Deval Deliwala

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Education

B.A. Applied Math and Astrophysics 2022–2026
University of California, Berkeley GPA 3.75

Publications

[1] D. R. Hart, **D. M. Deliwala**, R. Byrne, D. J. Spry. "Electrically detected magnetic resonance (EDMR) of introduced spin defects in silicon carbide for quantum magnetometry." *Proc. SPIE Spintronics XVIII*, 13586, 135860F (2025). https://doi.org/10.1117/12.3066222

[2] **D. M. Deliwala**, M. Hosek. "The Extinction Laws of the Galactic Center." *The Astrophysical Journal. Pending Publication.* ⟨Preprint⟩

Experience

NASA Internship — Summer 2025

Quantum Artificial Intelligence Lab (QuAIL)

- Wrote fast EDMR simulations of spin-defects in silicon carbide in magnetic fields for quantum sensing.
- Derived and programmatically solved the Stochastic Liouville Equation for spin-dependent recombination in coupled 16×16 electron–nuclear systems.
- Validated my simulations against experimental spectra and predicted new hyperfine signals. These signals were later confirmed and are described in [1].

Moving Universe Lab — 2022–Present

- Derived spatially-dependent extinction laws in the immediate vicinity of Sag A^* using data from JWST.
- Wrote MCMC regression algorithms to measure extinction ratios using Red Clump stars despite lacking resolution. My work is being finalized into [2].

Lawrence Berkeley National Lab — 2024–2025

Quantum Nanoelectronics Lab (QNL) / Advanced Quantum Testbed (AQT)

- Developed software packages for rendering superconducting fluxonium chips in GDS.
- Designed and executed eigenmode simulations of 4-qubit fluxoniums and transmon architectures.

Projects

CORAL | a pure-Rust BLAS for AArch64

- COre Rust Architecture for Linear Algebra – a BLAS library written from scratch in Rust for AArch64.
- Implemented cache-aware microkernels using NEON SIMD intrinsics for high throughput.
- Achieved performance comparable with OpenBLAS. You can see the `GEMM` benchmark ⟨here⟩.
- Wrote a technical blog series walking through the design of CORAL.

RIVER | a Rust Numerical Library

Rust Numerical Computing Library

- Rust Infrastructure for Vector and Eigenvalue Routines – a scientific-computing library combining Python-like clarity with Rust's safety and performance.
- Emphasizes clear, expressive and intuitive syntax for implementing numerical algorithms.
- Foundation for future vector, eigenvalue, and other numerical routines. Will wrap around CORAL to have critical fast LAPACK routines – all in pure Rust. Only root-finding algorithms have been written.

Skills

Rust, C, C++, AArch64 assembly, Python, LaTeX, Mathematica