

# (Robert) Cameron Rutherford

[linkedin.com/in/robert-c-rutherford/](https://www.linkedin.com/in/robert-c-rutherford/)

[github.com/CameronRutherford/](https://github.com/CameronRutherford/)

[cameron.rutherford@me.com](mailto:cameron.rutherford@me.com)

(509) 218-1818

## Publications

S. Abhyankar, S. Peles, **R. Rutherford**, A. Mancinelli, **Evaluation of AC optimal power flow on graphical processing units.** (IEEE PESGM 2021)

S. Peles, M. Alam, A. J. Mancinelli, K. Perumalla, **R. C. Rutherford**, J. Ryan, C. G. Petra, **Porting the Nonlinear Optimization Library HiOp to Accelerator-Based Hardware Architectures** (arxiv 2021)

## Work Experience

### Pacific Northwest National Laboratory

**Software Engineer II** (HPC/Machine Learning/Quantum group, Research Computing) *Jan '22 – Present*

Lead of Software Stack for ExaSGD (Exascale Grid Dynamics), deployed to AMD/HIP (Frontier)  
GitLab CI pipeline architect for C++/Kokkos port of Fortan within E3SM (Energy Exascale Earth System Model)  
MLOps engineer for internal offerings within PNNL HPC Group, continuing Quantum Engagement  
Machine Learning Project work for Neural Tangent Kernel and Knowledge Graph research

**Software Engineer I** (HPC/Machine Learning/Quantum group, Research Computing) *Jan '21 – Dec '21*

Continued work for ExaSGD project, successfully deployed to Power9/NVIDIA (Summit)  
Became IBMQ coordinator for PNNL, delivered Qiskit tutorials, contributed to Quantum Research Project  
Machine Learning Project work for Neuromancer ([github.com/pnnl/neuromancer](https://github.com/pnnl/neuromancer))  
Privacy Preserving Machine Learning offering lead, along with MLflow offering co-lead

**Post Bachelors Research Associate** (Optimization & Control Group, Energy Environment Directorate) *Nov '20 – Jan '21*

Continue work for ExaSGD project, successfully integrated RAJA ported HiOp to ExaGO  
Studied Influence Maximization in Graph networks on Exascale Graph Analytics (ExaGraph) project  
Studied Distributed Reinforcement Learning techniques on distributed HPC systems

**Tech Student 4** (Optimization & Control Group, Energy Environment Directorate) *Jun '20 – Oct '21*

Quickly became productive in large scale project during heavy development  
Ported C++ code to RAJA for GPU execution enabling scalability performance portability  
Utilised state of the art software libraries Ipopt, SUNDIALS and Petsc

**Whitworth University:** Sports Events Coordinator *Aug '19 – May '20*

**Keysight Technologies:** I.T. Intern, Mac Management, Colorado Springs, CO *May '18 – Aug '18*

**Whitworth University:** Whitworth Mathematics Tutor *Aug '19 – Dec '19*

Calculus 3 Grader *Aug '17 – Dec '17*

## Projects

**HiOp – HPC Solver for Optimization** ([github.com/LLNL/hiop](https://github.com/LLNL/hiop)) *May '20 - Present*

**ExaGO – Exascale Grid Optimization** ([gitlab.pnnl.gov/exasgd/frameworks/exago](https://gitlab.pnnl.gov/exasgd/frameworks/exago)) *May '20 - Present*

## Technical Summary

### Proficient

C/C++, CMake, Bash, Git, GDB, LaTeX,  
MPI, RAJA/Umpire, Python, Spack, JAX,  
Pytorch, Tensorflow, Ray, Horovod,  
Qiskit, GitLab/GitHub CI/CD pipelines

### Familiar

CUDA, Nsight Systems, NCCL, HIP, RCCL,  
Golang, R, VHDL, SQL, OpenMP,  
React/Django, Poetry, Anaconda,  
(Deep/Graph/Reinforcement) Learning

### Exploratory

Hpctoolkit, TAU, Rocprof, MIPerf,  
Ansible, k8s, Singularity/Docker,  
Distributed Machine Learning  
Frameworks

## Conferences

(ECP) Exascale Computing Project Annual Meeting	'21, '22, '23
Presented posters for ExaSGD project, attended tutorials about latest HPC technology	
Networked with other projects and grew understanding of Exascale scientific Software	
PNNL Innovation Summit	May '22
Conference to generate innovation around predictive phenomics research	
Brought HPC expertise to conversation with domain experts across PNNL	
PNNL Tech Fest	Jun '22
Presented on Quantum Computing and Privacy Preserving Machine Learning	
Networked with PNNL staff about projects, and grow technical skillset	
(C2QA) Co-Design Centre for Quantum Advantage Annual Meeting	Oct '22
Learned about latest Quantum Research across hardware, software, and algorithms	
Contextualized the need for Software Engineering skills within Quantum Computing space	

## Education

Whitworth University, Spokane, WA	May '20
B.S. in Computer Science, B.S. in Mathematics	G.P.A. 3.9/4.0
Pacific Northwest National Laboratory	
Quantum Computing Boot Camp	'21
Data Science for Biologists Boot Camp	'21
Cyber Security Seminar Series	'21
National Security Seminar Series	'22

## Academic Honours

Outstanding Mathematics Major – Whitworth University - 2020  
ICPC Pacific Northwest Eastern Washington Site Winner - 2018  
Howard R. Gage Memorial Scholarship - 2017, 2018, 2019

## Other Activities

Sustainable Horizons Institute HPC Mentor	'22, '23
Quantum Information Science STEM Mentor	'22 – Present
Founder/President Whitworth Chess Club	Jan '19 – Mar '20
Pine Codes Hackathon Winner	Spring '19
SpokAnimal Animal Shelter Volunteer	Spring '19
Men's basketball team, Whitworth University	Aug '16 – Nov '19