

Anirudh Appachar

San Francisco, CA

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Scientific software engineer focused on building scalable simulation and data infrastructure for research and industry. Proven track record in accelerating high-performance computing workflows, automating data pipelines, and enabling collaboration across cross-functional teams.

Skills

Programming: Python, Bash Shell, C++, MongoDB, SQL, Java, Javascript

Data & Scientific Tools: NumPy, Pandas, SciPy, plotly, Pymatgen, scikit-learn

Infrastructure & DevOps: Apache Airflow, Git, GraphQL, High Performance Computing (HPC) on SLURM, Jupyter, Pytest

Machine Learning (Familiar): PyTorch

Languages: Tamil (Native, Spoken), Business Proficiency in Japanese (N1, Speak, Read, Write)

Research Experience: Molecular Dynamics, Computational Lithography, Computational Materials Science, Cheminformatics

Work Experience

Intel | Software Research Engineer, Jul. 2022-Present

Hillsboro, OR/ San Francisco, CA

- Built and maintained parallelized simulation software for CPU manufacturing on HPC clusters, focusing on improving simulation accuracy by tuning numerical algorithms and developing more efficient infrastructure to reduce compute time.
- Designed Python-based validation tools that eliminated invalid simulation I/O, saving an estimated 15,000-25,000 developer hours annually across a 100+ person engineering team.
- Designed visualization utilities which enabled engineers to identify convergence chokepoints in numerical simulations, allowing them to optimize compute time and save 10k+ CPU-hours of compute in production.
- Developed a static-analysis QA pipeline in Pytest to identify invalid configurations in simulation I/O and CI deployment, ensuring correct simulation results in production and preventing several 1000s of CPU-hours in wasted compute.
- Implemented and maintained GraphQL APIs to enable internal automation and CI pipeline infrastructure.
- Proposed and built a centralized documentation system using Python, MongoDB, and Flask to improve onboarding and team knowledge sharing.
- Conduct peer code reviews and technical audits to uphold engineering quality standards.

Samsung Advanced Materials Lab (AML) | Data Engineer May-Dec. 2021 (Contract)

Cambridge, MA

Worked alongside other computational and experimental materials scientists at Samsung AML to enable exploration and synthesis of novel Li-ion battery materials.

- Created an extensible Apache Airflow pipeline for HPC workflows, accelerating sampling of novel battery materials by 50x.
- Built ETL Pipelines to merge simulation and experimental datasets for automated high-throughput materials analysis.

University of Michigan | Graduate Researcher, Oct. 2020-Jul. 2022

Ann Arbor, MI

- Developed quantum-mechanical methodologies and computational algorithms to carry out molecular dynamics simulations.
- Automated high-throughput molecular simulations using ETL pipelines in Python and Bash, reducing prep time by 30x.
- Deployed group infrastructure: HPC cheminformatics workflows, chemical databases, and collaborative JupyterHub instances for data visualization and analysis.

Education

University of Michigan

Master of Science in Computational Materials Science & Engineering

May 2022

Carleton College

Bachelor of Arts *cum laude*, Chemistry

June 2018

GPA: 4.00

Relevant Coursework: Computational Materials Science, Material Informatics, Data Structures, Machine Learning, NLP