Dave Austin, Ph.D.

Charleston, SC | austindi1133@gmail.com | LinkedIn | GitHub

Summary

AI Engineer and Data Engineer with a Ph.D. in Computational Physics focused on building intelligent automation systems, agentic workflows, and scalable data platforms. Experienced developing LLM-assisted monitoring, workflow orchestration, and autonomous recovery systems that transform operational data into reliable, decision-ready infrastructure. Combines scientific computing rigor with modern cloud and AI engineering practices.

Technical Skills

Languages: Python, SQL, Bash, TypeScript
AI Systems: OpenAI API, LLM workflows, prompt engineering, RAG concepts, agentic automation
Data Platforms: Snowflake, PostgreSQL, Parquet, JSON
Cloud & Infra: AWS (S3, EC2, Lambda, CloudWatch), Docker
Orchestration: Prefect, SLURM
Engineering: ETL/ELT, event-driven workflows, observability, structured logging
Scientific Computing: VASP, Quantum ESPRESSO
Other: Git, Linux, CI/CD, LaTeX

Experience

AI Engineer / Data Engineer   Mar 2025 – Present
Bear Cognition   *Charleston, SC*

- Designed intelligent data workflows integrating APIs, cloud systems, and Snowflake analytics environments supporting business operations.
- Built agentic monitoring systems using LLMs to analyze Prefect logs and generate automated diagnostics and recovery recommendations.
- Developed orchestration infrastructure managing retries, scheduling, observability, and automated pipeline recovery.
- Created internal CLI tooling automating pipeline scaffolding, CI/CD deployment, and secret management workflows.
- Implemented automated ticket creation and runtime tracking to monitor workflow reliability and execution cost.
- Engineered normalization and validation logic transforming inconsistent real-world partner data into structured production datasets.
- Collaborated with engineering and business teams to translate operational problems into automated AI-assisted solutions.
- Contributed to backend development within a Nuxt + TypeScript application integrating APIs and automation services.

Postdoctoral Scholar — Scientific Computing & Data Systems   Aug 2024 – Mar 2025
University of Central Florida   *Orlando, FL*

- Extended automated computational workflows supporting large-scale electronic structure simulations across HPC environments.
- Built data pipelines converting quantum simulation outputs into structured datasets used for modeling and visualization.
- Developed validation and monitoring logic detecting incomplete simulations using physics-informed automated checks.

- Maintained reproducible workflows enabling regeneration of analysis artifacts from tracked configuration metadata.

- Mentored researchers on workflow automation, scalable data processing, and reproducible computational practices.

Graduate Research Assistant — Scientific Computing & Data Engineering Aug 2018 – Aug 2024
University of Central Florida *Orlando, FL*

- Designed automated HPC orchestration systems managing DFT simulations across distributed supercomputers (Stampede2/3, Perlmutter, Anvil).
- Built Python tooling to submit, monitor, and manage concurrent simulations with timeout detection, retry logic, and automated restart workflows.
- Eliminated manual monitoring through logging, validation checks, and automated notifications, saving days of compute time per project.
- Developed ingestion pipelines parsing GB–TB simulation outputs into structured datasets (JSON/CSV).
- Extracted electronic structure features and generated reproducible STM/STS simulations from quantum mechanical calculations.
- Automated data transfer pipelines between HPC systems and local environments using SSH/SCP workflows.
- Collaborated internationally with experimental researchers validating computational results against measurements.
- Contributed to eight peer-reviewed scientific publications.

Teaching Assistant Aug 2019 – May 2020
University of Central Florida *Orlando, FL*

- Led undergraduate physics laboratories and instructed students in experimental analysis and quantitative reasoning.
- Provided technical mentorship and structured evaluation supporting consistent learning outcomes.

Education

Ph.D. in Physics (Computational Materials Science) 2024
University of Central Florida
Dissertation: First Principles Studies of Nano-Scale Phenomena At Surfaces: From Characteristics of Single Atom Catalysts to Molecular Structure Formation

B.S. in Physics 2018
College of Charleston

Research Impact

8 peer-reviewed publications in computational physics and materials science demonstrating advanced modeling, large-scale data analysis, and interdisciplinary collaboration.