Daniel R. Livingston

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Accomplished Scientific & GPU Software Engineer

GPU & Graphics Programming • Systems Programming • Computational Geometry • GIS/Geospatial Analysis
Project Management • Strong Communication • Great Collaborator • Creative Problem Solver
D.O.E., LANL & AMD Award Winner • LANL Top Performer • Security Clearance: Top Secret/D.O.E. Q-Level (Expired)

Work Experience

Senior Software Development Engineer — Jan. 2022 – Present
Advanced Micro Devices, Inc. – GPU Technologies & Engineering — *Boxborough, MA*

- **Key contributor to the creation of Radeon GPU Detective (RGD)** by spearheading the design and development of DirectX 12 and Vulkan driver components and collaborating with cross-functional teams on the overall project. Adopted by major video game studios to resolve GPU crashes in over six AAA titles, earning internal recognition with an "Executive Spotlight" award.
- **Architected and led the development of a new GPU profiling and tracing system**, replacing a rigid legacy setup with a centralized, modular, cross-driver solution (DX12, Vulkan, OpenGL, OpenCL, HIP, ROCm) for Windows and Linux. Guided and collaborated with a small team, alongside cross-functional partners, to build a system that is highly extensible and robust. Developed an extensive Google Test suite for rigorous validation of system integrity.
- **Improved driver developer productivity** by developing internal tooling for deploying and managing AMD graphics & compute drivers

Research Technologist — Mar. 2017 – Dec. 2021
Los Alamos National Laboratory – Computational Earth Science group (EES-16) — *Los Alamos, NM*

- Project lead and primary developer on *TINerator*, an open-source **Python** module for generating multi-scale geologic **3D polygonal meshes** from **GIS** & **geospatial** data for use in flow and transport simulation codes – widely used across U.S. D.O.E. national laboratories and presented in numerous conferences, lectures, and journals
- Reduced model setup and analysis time by ∼70% by developing an **award-winning program** for interactive **2D** & **3D visualization** + **analysis** of geospatial data
- Project lead and primary developer on *VORONOI*, an open-source **Fortran90** application for **MPI**-based "embarrassingly parallel" generation of Voronoi tessellations from polygonal meshes, formatted for use in various multi-physics numerical models – presented at several conferences and has national & international users
- Reduced computation time by >100x by leading development on an internal **Julia** module containing a **novel algorithm** for parallel computation of fire spread behavior from geospatial data
- Reduced mesh generation time by ∼40% by designing high-performing **algorithms** in **C, C++, and Fortran** for polygonal mesh attribute interpolation & dynamic sub-mesh querying and extraction

Graduate Research Assistant — Jun. 2015 – Dec. 2015
Arizona State University – School of Earth & Space Exploration (SESE) — *Tempe, AZ*

- Developed an **Artificial Neural Network** which, when deployed on a cluster of drones acting as a "mesh network", finds and directs the drones to the optimal spatial configuration for maximum network coverage
- Reduced neural network training & execution time by ∼70% by implementing **shared-memory parallelization** with **OpenMP**

Education

Georgia Institute of Technology — Atlanta, GA (Online)
Master of Science, Computer Science — *May 2025 (Expected)*

- Specialization: Computing Systems

Arizona State University — Tempe, AZ
Professional Science Masters, Nanoscience — *Dec. 2015*

- Thesis: *Particle-Based Device Simulations of Germanium Transistors*

New Mexico State University — Las Cruces, NM
Bachelor of Science, Physics; Minor, Philosophy — *May 2014*

- Physics Honors Society member, *Sigma Pi Sigma*

Technologies & Skills

Languages: C++, C, Rust, Python, Bash, Swift, Julia, FORTRAN, HTML/CSS
Tools/APIs: OpenGL, DirectX 12, OpenMP, VTK, GDAL, CMake, Git, CI/CD, LaTeX
Mathematics: GPU programming, mesh generation, computational geometry, graph theory, geospatial analysis

Honors & Awards

Executive Spotlight Award | *Advanced Micro Devices, Inc.* — Jun. 2023
R&D 100 Award & Special Recognition Market Disruptor: SmartTensors Team | *R&D 100 Conference & Awards* — Oct. 2021
Secretary's Achievement Honor Award | *U.S. Department of Energy* — Jan. 2021
R&D 100 Award: Amanzi-ATS Team | *R&D 100 Conference & Awards* — Oct. 2020
Spot Award (2x) | *Los Alamos National Laboratory* — Jan. & