AGENDA

- Objectives

- Target Audience

- Anatomy of a Strong Portfolio

- Choosing and Presenting Projects

- Making your Portfolio AI-Friendly

- Hosting/Serving Your Portfolio

- Checklists

- Examples

- Q&A

OBJECTIVES

- Identify who your portfolio is for — and what to include

- Choose and showcase your best projects

- Write clear, impactful project summaries

- Organize and publish your portfolio

- Optimize your portfolio for both people and AI tools

- Review and improve your portfolio with a reusable, adaptable checklist

TARGET AUDIENCES FOR YOUR PORTFOLIO (AND WHAT TO INCLUDE)

INDUSTRY

- Experience with large-scale systems, parallelization

- Performance benchmarking

- Tools used such as MPI, CUDA, PyTorch, Slurm

GRADUATE + PHD PROGRAMS

- Research potential, deep curiosity

- Clear technical writing and communication

- Alignment with lab or faculty interests

NATIONAL LABS + RESEARCH INSTITUTIONS

- Research-quality documentation of simulations or AI models

- Work on clusters or supercomputers

- Evidence of collaboration, reproducibility, open science

ACADEMIA (RESEARCH OR TEACHING FACULTY)

- Research vision

- Original contributions and leadership in projects

- Teaching and mentoring experience

ANATOMY OF A STRONG PORTFOLIO

1. **Homepage / Overview**

   Short, clear introduction (1-2 sentences)

   Photo and contact information (GitHub, LinkedIn, Resume, etc)

2. Skills and Tools

   Clear, categorized lists (Languages, Frameworks, Tools, Cloud/Infrastructure)

   Include level of proficiency where appropriate

3. Featured Projects

   More to follow…

4. Research & Publications (if Applicable)

   List of papers, posters, and/or preprints

   Citation, PDF link, 1-line summary of each, Slides if applicable

5. Teaching, Mentoring, Outreach (if Applicable)

   Courses assisted or taught (with materials)
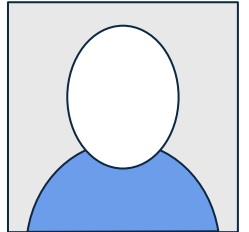
   Mentored student projects or REUs

6. GitHub / Open-Source Section

   Link to relevant repositories

Riley Smith
Graduate Student at Some University

Email | LinkedIn | GitHub

Riley Smith is a PhD student at Some University whose work sits at the intersection of high-performance computing and artificial intelligence. They use machine learning and predictive modeling to optimize cluster utilization and reduce power consumption.

Riley is seeking industry roles focused on improving efficiency and performance in modern datacenters.

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Skills

Programming Languages:
- Python (preferred, advanced)
- Go (advanced)
- C (advanced)
- C++ (proficient)
- Rust (working knowledge)

Frameworks:
- PyTorch
- MPI
- CUDA and ROCm/HIP
- NCCL
- gRPC / Protobuf
- Prometheus

Tools:
- Kubernetes
- GitHub Actions
- GitLab CI/CD
- Docker

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Publications

Adaptive Power Modeling for Heterogeneous HPC Clusters Using Deep Temporal Networks.
PDF | Slides
Smith, R., Patel, V., Zhao, L., & Caldwell, M. Proceedings of the International Conference for High Performance Computing, Networking, Storage, and Analysis (SC '25), 2025.
Proposes a deep-learning model that predicts power consumption across mixed CPU/GPU nodes more accurately than existing HPC power models.

Predictive Scheduling for Energy-Aware Job Placement in GPU-Accelerated Datacenters.
PDF | Slides
Smith, R., Nguyen, T., & Caldwell, M.
IEEE International Parallel & Distributed Processing Symposium (IPDPS), 2024.
Introduces a scheduling algorithm that uses machine-learning forecasts to place jobs on nodes that minimize overall energy use by up to 12%.

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    Link to relevant repositories

Teaching

Spring 2024: Teaching Assistant for CSCE 662: Advanced Computer Architecture

- Delivered lectures on reservation stations and Tomasulo's algorithm.
- Designed case studies for cross-architecture analysis.
- Lead classroom discussions on evaluating architecture peak performance on dynamic frequency chips.

