Aaron Goidel

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Distributed Systems Engineer with a track record of building high-performance, mission-critical hyper-scale infrastructure in C++ and other languages at Meta, NASA, and the NSA. Adept at scaling AI/ML pipelines, optimizing performance on massive codebases, and delivering cross-functional solutions for thousands of machines and billions of users.

Education

BSUniversity of Toronto, Computer Science (with High Distinction)Sept 2019 – Dec 2023Coursework: Deep Learning, Natural Language Processing, Image Understanding,
Compilers, Machine Learning, Software Design, Theory of ComputationSept 2019 – Dec 2023

Experience _____

Meta, Software Engineer	Seattle, WA
 Engineered a lossless audio encoding system with 99.9% reliability across billions of assets, enabling multi-modal GenAI training on high-fidelity audio 	Mar 2024 – Mar 2025
- Developed and deployed new deep-learning-based audio quality metrics, cutting premium audio compute usage by ${\sim}500$ machines daily	
 Architected an LLM orchestration framework for video-understanding tasks (e.g., cap- tioning, smart ad segmentation), allowing product teams to rapidly iterate on features 	
 Implemented a provenance metadata system to tag and track AI-generated videos, en- suring compliance and traceability across products 	
 Unified licensed music and VOD audio pipelines, saving 20PB of storage while achieving +0.06% watch-time lift 	
 Owned unified audio processing for 1B+ daily FB/IG uploads, overseeing on-call rota- tion, KTLO tasks, and performance optimizations 	
 Optimized Adaptive Bitrate (ABR) algorithms, resulting in a 0.1% decrease in overall VOD streaming egress bytes 	
 Collaborated with product and GenAI research teams to integrate lossless encoding into model-training pipelines and streamline licensing across multiple platforms 	
University of Toronto, Research Assistant	Toronto, ON
 Awarded the University of Toronto Excellence Award to pursue NLP research under Prof. Barend Beekhuizen, exploring cross-linguistic semantic distribution in 1,200+ languages 	Jun 2023 – Dec 2023
 Prototyped novel ML models using NumPy and spaCy, developing pipelines for large- scale natural language data processing 	
 Conducted independent research on current NLP techniques and implemented models from literature 	
MLabs, Software Engineer	Remote
 Implemented backend and on-chain logic for an NFT marketplace and crypto platform on Cardano, including smart contracts for minting tokens and managing royalties 	Jun 2022 – Feb 2023
 Collaborated with designers and front-end teams to build features, fix bugs, and pro- duce client-facing documentation 	
 Engineered a performant property-testing framework and Haskell library for generating Cardano transactions, reducing integration friction across multiple products 	
NASA, Software Engineering Intern	Remote
 Contributed mission-critical C++ code to an Artemis I launch subsystem, ensuring low- latency, high-throughput Class-A safety compliance in real-time communication 	Jan 2022 – May 2022

- Onboarded multiple teams onto a centralized message-passing platform for rocket telemetry and launchpad metrics, building APIs and adapters to integrate diverse endpoints
- Developed a safe, extensible interface for parallel data logging/monitoring, enabling robust pub/sub communication among hardware and software modules
- Expanded integration test coverage for distributed data-monitoring components, safeguarding critical flight operations against regressions

University of Toronto, Teaching Assistant

• Taught Theory of Computation, covering topics such as runtime complexity, finite automata, and state machines

Toronto, ON

Sept 2021 - Dec 2023

Fort Meade, MD Jun 2019 - Aug 2019

• Mentored 30+ students through weekly tutorials, enhancing understanding through problem-solving and Q&A sessions

National Security Agency (NSA), Cybersecurity Software Intern

- Authored a patch in the Linux operating system, implementing a security hook and permissions for controlling file system watches, including test suite
- Experimented with machine learning models to estimate the proximity of Bluetooth Low Energy enabled IoT devices in obstructed spaces
- Presented findings to groups of 20+ researchers in biweekly technical briefings

Projects _

ML 3D Scanner, Deep Learning, PyTorch, OpenCV

- Implemented a Neural Radiance Field (NeRF) model to optimize the radiance and 3D structure from 2D photographs
- Developed a comprehensive pipeline from image input to 3D mesh extraction

Visual Product Recommendations, Artificial Intelligence, PyTorch

- Designed and implemented a deep learning system to recommend products based on user image aesthetics.
- Utilized a CNN for feature extraction, embedded product and user image features via deep learning, and integrated an attention mechanism
- Trained the model in parallel using CUDA

Cookie, ReactNative, SciKitLearn

- Created a smart cookbook application that leverages ML and graph theory to optimize home cooking
- Developed an algorithm that models recipes as a dependency graph, intelligently merging smaller recipes into novel combinations and scheduling steps efficiently

Linux Security Module, C, Linux Kernel

- Developed new hooks for the Linux Security Module to set permissions on filesystem watches, preventing unauthorized access to pattern-of-life data
- Navigated kernel development challenges by learning OS internals, filesystem architecture, and syscalls to contribute secure patches

Skills _

Languages: C++, PHP, Python, C, JavaScript/TypeScript (React, Node, Express), Java, Haskell, x86 Assembly

Technologies: PyTorch, TensorFlow, NumPy, NixOS, Buck, FFMPEG, Linux, Bash, Git, Jira, OOP, Agile, Functional Programming, Hugging Face

Soft Skills: Cross-functional collaboration, rapid learner, effective communication, leadership in large-scale codebases, adaptability