

Joel Sprunger

Portland, Oregon • sprunger.joel@gmail.com • (503) 537 8046
[LinkedIn.com/in/joel-sprunger-29343b12/](https://www.linkedin.com/in/joel-sprunger-29343b12/) • hire-joel.com

SUMMARY

Staff Engineer with an MS in Electrical and Computer Engineering and 10+ years of innovation in signal processing and machine learning across industries. Determined, analytical, and knowledgeable problem-solver with proficiency in Python, Matlab, C/C++, Verilog/VHDL, and LabVIEW with strong cross-functional teamwork and relationship building skills. Seeking to leverage talents in a DSP engineering role at a future-forward company to build innovative products and consumer experiences. Always curious, and not afraid of hard work.

TECHNICAL SKILLS

Machine Learning & AI: TensorFlow, PyTorch, Keras, Linear Regression, Logistic Regression, Gradient Descent, Optimum Algorithms, K-means Clustering, Recommendation Systems, Anomaly Detection, Support Vector Machines, Computer Vision, NLP, LLM chains and agents.

Signal Processing: Spectral Analysis (FFT, PSD), STFT, WOLA, Digital Filters, Adaptive Filters, State Space Tracking, Image Processing, Array Processing, Communication Systems (AM/FM/PM, FSK, PSK, CDMA), Audio Signal Processing (AEC, Beamforming, Noise Suppression, ANC, Noise Gate, AGC)

Frameworks & Libraries: Flask, Fast API, Pandas, NumPy, Matplotlib, Seaborn, Soundfile, Librosa, Huggingface, Langchain, Autogen, Ollama

Development Tools: VS Code, PyCharm, CLion, Git, GitHub, Docker, AWS, Amazon Mechanical Turk

Hardware & PCB Design: PCB Capture/Layout, HW/SW Debugging, CPU Design, Microphone Array Design, Circuit Analysis, LTSpice, Soldering

Operating Systems & IT Skills: Linux, macOS, Windows, Shell Scripting, Productivity Suites (Excel, Outlook, etc.)

WORK EXPERIENCE

Lender Toolkit, Remote (United States)

June 2023 – Present

Machine Learning Engineer

- AI Chat Deployment with OpenAI: Deployed an open-source chat application using Next.js (React framework) for the frontend, hosted on Vercel. Developed the backend using FastAPI and Python, deployed on AWS Fargate. Managed storage of OpenAI text embeddings using Supabase.
- User Integration & UI Enhancement: Implemented auto-login functionality and refactored chat descriptions for AI-summarized questions. Improved user interface using TypeScript.
- Database & Feedback Mechanics: Developed and integrated new feedback-related columns in the Supabase database schema. Created frontend UI components for collecting user feedback, enhancing user interaction.

Skyworks Solutions Inc, Hillsboro, Oregon

Sep 2019 – Jan 2023

Staff Machine Learning Engineer

- Developed deep learning models using Python, Tensorflow, Keras, and Pytorch for AI noise suppression for speech
- Designed custom algorithm layers using Python, Tensorflow, and Keras for custom losses and pre-processing - Weighted Overlap Add (WOLA) layers - Noise Gate - Spectral Noise Gate - SNR estimator - AI model back-off algorithm
- Evaluated model performance using Amazon Mechanical Turk in the Microsoft P.808 library on Github
- Developed tool for analyzing/presenting model performance using Flask, Matplotlib, and Seaborn
- Deployed model to Arm M55+ EthosU55 FPGA dev kit with C++ to benchmark Arm processors for audio noise suppression, influencing selection of hardware target processor/co-processor
- Designed DSP algorithms for embedded audio applications including snore presence and location estimation using mic arrays (provisional patent) using Matlab and C, User voice activity detection (VAD) based on multi-modal audio signals using Matlab, and Design algorithm using Matlab and C++ to detect failure mode for production testing team
- Built software in Linux and Github/Git revision control

- Developed noise gate algorithm as Keras layer in Python/TensorFlow and trained model with noise-gated files to learn noise gate task, improving model performance in statistically significant way
- Conducted Amazon Mechanical Turk study to identify ways to clean target files for AI noise suppression application, determining noise-gated speech as user preference
- Oversaw smart bed with snore detection project and implementation of hardware for novel application, resulting in new algorithm and customer satisfaction

Maxim Integrated Inc, Beaverton, Oregon

Feb 2013 – Aug 2019

Senior MTS Test System Development

- Led test projects for Class-D amplifier ASICs for tier-1 customers and developed software in VB for production testing of integrated circuits
- Wrote patterns for digital audio communication (PCM, PDM) and conducted signal processing for testing audio quality (THDN, PSRR, DR)
- Developed test vectors with varied edge timing for characterizing I2C and I2S communication.
- Resolved issues and debugged hardware/software for important client alongside VP of Engineering, resulting in successful IC launch and satisfied customer
- Produced schematic design for PCB test hardware, statistical analysis of production data, and technical writing
- Collaborated with team to develop DSP functionality using Verilog syntax for capturing high frequency test signals on test platform, using FPGAs without expending excess resources
- Created PDM class in VB to test embedded audio devices in production. Worked with the customer to verify the specs, generate test vectors and confirm out of band noise performance.

EDUCATION

Portland State University, Portland, Oregon

Jun 2019

Master of Science in Electrical and Computer Engineering

Oregon Institute of Technology, Portland, Oregon

Jun 2011

Bachelor of Science in Electronic Engineering Technology

ACHIEVEMENTS & CERTIFICATIONS

Achievements: Outstanding Scholar Award & Student Achievement Award (Oregon Institute of Technology – 2011)

Certifications: Data Science Foundations (LinkedIn), Programming Foundations: Databases (LinkedIn), Learning SQL Programming (LinkedIn), Machine Learning (Stanford – Coursera), Neural Networks and Deep Learning (Coursera), Improving Neural Networks (Coursera), Structuring Machine Learning Projects (Deeplearning.ai – Coursera), Intro to ML: Language Processing (Google Quiklabs), Getting Started with AWS Machine Learning (Amazon – Coursera)

REFERENCES

Skyworks Solutions Inc.

Amit Kumar: (408) 318 – 1047 | Alexander Kain: lxxkain@me.com

Maxim Integrated Inc.

Rafael Colon: (503) 504 - 0072