Jacob B. Collins

jbcollins@csuchico.edu | (925) 207-0765 | GitHub.com/collinsjacob127 | Linkedin.com/in/collinsjacob127 | Chico, CA

EDUCATION

M.S. Computer Science | Expected Graduation: December 2026 — **California State University, Chico**
B.S. Computer Science Cum Laude | Cumulative GPA: 3.74
Data Science Certificate | Graduated December 2025

SKILLS

Programming: C/C++, Python, R, MPI, OpenMP, Pthreads, CUDA-Q, Qiskit, UDS, Winsock
Tools & Libraries: OpenCV, NetworkX, PyTorch, Slurm, Docker, Singularity, SDL, Git CLI, CMake

PUBLICATIONS

Mission Planning Simulation and Design Software Scaling for Shared and Distributed Memory Computing — **IEEE Aerospace Conference 2026 10.0304**
Skills: *MPI, OpenMP, CMake, Bash, C++*

Integrated MPI & OpenMP modifications to NASA's General Mission Analysis Tool. Achieved 2,387% speedup on 62x Monte-Carlo simulation trials distributed across 36x 2-core nodes, compared to sequential runtime.

Quantum Semiprime Factorization: Leveraging Grover's Algorithm for Efficient Prime Decomposition — **CSCSU 2025 Research Conference**
Skills: *Slurm, Singularity, CUDA-Q, C++*

Designed a dynamic quantum circuit generator using CUDA-Q which can find factors of large semiprimes using asymptotically lesser qubits than existing methods. Ran simulations with Slurm using a custom Singularity container on the SDSC Expanse supercomputer.

PROJECTS

Distributed Sieve of Eratosthenes — **Available upon request**
Skills: *Slurm, MPI, OpenMP, C*

Wrote a distributed prime number sieve in C which uses MPI to divide the search region evenly across all nodes. OpenMP is used to parallelize the local filtering through each node's region. The prime sieve itself is stored as a binary mapping to maximize memory efficiency. Tests were run using Slurm with provided Singularity containers on SDSC Expanse. I achieved 13,482% speedup (99.3% parallel) compared to the sequential runtime searching for all primes below 10 billion.

Iterative Network Simulation — **Hosted on GitHub**
Skills: *Python, NetworkX*

Simulated an iterative adaptation of the prisoner's dilemma on a variety of networks. Automated generation of animations visualizing model statistics.

EMPLOYMENT

I-SAIL Lab Planning Assistant — **California State University, Chico**
Dr. Sam Siewert
June 2025 – August 2025

In-person liaison for i-SAIL lab and summer research program. Used CAD to design lab layout, found quotes for workbench orders, and supervised CURE-E research students.

Student Research Assistant — **Chico State Enterprises**
Dr. Jaime Raigoza, Dr. Sam Siewert
June 2024 – December 2024

Student lead for research efforts to design Quantum Computing algorithms, to be compared against equivalent parallel solutions. Quantum circuits implemented with CUDA-Q: C++.

EXTRACURRICULAR ACTIVITY

CSCI Research Club President | Dr. Richard Tillquist — **California State University, Chico**
August 2023 - Present

The CSCI Research Club meets weekly to discuss recent discoveries and innovations in the field of Computer Science.

HPC & Quantum Computing Research Club President | Dr. Jaime Raigoza — **California State University, Chico**
April 2025 - Present

Co-founder and president of the interdisciplinary quantum research club.