Justin Jasper

Candidate for M.S. Computer Science (Artificial Intelligence), B.S. Bioengineering

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SKILLS

- **Computational Expertise:** Proficient in Python (NumPy, Pandas, SciKit-learn, TensorFlow), C++, C, MATLAB, git, UNIX environments, Arduino microcontrollers, LLM training & deployment (LangChain, LlamaIndex, Kubernetes), retrieval augmented generation development, neural networks
- **3D Modeling:** Proficient in creating 3D models and interactive designs using Onshape, AutoCAD, Blender, Unity.
- **Languages:** Fluent in Spanish, with strong cross-cultural communication skills.

EDUCATION

Stanford University, Palo Alto - *MS, Computer Science*

January 2025 - June 2026

Pursuing a master's degree in computer science with a concentration in artificial intelligence through the Masters Coterminal Program at Stanford University.

- Relevant Coursework: Artificial Intelligence: Principles and Techniques, Translational Bioinformatics, Computational Biology: Structure and Organization of Biomolecules and Cells, Probes and Applications for Multi-modality Molecular Imaging of Living Subjects, Computer Organization and Systems.

Stanford University, Palo Alto - *BS, Bioengineering*

September 2021 - June 2025

Pursuing a bachelor's degree in bioengineering from Stanford University.

- Relevant Coursework: Biochemistry & Molecular Biology, Physical Biology of Cells, Systems Physiology and Design, Fundamentals for Engineering Biology Lab, Biomedical System Prototyping Lab, Biosecurity and Bioterrorism Response
- Technical Foundations: Linear Algebra, Multivariable Calculus, Ordinary Differential Equations, Mechanics, Electricity and Magnetism, Structure and Reactivity of Organic Molecules

EXPERIENCE

Mitre Corporation, Mclean, VA. - *Computational Biology Intern*

June 2024 - Present

- Developed automation software to optimize high-throughput training and fine-tuning processes for open-source large language models (LLMs).
- Developed an LLM-driven retrieval augmented generation system to extract and summarize key insights from complex scientific literature, streamlining knowledge access for synthetic biology workflows (Used scientific python, LangChain, LlamaIndex, Kubernetes).
- Developed the BioNet Domain-Specific Language, an open-source programming language designed to enable extensive scaling of synthetic biology experiments and industrial workflows.

Omniwear AI, Palo Alto - *Co-founder & Chief Executive Officer*

December 2022 - December 2023

- https://www.tryomniwear.com/demo
- Led the development of a cutting-edge B2B virtual try-on platform for e-commerce powered by computer vision and generative AI, catering specifically to the D2C retail clothing sector.
- Spearheaded the B2B growth strategy, successfully acquiring early customer brands. Notably, secured partnerships with a retail giant valued at over $1 billion and a retailer valued at around $250 million.
- Established and maintained direct communication channels with corporate executives, ensuring seamless collaboration and addressing clients' unique needs and concerns.
- Participated in Launchpad (Stanford's premier graduate accelerator) Spring '23 and Entrepreneur First's NYC unicorn training program.

Projects

CV Image Processing for CT and Ultrasound-based Tumor Detection

- Developed a computer-vision (CV)-based image processing pipeline for lung CT scans using Python and OpenCV to segment and reconstruct 3D lung images for clinical diagnosis of suspected of cancer
- Explored deep learning for tumor segmentation using an Attention U-Net model, achieving high accuracy in classifying malignant and benign lesions.
- Implemented K-means clustering to classify lung tissue and air regions, achieving accurate segmentation of lung abnormalities.

- Demonstrated proficiency in Python, OpenCV, scikit-learn, and TensorFlow

CV Image Nutritional Analysis
- https://github.com/justinjasper/meal-calorie-predictor
- Developed a computer vision (CV)-based web application that detects and classifies food items from user-uploaded images.
- Trained a ResNet18 convolutional neural network model on a Food image dataset from Kaggle (using Tensorflow)
- Implemented an object detection pipeline to localize and identify food items before classification.
- Built a full-stack web interface using HTML (frontend) and a Python Flask backend to allow users to upload images for real-time food classification.

Synthetic Biosensor Development for Pathogen Detection
- Developed a novel biosensor to detect waterborne *Salmonella enterica* using a SynNotch receptor system with an anti-Salmonella single-chain variable fragment (scFv) transfected into human embryonic kidney cells (HEK293)
- Designed and transfected mammalian cell cultures (HEK293) with receptor plasmids, optimizing expression through flow cytometry and Western cell blotting analysis.
- Leveraged common wet lab techniques including polymerase chain reaction (PCR), gel electrophoresis, mammalian cell cultures, and bacterial cultures

Custom Heap Allocator (Memory Management & Systems Programming)
- Designed and implemented a custom heap allocator in C, featuring both implicit and explicit free lists for dynamic memory allocation.
- Optimized memory utilization and allocation efficiency by integrating block coalescing, splitting, and best-fit/free-list strategies.
- Implemented a custom malloc, free, realloc, and calloc, improving memory allocation speed and fragmentation handling.

Computational Analysis of NMDA Receptor Antagonist Binding for Chronic Pain Therapeutics
- Investigated the molecular interactions between NMDA receptor antagonists and their binding sites using molecular docking simulations with SwissDock and AutoDock Vina.
- Designed and optimized docking workflows, refining model parameters to maximize accuracy in predicting ligand-receptor interactions.

- Quantified binding affinities to assess antagonist efficacy, providing computational insights for drug repurposing in chronic pain management.