# 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 supporting ROCm on MI250X GPUs with PyTorch, enabling cross-institution healthcare training for privacy-preserving medical foundation models.
- Optimized a core API, initially targeting enforcement of 100k+ filesystem directories across 27 HPC clusters. Added caching and serialization to cut RTT from 272s to 0.178s ($\sim$1,320$\times$ faster). Stabilized facility's critical HPC management software, eliminating cluster policy sync timeouts.
- Deployed and expanded myOLCF, a researcher self-service and monitoring app supporting 4,000+ users across 1,000+ large-scale research campaigns that yearly achieves $\sim$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.
- Maintain and improve the system of record for 27 HPC clusters, including Frontier, serving as the single source of truth for cluster state. Software-driven HPC management provisions (filesystem directories, UNIX users/groups), enables access, and job scheduling to ensure continuous operations for $700M+ in compute systems.

### 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 podcast scripts, to audio creation, to scheduled distribution.
- **Automatic e-commerce creation** – Built workflow to automate the creation and distribution of products. Generated 152 products (~$0.31/unit) with descriptions and imagery, and auto-publish to Etsy for sale.
- **Project Cadenza (autonomous music video creation)** – Published 150 music videos via an end-to-end automated pipeline: artist/album creation, lyric/song generation, thumbnail choice, and YouTube publishing.

## Professional Activities

- *Employing a Software-Driven Approach to Scalable HPC System Management* | Technical Talk | CUG 2025
- *Employing DevOps in HPC Operational Management* | Technical Talk | NLIT 2024
- PEARC Student Program | Committee Chair | 2021–present
- ORNL Pathways to Computing Workshop | Chair | 2022–present