Brooks Christensen

Optical Physics | Photonic Simulation | Machine Learning

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Denver, CO · Open to Relocation

Optical physicist and machine learning engineer with hands-on experience in photonic device simulation and analysis, scientific computing, and AI-driven modeling. Background includes simulation and analysis of optical systems using Lumerical and MATLAB, along with development of scalable data pipelines and machine learning systems. Strong ability to translate complex technical concepts into practical engineering solutions.

Technical Skills

MATLAB · Lumerical · Machine Learning & AI · Computer Vision · Signal Processing · Data Engineering / ETL Pipelines · Large Language Models (LLM) · Model Evaluation & Optimization · Experiment Design · Technical Leadership

Tools:	PyTorch, TensorFlow, Keras, AWS, SSH, OpenCV, FFmpeg, HDF5, ElasticSearch, Jupyter, VS Code, Linux, WSL
Languages:	Python, SQL, Bash, C++, MATLAB, Mathematica, LaTeX

Optical Simulation Experience

- Performed parameter sweeps on photonic device geometries (e.g., gap spacing, waveguide widths) to analyze optical coupling behavior using Lumerical
- Developed MATLAB scripts to process and visualize simulation data, including surface plots and coupling coefficient analysis
- Built automated workflows for extracting and summarizing simulation results across multiple design configurations
- Applied numerical modeling and signal-processing techniques to interpret optical device performance and coupling behavior
- Interpreted simulation results to inform design trade-offs and performance optimization of photonic structures

Professional Experience

Engineering Research Scientist - Nielsen   **Dec 2021 – Jul 2024**

- Designed and deployed an automated ETL pipeline processing 10,000+ video streams annually for computer-vision training datasets
- Improved machine learning model accuracy from ~80% to >95% through dataset augmentation, feature engineering, and hyperparameter optimization
- Developed signal-processing algorithms for detecting media content in noisy broadcast streams, improving detection accuracy from 60% → 90%
- Built SQL frameworks and real-time dashboards monitoring AI/ML performance metrics and operational analytics for engineering teams
- Collaborated with cross-functional R&D teams to develop experimental AI systems and production data pipelines
- Applied signal-processing and numerical modeling techniques to analyze complex physical and media signals

Education

M.S. Optical Physics (NSF Graduate Research Fellow) - University of Colorado, Boulder, CO   **2017 – 2020**

B.A. Physics (Summa Cum Laude) - University of Colorado, Boulder, CO   **2014 – 2017**

Selected Projects

Optical Device Simulation & Analysis

- Simulated photonic device behavior and optical coupling characteristics using Lumerical and MATLAB-based workflows
- Conducted parameter sweeps across geometric design variables (gap spacing, waveguide widths) and analyzed resulting performance metrics
- Developed custom MATLAB scripts to generate surface plots and statistical summaries from simulation outputs
- Built automated pipelines for aggregating and visualizing simulation results across multiple configurations

Alan Watts Conversational LLM

- Built a GPT-based conversational model trained on 50k+ lecture transcripts using PyTorch and HuggingFace. Developed data cleaning pipelines, training workflows, and prompt engineering strategies

Certifications

- [Data Science Certificate](), MIT Professional Education
- [AI with Deep Learning Certificate](), University of Texas at Austin