Miranda Mundt

505 412 3812 ✉ miranda.r.mundt@gmail.com ⌂ mrmundt ⧉ mrmundt.github.io

SUMMARY

Senior Software Engineer with over 7 years of experience leading the design, modernization, and operation of large-scale, high-stakes software systems. Proven track record shaping system architecture, driving reliability and performance improvements, and establishing sustainable engineering practices across organizations. Deep expertise in Python-based platforms, distributed pipelines, CI/CD, DevSecOps, and open-source ecosystems, with a strong emphasis on observability and long-term system resilience.

EDUCATION

ARIZONA STATE UNIVERSITY │ *MS in Software Engineering*   2022 – 2025
- Graduated *summa cum laude*
- Extensive coursework in Software Engineering, Research Methods, Cybersecurity

UNIVERSITY OF NEW MEXICO │ *BS in Applied Mathematics*   2012 – 2014
- Minor: Economics, *summa cum laude*
- Extensive coursework in Scientific Computing, Numerical Computation

EXPERIENCE

SANDIA NATIONAL LABORATORIES   Albuquerque, NM
Senior Member of Technical Staff / Research Software Engineer   2019 – Present
- Led architecture and modernization of Pyomo, a globally used open-source optimization package, improving system stability, contributor scalability, and long-term maintainability across a distributed developer community
- Designed and evaluated CI/CD strategies to overcome productivity plateaus caused by automation bottlenecks, introducing improved concurrency and workflow efficiency using GitHub Actions and distributed test environments
- Built reproducible, automated experimentation and data-processing pipelines with integrated validation, anomaly detection, and performance monitoring to surface failure modes earlier in the development lifecycle
- Served as a technical mentor and reviewer for senior engineers and researchers, setting expectations for code quality, system design, and long-term sustainability
- Applied evidence-based software engineering principles to balance research demands, human values, and technical constraints when designing and evolving development practices
- Contributed to the design of secure, adaptive DevSecOps and testing infrastructures within a heterogeneous, multi-platform environment spanning HPC systems, cloud tooling, and developer workstations
- Co-led participatory action research initiatives to identify systemic barriers to sustainable software practices, translating practitioner experience into actionable technical guidance for large institutions
- Established organization-wide engineering practices through a Research Software Engineering Community of Practice, improving knowledge sharing, operational consistency, and collective ownership

Year-Round Technical Intern 2014 – 2015
- Supported research computing projects and scientific software development
- Assisted in automation and testing for internal tools

SAIC Albuquerque, NM
IT Service Management Specialist 2019
- Implemented ITIL best practices for Knowledge Management, Incident Management, and Major Incident Management
- Developed and monitored service level agreements (SLAs) and key performance indicators

BELCAN GOVERNMENT SERVICES Albuquerque, NM
Service, Quality, and Innovation Trainer 2017 – 2019
- Created training resources and onboarding materials for IT analysts
- Supported quality-improvement and process-standardization initiatives

———— TECHNICAL SKILLS ————

Languages Python, C++, Java, NodeJS, TypeScript, SQL

Automation & Tooling GitHub Actions, GitLab CI/CD, Jenkins, Docker, reproducible environments, HPC workflows

Systems Linux/Unix, SSH, networking fundamentals, remote environments

Distributed Systems High-performance computing (HPC), heterogeneous computing environments, distributed pipelines, workload orchestration

Data & Observability FAIR(ER) data practices, metadata design, validation pipelines, anomaly detection, performance benchmarking, telemetry concepts

Engineering Collaboration Jira, Confluence, GitHub, GitLab, documentation platforms, cross-team workflow design

Software Architecture Distributed system design, secure-by-design architectures, system modernization, backward compatibility strategies, platform evolution

Engineering Focus Technical leadership, developer productivity, reliability engineering, observability, sustainability, evidence-based decision making

Leadership Practices Technical mentoring, community building, cross-organizational coordination

———— CERTIFICATIONS AND TRAINING ————

CITI Human Subjects Training (Sandia and ASU) 2022, 2024
ITIL Foundation Training 2019

———— SELECTED PUBLICATIONS ————

1. Zakariya, P., Babushka, T., Mundt, M., Henriksen, A. "Developing open data for anomaly detection on nanoindentation curves." [Manuscript submitted for publication in 2025].

2. Dunlavy, M., Mundt, M., Henriksen, A. "Lost at sea: The reproducibility crisis in AIS anomaly detection." [Manuscript submitted for publication in 2025].

3. Drum, C., Dunlavy, M., Mundt, M., et al. "Keeping anomaly rules above board: A study on overspeed for maritime surveillance." [Manuscript submitted for publication in 2025].

4. Mundt, M. et al. "Pyomo: Accidentally Outrunning the Bear." *Patterns*, 2025.

5. Henriksen, A., Mundt, M. "Sharing is Caring: A Practical Guide to FAIR(ER) Open Data Release." 30th ACM SIGKDD Conference on Knowledge Discovery and Data Mining, 2024.

6. Milewicz, R., Bisila, J., Mundt, M. et al. "DevOps Pragmatic Practices and Potential Perils in Scientific Software Development." Eighth International Congress on Information and Communication Technology, 2023.

7. Mundt, M. et al. "For the Public Good: Connecting, Retaining, and Recognizing Current and Future RSEs at U.S. National Research Laboratories and Agencies." *IEEE Computing in Science & Engineering*, 2023.

8. Gilbertson, C., Mundt, M. et al. "Towards Evidence-Based Software Quality Practices for Reproducibility: Practices and Aligned Software Qualities." 2nd ACM Conference on Reproducibility and Replicability, 2024.

9. Mundt, M. et al. "Challenges and Strategies for Testing Automation Practices at Sandia." US-RSE Conference, 2023.

10. Mundt, M., Milewicz, R. "A Tiered Approach to Scientific Software Quality Practices." Improving Scientific Software Conference, 2022.

―――――――――――――――――― **LEADERSHIP & SERVICE** ――――――――――――――――――

UNITED STATES RESEARCH SOFTWARE ENGINEER ASSOCIATION   2021 – Present
- Elected Steering Committee Member (2023–2024, 2025–2026)
- General Chair, US-RSE Conference 2024
- Contribute to long-term strategy, community growth, and the formalization of research software as a profession

IEEE COMPUTING IN SCIENCE AND ENGINEERING MAGAZINE   2025 – Present
- Invited Editor, Research Software Engineering Department
- Create or request regular content for quarterly department submissions, focusing on the evolving profession and practice of research software engineering in computational science and engineering

LAB-DIRECTED RESEARCH AND DEVELOPMENT GRANT   2022 – 2023
- Co-Principal Investigator on federally funded project addressing reproducibility and software quality
- Led case study design, coordination, and data curation for multi-team research effort

RESEARCH SOFTWARE ENGINEERING COMMUNITY OF PRACTICE   2022 – Present
- Founding member and administrator at Sandia National Laboratories
- Create mission statement, code of conduct, and onboarding resources
- Organize monthly meetings and community initiatives

――――――――――――――――――――――― **AWARDS** ―――――――――――――――――――――――

2020 R&D 100 Award – Institute for the Design of Advanced Energy Systems

2021 Noteworthy Practice Award – QA Independent Assessment Program

2020 – 2023 Sandia Employee Recognition Awards – multiple categories