

Chico, CA
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Lucas Butler

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Education

Chico, CA	California State University	August 2024 December 2025
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- MS in Computer Science. GPA: 3.883
- Research Focus: Machine Learning, AI, and Neural Network Architecture Design

Chico, CA	California State University	August 2021 May 2024
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- BS in Computer Engineering, Minor in Computer Science. GPA: 3.85
- Cum Laude, Computer Engineering Faculty Award

Research Experience

Elephant Listening Project Research Assistant	CSU, Chico	August 2024 Present
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- **Published Research:** Co-authored paper in SPIE comparing RNNs and CNNs for pattern recognition in infrasound detection
- **Neural Architecture Design:** Led entire research project from conception to completion, designing neural networks for auditory pattern recognition
- **Algorithmic Optimization:** Processed 22,000 examples using cross-validation and grid search to optimize hyperparameters for pattern recognition
- **High-Performance Computing:** Used Singularity containers to scale TensorFlow training pipelines, achieving efficient model training
- **Data Engineering:** Engineered optimal spectrogram resolution for audio processing, demonstrating understanding of sensory data processing

Work Experience

Software Engineer Intern	Sandia National Laboratories	September 2023 Present
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Albuquerque, NM and Remote

- **Agentic AI Development:** Developed custom agentic scripts for automated analysis, creating systems that think and reason like human analysts
- **Pattern Recognition:** Applied LLMs to requirements analysis, developing novel approaches combining Fagan inspection and Parent-Child analysis for comprehensive validation
- **Algorithmic Design:** Built isolated AI systems deployable on classified networks, demonstrating ability to create scrutable and explainable AI systems
- **Research Impact:** Developed systems with potential to save \$300M+ in reengineering costs, showcasing ability to create AI that replicates human reasoning processes
- **Technical Stack:** Python, Langchain, Flask API, ChromaDB, Llama3.2-8b, Docker, Electron, React

Manufacturing Engineer Intern	SMC Ltd.	May 2022 August 2022
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Santa Rosa, CA

- **Process Optimization:** Created innovative automation solutions, demonstrating systematic problem-solving approach essential for AI development

- **Analytical Thinking:** Conducted Statistical Process Control (SPC) to identify and resolve production issues, showcasing logical problem-solving skills

Technical Skills

- **Programming Languages:** Python, C++, C, TypeScript, JavaScript, System Verilog
- **AI/ML Frameworks:** TensorFlow, PyTorch, Langchain, OpenAI API, Ollama, VLLM
- **Machine Learning:** Neural Networks, RNNs, CNNs, Pattern Recognition, Agentic AI
- **Algorithmic Design:** Data Structures, Algorithms, Optimization, High-Performance Computing
- **Research Tools:** Jupyter, Pandas, NumPy, Matplotlib, Scikit-Learn, Ray-Tune, MLFlow

Relevant Projects

- **Text-Based Image Search** (github.com/r-butl/TextBasedImageSearch): Trained neural networks to understand relationships between image and text embeddings, demonstrating pattern recognition capabilities
- **ROS-LLM Integration** (github.com/r-butl/ROS-LLM): Connected ChatGPT with ROS2 for voice-controlled robotics, showcasing ability to integrate AI with complex systems
- **ADAS System** (github.com/r-butl/ADAS-System): Designed 6-service system with YOLO models achieving 25+ FPS on Jetson Orin Nano, demonstrating algorithmic optimization and real-time processing
- **Heart Abnormality Classification** (github.com/r-butl/Heart-Abnormality-Classification): Attempted CNN training on ECG spectrograms, showing early interest in pattern recognition for medical applications

Leadership Experience

Formula SAE	CSU, Chico	2022 2024
Business/Finance Lead		
<ul style="list-style-type: none">• Innovation Award: Led team to 1st prize in cost event through innovative ECU redesign combining downsized module with external gyroscope component• Systematic Problem-Solving: Created cost models and identified \$5,000 in savings opportunities, demonstrating analytical thinking essential for AI development		

Research Publications

- **SPIE Conference Paper:** "A comparison of machine learning multiband sensor fusion models for elephant rumble detection in infrasound recordings" - Demonstrates AI research capabilities and pattern recognition expertise