Fall 2023: Teaching Assistant for CSCE 362: Computer Architecture and CSCE 372: Operating Systems

- Delivered lectures on x86 function calling conventions, fork-join process model and process management.
- Graded laboratory assignments across 12 labs for 47 students.
- Assisted in exam question creation and grading.

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3. Featured Projects

   More to follow… (1-4 recommended; 6 maximum)

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6. **GitHub / Open-Source Section**

   Link to relevant repositories

GitHub and Open-Source Projects

riley-smith / deeptemp-hpc-power-model (owner)
Deep temporal neural networks for cluster-level power prediction.
https://github.com/riley-smith/deeptemp-hpc-power-model
This repository contains the full training pipeline, preprocessing scripts for multi-node CPU/GPU telemetry, experiment configs, and reproducible evaluation tools.

Prometheus / node_exporter (contributor)
Exporter for machine metrics
https://github.com/prometheus/node_exporter
Improved metrics for power and thermal reporting on new architectures.

dask / dask (contributor)
Parallel computing with task scheduling
https://github.com/dask/dask
Improved the core scheduler by considering power metrics on running nodes

CHOOSING PROJECTS TO HIGHLIGHT

- Open-source projects to which you've *meaningfully* contributed
    - Not just README updates

- Internship projects
    - Medium-term projects that were well-scoped for a predetermined duration

- External collaborations
    - Highlights your ability to work well with a diverse set of people

- Semester-long projects
    - Think capstone-level courses or advanced research courses

- Projects which have resulted in publications
    - "Advertisement" for the paper with more information that what could go on your resume

- Course projects (if applicable)
    - If you're an undergraduate student, definitely!

CREATING STAND-OUT PROJECT DESCRIPTIONS

- Title of Project
- Short Description (one sentence problem -> solution)
  - This is probably the hardest thing to do!
- Your role and contribution(s)
- Tools and technologies used
- Results/metrics (speedup, accuracy, comparisons)
- Visuals (graphs, diagrams, screenshots)
  - Always include full captions and alt-text
- Links to external resources
  - GitHub repository
  - Blog post or paper
  - Live demo or video

Accelerating Multi-Backend Kernels with RAJA for Performance Portability

To address the challenge of maintaining performant and portable code across diverse architectures, this project used the RAJA C++ abstraction layer to refactor legacy HPC kernels for cross-platform execution.

I refactored core loop structures in a physics simulation codebase to use RAJA execution policies, implemented backend support for both OpenMP and CUDA, and benchmarked cross-platform performance.

Languages & Frameworks: C++, RAJA, OpenMP, CUDA
Build & Tooling: CMake, nvcc, Clang
Platforms: NVIDIA A100 GPU, AMD EPYC CPU
Profiling: Nsight Systems, Intel Vtune

- Achieved **5.3× speedup** on GPU vs. original CPU loop structures
- Maintained <10% performance delta between OpenMP and CUDA backends
- Reduced architecture-specific code by **~40%**, improving maintainability

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ORGANIZING YOUR PORTFOLIO – TIPS AND SUGGESTIONS

- Use headings and subheadings appropriately

- Whitespace is your friend. You want everything to be easy-to-read

- List most relevant/recent projects first (reverse chronological order)

- If you have a navigation bar, keep it simple (links to headings only)

- Use anchor links (also called internal links) to navigate between sections

- Check presentation of your portfolio on phone, tablet, and desktop

- Make sure fonts are legible, maximize contrast, adopt a colorblind-friendly palette

- Avoid too much jargon — explain key concepts briefly

- Show fewer projects, but do them well

MAKING YOUR PORTFOLIO AI FRIENDLY

1. Write for Clarity First

   - LLMs understand and summarize best when content is explicit and well-organized

   - Write short, clear sentences

   - Use action verbs such as *built*, *optimized*, *trained*, *deployed*

2. Use Structured Headings and Labels

   - Semantic structure helps both humans and AI extract meaning

   - Use consistent headers for all projects

   - Use bullet points for: tools, skills, contributions, results

3. Choose Machine-Readable Formats

   - Avoid hiding content in formats LLMs struggle with

   - Use: Markdown, HTML, Notion, accessible PDFs

   - Make GitHub repositories AI friendly, too! (Clean README.md with summaries, tools, usage)

MAKING YOUR PORTFOLIO AI FRIENDLY

4. Include Skills, Tools, and Keywords Explicitly

    - AI screeners and LLMs match based on keywords

    - Mention both acronyms and full names: MPI (Message Passing Interface)

    - Include job-aligned tags/labels: #cuda, #mlops, #distributed-training

5. Add Alt-Text and Captions to Visuals

    - LLMs and screen readers rely on alt-text to "see" images.

