

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 ($\sim 1,320\times$) 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 $\sim 99.9\%$ availability.
- Co-architected Smart Facility metrics (Crystal/Amber): dashboards serve 100k-row views and 50k points in 87 ms, benchmarked 10.4k req/s/core (96 μ s/req), offloaded compute to background jobs and indexes, used by leadership to guide procurements 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 (2019–2020), Ethical Hacking Vice President (2018–2019)

Selected Projects

- **Automatic podcast creation** – Produced 192 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)