Aaron Barlow

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Experience

Oak Ridge National Laboratory

HPC Software Engineer, National Center for Computational Sciences | Jun 2020–Present | Remote

- Delivered AMD-compatible NVFLARE on Frontier (TOP500 #2) by integrating ROCm on MI250X GPUs with PyTorch, enabling cross-institution healthcare training for privacy-preserving medical foundation models.
- Maintain and enhance the system of record for 27 HPC clusters, including Frontier, serving as the single source of truth for cluster state. Automate provisioning (filesystem directories, UNIX users/groups), access, and scheduling in Slurm/LSF to ensure continuous operations for $700M+ in compute systems.
- Optimized Directories API by replacing Jbuilder with JSON:API and adding Redis caching—cutting cached responses from 272 s to 178–206 ms (∼1,320×) and first-hit latency by 17%. Eliminated view rendering, reduced ActiveRecord time from 19.2 s to 8.8 ms, and stabilized fleet polling to remove cluster-sync timeouts.
- Deployed and expanded myOLCF, a researcher self-service and monitoring platform supporting 4,000+ users across 1,000+ large-scale research campaigns, consistently achieving ∼99.9% availability.
- Co-architected Smart Facility metrics delivering 100k time-series records in 87ms. Offloaded compute to background jobs with indexes and caching. Used by leadership to guide procurement and flag inefficient Slurm jobs.
- Migrated to Vite and optimized CI pipelines, cutting builds from 2min to 9s, startup from 30s to under 200ms, and tests from 90s to 6s-boosting developer productivity, shortening feedback loops, and speeding deployments.

Bank of America

ML Engineer Intern, Consumer, Small Business & Wealth Tech | Jun–Aug 2019 | Los Angeles, CA

- Built an NLP entity-extraction (such as names, addresses, account numbers) pipeline for 100M+ documents, achieving a 96% F1 score and supporting $20M+ annual automation savings.

Oak Ridge National Laboratory

Software Developer Intern, National Center for Computational Sciences | May 2015–May 2019 | Oak Ridge, TN

- Year-round development on ops software for 20+ HPC clusters—the system of record for cluster state—automating provisioning (filesystems, UNIX users/groups) and access control ensuring uptime for $250M compute.

Skills

- **Languages** Ruby, Python, Go, Crystal, C, C++, C#, JavaScript, SQL, Bash, HTML, SASS
- **Frameworks** Ruby on Rails, Amber, Vue.js, React, NVFLARE, CrewAI, PhiData
- **Tools** Docker, Kubernetes, Kustomize, Argo CD, Slurm, Redis, PostgreSQL

Education

East Tennessee State University

Bachelor of Science in Computer Science | May 2020 | 3.94/4 GPA | ACM President & VP of Ethical Hacking

Selected Projects

- **Automatic podcast creation** – Produced 192 engaging podcast episodes (1.8k downloads, 50+ hours listened) through a fully automated pipeline from Claude Sonnet scripts to ElevenLabs TTS to Spreaker publishing.
- **Automatic e-commerce creation** – Generated 152 products (57k+ views) at $0.31/unit via GPT orchestration + Flux Pro imagery, auto-published to Printful/Etsy/Redbubble.
- **Project Cadenza (autonomous music video creation)** – Published 150 videos via an end-to-end pipeline: artist/album creation, lyric/song generation, thumbnail choice, and YouTube publishing.

Professional Activities

- **Talks:** CUG 2025 — ”Employing a Software-Driven Approach to Scalable HPC System Management.”; NLIT 2024 — ”Employing DevOps in HPC Operational Management.”
- **Community:** ORNL Pathways to Computing Workshop Chair (2022–present); PEARC Student Program Committee Chair (2021–present)