

Bryan Vela

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Los Angeles, CA

Education

University of California, Irvine

Bachelor of Science in Computer Science

Graduated Cum Laude | GPA: 3.93 / 4.00

Specialization: Artificial Intelligence and Machine Learning

Sep 2022 – Mar 2025

Irvine, CA

El Camino College

Associate of Science in: Mathematics, Physics, Computer Science

Aug 2019 – Jun 2022

Torrance, CA

Relevant Coursework

Core Courses (Grades to the right)

- | | | | |
|--|------|--|-----|
| • Machine Learning and Data Mining | (A) | • Probabilistic and Deterministic Graphical Models | (A) |
| • Neural Networks and Deep Learning | (A) | • Causal Reasoning with Graphical Models | (A) |
| • Deep Generative Models | (A) | • Causal Inference for Reinforcement Learning | (A) |
| • Probability for Computer Science | (A–) | • Efficient Quantized Machine Learning Computing | (A) |
| • Project in Deep Reinforcement Learning | (A+) | • Introduction to Artificial Intelligence | (A) |
| • Linear Algebra for Computer Science | (A) | • AI Frontiers: Technical, Ethical, and Societal | (A) |

Publications

C=Conference, J=Journal, S=In-Submission, *Equal Contribution

- [S1] S. Manzur*, **Bryan Vela***, B. Vela*, *et al.* (2025). PoseBench3D: A Cross-Dataset Analysis Framework for 3D Human Pose Estimation. In *arXiv preprint arXiv:2505.10888*. Submitted to NeurIPS 2025.

Research Experience

Machine Learning Researcher

Dec 2023 – Present

University of California, Irvine

Irvine, CA

- Co-first authored *PoseBench3D*, a unified benchmarking framework enabling standardized cross-dataset evaluation of 3D human pose estimation models across H36M, 3DPW, GPA, and Surreal datasets promoting real-world generalization
- Re-implemented and re-evaluated 18 prior methods under controlled settings, reporting over 100 new cross-dataset generalization results using MPJPE and PA-MPJPE metrics, with analysis of data preprocessing impacts
- Developed a program for human pose estimation allowing for 3D-to-2D skeleton projection and superimposition, integrating 14 limbs and vector calculations to ensure geometrically precise and accurate pose estimation visualization
- Analyzed synthetic and in-the-wild datasets in pose estimation studies to evaluate the impact of ordinal depth and occlusion on accuracy metrics such as MPJPE, PA-MPJPE, and PCK3D, under varied and occluded conditions
- Awarded \$6,000 scholarship to work over the summer and earn course credit, also excelled in understanding concepts from cutting-edge papers, particularly focusing on human pose estimation and novel techniques of encoding human poses

Graph Theory Researcher

Aug 2023 – Dec 2023

University of California, Irvine

Irvine, CA

- Developed a program utilizing to compute connected components, strongly connected components, degrees, and histograms for large directed and undirected graphs of PPIs (protein-protein interaction networks)
- Implemented dynamic construction of the canon-map lookup table in the BLANT codebase (Basic Local Alignment Network Tool) for efficient memory usage long-term compared to a full, static lookup table of graphettes of size $k > 9$
- Fixed existing bugs, memory leaks, and debugged the extensive BLANT codebase with Valgrind and GDB

NASA Community College Aerospace Scholar

Jan 2021 – Sep 2021

National Aeronautics and Space Administration

Pasadena, CA

- Conducted research on failed NASA missions involving In-Situ Resource Utilization (ISRU) capabilities and the Moon to Mars program, proposed the use of graphene in future designs for a wide range of equipment and tools
- Researched the development of state-of-the-art diagnostic equipment designed to monitor astronaut health in real-time and improve the efficiency and sustainability of systems technology aboard next-generation spacecraft
- Demonstrated advanced knowledge of NASA's past, current, and future missions by suggesting material changes to failed parts of operations and collaborating with NASA scientists and educators from various national sites

Projects

Monte Carlo Checkers Simulation | C++

Jan 2024

- Leveraged the Monte Carlo Simulation technique, a concept of the law of large numbers, orchestrating thousands of randomized games to forecast sophisticated optimal agent moves using UCT for improved performance and optimization
- Initially implemented the Min-Max algorithm for the decision making process, then transitioned to the Alpha-Beta Min-Max and finally to a Monte Carlo Randomized approach to enhance memory use and performance prediction
- Engaged in a competitive class tournament where my AI agent went against and competed with my peers' agents, showcasing exceptional effectiveness and performance, securing a top 4 out of 249 participants ranking

Custom Search Engine | Python

Jun 2023

- Developed a custom search engine for UC Irvine's websites, indexing and managing over 56,000 documents utilizing BeautifulSoup and NLTK, while achieving a rapid query response time of approximately 100 ms and high accuracy
- Employed advanced techniques including inverted matrix indexing, vector space modeling, tf-idf weighting, cosine similarity scoring, skip pointers, and distributed query evaluation to ensure optimal performance and accuracy

Honors & Awards

Jack Kent Cooke Transfer Scholarship

Jack Kent Cooke Foundation

- Nationally awarded scholarship totaling **\$165,000** for academic excellence and leadership

Graduated Cum Laude, UC Irvine

Phi Theta Kappa Honor Society Scholar

Dean's List – All Quarters at UC Irvine

Howmet Aerospace Scholarship for STEM

Edison Scholars Scholarship

Inclusive Excellence Latinx Alliance Scholarship

Robert Sprague STEM Scholarship

Teaching Experience

Course Assistant (Unofficial) — Ed Discussion + Discord Support

Sep 2023 – Dec 2024

University of California, Irvine

Irvine, CA

- Provided peer support via Ed Discussion and Discord (course messaging platforms) for the following upper-division courses: CS178 (Machine Learning and Data Mining), CS177 (Applications of Probability in Computer Science), CS171 (Introduction to AI), CS175 (Deep Reinforcement Learning), and CS179 (Graphical Models)
- Consistently answered ~5 student questions per-course every weekday over 10-week quarters across multiple course offerings (more questions answered during midterm and finals season), demonstrated initiative and support in successfully explaining ML and AI concepts to fellow students.
- Recognized by instructors during office-hours for helpfulness and support, including in-person thanks and public acknowledgments on course forums and from other fellow students

Extracurriculars & Leadership

University of California, Irvine — ACM Interview Preparation Volunteer

University of California, Irvine — HackUCI Hackathon Peer Mentor

University of California, Irvine — Artificial Intelligence Club Volunteer

Massachusetts Institute of Technology — HackMIT Blueprint Judge

Massachusetts Institute of Technology — HackMIT Participant

Jack Kent Cooke Foundation — Peer Mentor

Society of Hispanic Professional Engineers — Peer Mentor

Technical Skills

Programming Languages: Python, C++, C, Java, Bash, LaTeX

Libraries/Frameworks: PyTorch, TensorFlow, NumPy, Scikit-Learn, Pandas, Matplotlib, Plotly, Seaborn, Jupyter, OpenCV

Tools/Platforms: Git, Linux/Unix, Conda, Slurm, High Performance Clusters (HPC), VS Code, GitHub, Google Colab