

**Nasreen Buhn**  
[nazbuhn@gmail.com](mailto:nazbuhn@gmail.com) • (484) 433-6379 • [nazbuhn.github.io](https://nazbuhn.github.io)

## EDUCATION

**California Polytechnic State University**, San Luis Obispo, CA  
Bachelor of Science in Biological Sciences, Concentration in Cellular and Molecular Biology,  
Minors in Computer Science and Bioinformatics, *Cum Laude* June 2025

*Relevant Coursework:* Bioinformatics Algorithms, Bioinformatics Capstone I & II, Deep Learning, Introduction to Data Science, Data Structures, Applied Experimental Design and Regression Models, Project-Based Object-Oriented Programming and Design, Molecular Biology Laboratory, Biochemical Principles, Cell Biology, Hematology

*Honors:* President's Honors List (2023-2024), Dean's List (6 quarters, 2022-2025)

## RESEARCH EXPERIENCE

**Bioinformatics Research Group, California Polytechnic State University, Biological Sciences and Computer Science & Software Engineering Departments**

*Undergraduate Research Assistant*, January 2024-June 2025

Advisors: Jean Davidson, Paul Anderson

Collaborated on the design and development of a zero-shot entity resolution methodology assessing the impact of context in NIH-funded chronic lower back pain (CLBP) knowledge graph research. Evaluated entity pairs to build a ground-truth dataset and helped craft LLM prompts for entity resolution across varying context levels.

Advisors: Paul Anderson, Javin Oza

Assessed the performance of protein clustering and alignment algorithms for classifying carbonic anhydrase proteins. Applied SVD and K-means clustering, evaluating the impact of sequence length and clustering conditions using silhouette scores. Compared multiple-sequence alignment and multiple-structure alignment methods with phylogenetic tree analysis.

**California Polytechnic State University, Computer Science & Software Engineering Department**

*Summer Undergraduate Research Program*, College of Engineering, June 2024-September 2024  
*Undergraduate Research Assistant*, September 2024-Present

Advisor: Jonathan Ventura

Trained, tested, and evaluated supervised deep learning models for fluorescence microscopy image denoising as part of NIH-funded research. Developed a stitching algorithm to reconstruct full-resolution images from overlapping, denoised segments with varying light intensities.

Assessed denoising performance using PSNR and SSIM image quality metrics.

**QuantumCyte, California Polytechnic State University, Bioinformatics Capstone (*DATA 441 & 442*)**

*Undergraduate Bioinformatics Consultant (Internship)*, April 2025-June 2025

Advisors: Jean Davidson, Paul Anderson

Co-developed a modular, interactive RNA-seq analysis pipeline in R. Built core modules for data cleaning, differential gene expression analysis (DESeq2), PCA, gene set enrichment analysis

(fgsea), and GO analysis, enabling real-time adjustment of parameters such as p-value thresholds, sample groupings, and sample size assumptions. Created integrated visualizations illustrating gene expression patterns, PCA results, and sample size estimates.

### **Pheast Therapeutics, California Polytechnic State University**

*Bioinformatics Consultant*, August 2025-Present

Advisor: Jean Davidson

Applying clustering and longitudinal modeling to macrophage–cancer co-culture datasets. Analyzing proliferation, dosage, and donor-specific effects on treatment response curves, with a focus on identifying inflection points and phagocytosis onset.

## **RELATED PROFESSIONAL EXPERIENCE**

### **Jazz Pharmaceuticals**

*Regulatory Strategy Intern*, June 2023-August 2023

Conducted a comprehensive review of real-world evidence (RWE) use in FDA NDAs, BLAs, and supplemental submissions, examining purposes of use, primary endpoints, and cases where submissions were unsuccessful due to RWE control arm limitations.

## **PUBLICATIONS**

Lin, D., Koenig, C., Kaplan, S., Bittner, M., Paraiso, M., **Buhn, N.**, et al. (2025). Investigating the impact of context on zero-shot entity resolution: Applications in chronic lower back pain. In *2025 8th International Conference on Information and Computer Technologies (ICICT)* (pp. 390–396). IEEE. <https://doi.org/10.1109/ICICT64582.2025.00067>

Anderson, P., Lin, D., Davidson, J., Migler, T., Ho, I., Koenig, C., Bittner, M., Kaplan, S., Paraiso, M., **Buhn, N.**, et al. (2024). Bridging domains in chronic lower back pain: Large language models and ontology-driven strategies for knowledge graph construction. In I. Rojas, F. Ortuño, F. Rojas, L. J. Herrera, & O. Valenzuela (Eds.), *Bioinformatics and biomedical engineering. IWBBIO 2024. Lecture notes in computer science* (Vol. 14849). Springer, Cham. [https://doi.org/10.1007/978-3-031-64636-2\\_2](https://doi.org/10.1007/978-3-031-64636-2_2)

## **SUBMITTED**

**Buhn, N.**, Adunur, S., Hamilton, J., Levis, S., Hagen, G., & Ventura, J. (2025). *Comparison of deep learning approaches for extreme low-SNR image restoration*. Manuscript submitted for publication.