    - *Alt-text:* "Bar graph showing 5.3x speedup using CUDA over OpenMP"

    - *Caption:* "Figure 1: Performance comparison on 128-core cluster."

6. Link to External, Trustworthy Resources

    - Use descriptive links ("View my GitHub repo" vs. "Click here")

    - LLMs follow links and associate credibility

    - Prefer GitHub/GitLab repositories, Research papers (arXiv), Institutional pages (university, lab, company)

MAKING YOUR PORTFOLIO AI FRIENDLY

Additional Suggestions

- Use AI Tools when creating/evaluating your own portfolio

- Feed the checklist items into the prompt before including your portfolio content

- Ensure that an AI can summarize each project with minimal confusion

- Ensure that an AI summary of your portfolio is representative and accurate

PUBLISHING / HOSTING YOUR PORTFOLIO

GitHub Pages **(yourgithubname.github.io)** -- **https://pages.github.com**

Why: Free, version-controlled, great for showcasing code, projects, and docs

- Supports HTML, CSS, Jekyll, and Markdown

- Ideal for students comfortable with Git/GitHub

- Can be linked to your repos and academic projects

Notion **(notion.site/yourname)** – **https://www.notion.com/**

Why: Simple to build, update, and share — no code required.

- Clean, flexible layout

- Great internal linking between sections

- Easy to embed GitHub, videos, PDFs

- Mobile-friendly out of the box

PORTFOLIO CHECKLIST AND RESOURCES

https://students-sc.github.io/workshops

PORTFOLIO CHECKLIST

1. Content & Communication

✅ Use clear, concise language throughout the portfolio

✅ Follow a consistent project structure

    Problem → Solution → Tools → Results

✅ Highlight your personal contributions distinctly

✅ Use action verbs and measurable outcomes

    speedup, accuracy, scale

2. Project Selection & Depth

✅ Showcase 2-4 high-quality, relevant projects

✅ Include a mix of industry-relevant and research-level

✅ Prioritize originality, impact, and clarity over quantity

3. Structure & Navigation

✅ Use clear section headers:

    About, Skills, Projects, Research, Contact

✅ Keep navigation simple and intuitive

✅ Ensure every project follows a repeatable, easy-to-read format

✅ Include an intro/homepage with name, tagline, and focus area

4. Skills, Tools, & Technologies

✅ List technical skills grouped by category

    Languages, Frameworks, HPC Tools, etc.

✅ Match tools used to projects where relevant

✅ Mention level of proficiency or years of experience if useful

PORTFOLIO CHECKLIST

5. Results & Impact

✅ Include metrics wherever possible

✅ Visualize benchmarks or performance results

    charts, graphs, tables

✅ Explain what the numbers mean in context

✅ Highlight collaboration, publication, or application outcomes

6. Visuals & Design

✅ Use visuals: diagrams, screenshots, figures to break up text

✅ Include descriptive captions and alt-text for all images

✅ Make sure layout is clean and mobile-responsive

✅ Use consistent fonts, spacing, and color scheme

7. Accessibility & Readability

✅ Use bullet points and short paragraphs for skimming

✅ Add alt-text to all graphics and figures for accessibility

✅ Test font sizes, contrast, and spacing on multiple devices

✅ Keep code examples syntax-highlighted and minimal

8. Hosting & Integration

✅ Host on a reliable platform

    GitHub Pages, Notion, university website

✅ Include GitHub, LinkedIn, resume, and email prominently

✅ Link to external content with descriptive anchor text

    repos, blogs, papers, demos

Q & A

Questions?