of Illinois Urbana-Champaign

[P10] University of Illinois Undergraduate Research Symposium
"Frequent Testing vs. Second-Chance Testing: An Exploration" — *April 2023*
Presenter — University of Illinois Urbana-Champaign

Teaching Experience

Course Assistant — University of Illinois at Urbana-Champaign
- Statistics & Probability I — *January 2024 – Present*
- Numerical Methods — *January 2024 – Present*
- Discrete Structures — *August 2023 – August 2024*

Academic Service

Worldwide Youth in Science and Engineering Program — June 2025 - July 2025
Computer Science Session Lead — *University of Illinois Urbana-Champaign*

Women in Computer Science — September 2022 - May 2023
Technical Resources Committee Member — *University of Illinois Urbana-Champaign*

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

Skills

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

Spoken languages: English, Hindi, Spanish, Gujarati