## **CONFERENCE PRESENTATIONS**

### **ORAL PRESENTATIONS**

Bittner, M., **Buhn, N.**, et al. (2025, May 15-16). *Bioinformatics capstone 2025: Solving real world genomics problems with biotechnology collaborators: Developing a comparative transcriptomics pipeline to identify key biomarkers for pre-metastatic tumor buds* [Conference Session]. Bailey College Student Research Conference 2025, California Polytechnic State University, San Luis Obispo, CA, USA.

### **POSTER PRESENTATIONS**

Butler, J., **Buhn, N.**, et al. (2025, November 11-15). *Training the next generation in molecular pathology through industry-academic collaboration: precision tissue enrichment of colorectal tumor buds analyzed by undergraduate bioinformatics students* [Poster Presentation, accepted]. Association for Molecular Pathology (AMP) 2025 Annual Meeting and Expo, Boston, MA, USA.

Adunur, S., **Buhn, N.**, Hagen, G., & Ventura, J. (2024, October 18). *Deep learning for microscope image denoising* [Poster Presentation]. Summer Undergraduate Research Program Symposium 2024, California Polytechnic State University, San Luis Obispo, CA, USA.  
[https://digitalcommons.calpoly.edu/ceng\\_surp/83/](https://digitalcommons.calpoly.edu/ceng_surp/83/)

Koenig, C., Bittner, M., Kaplan, S., Paraiso, M., **Buhn, N.**, et al. (2024, May 16-17). *Novel approaches to literature analysis and entity resolution for chronic lower back pain; Knowledge graphs and large language models* [Poster Presentation]. Bailey College Student Research Conference 2024, California Polytechnic State University, San Luis Obispo, CA, USA.

**Buhn, N.** (2023, October 23-25). *Real world evidence in FDA drug approvals 2021-2023* [Poster Presentation]. The Organization for Professionals in Regulatory Affairs' (TOPRA) Symposium 2023, Lisbon, Portugal.

## RELEVANT PROJECTS

**VIDA: Visual Intelligence for Detecting Anemia**, California Polytechnic State University, Deep Learning (CSC 487)

Co-developed an ensemble model approach for anemia detection from peripheral blood smear images and CBC data. Fine-tuned VGG-16 architecture on images, achieving a F1 score of 80.18%, which increased to 85.02% with the addition of CBC data in the ensemble model. Assessed model performance using Grad-CAM, identifying prediction drivers and visual cues that influenced model decisions.

**Predicting Cancer Incidence Rates from Toxic Chemical Spills**, California Polytechnic State University, Introduction to Data Science (DATA 301)

Built a machine learning pipeline to predict county-level cancer incidence rates from chemical spills reported in the EPA Toxics Release Inventory. Used PubChem PUG-REST to extract carcinogen classifications for each release. Conducted data cleaning and feature engineering. Trained regression models (Random Forest, k-NN, SVR) to evaluate predictive relationships.

## SKILLS

**Programming:** Python, R, Java, HTML, CSS

**Libraries and Packages:** PyTorch, scikit-learn, pandas, NumPy, Matplotlib, Altair, ipywidgets, tidyverse, ggplot2, Bioconductor

**Tools and Platforms:** Linux, Conda, tmux, Jupyter, Google Colab, VS Code, Vim, Git

**Bioinformatics & Imaging:** ImageJ, AlphaFold, BLAST, Clustal Omega

**Wet-lab Techniques:** PCR/RT-PCR, DNA/RNA extraction and purification, gel electrophoresis, aseptic technique, microbial staining and plating, <sup>1</sup>H/<sup>13</sup>C NMR, IR

## SERVICE

**Alzheimer's Association**

*Walk to End Alzheimer's Volunteer, 2021-2024*

Assisted with team fundraising events, contributing to over \$60,000 raised annually (2022–2024), and supported annual Walk to End Alzheimer's operations.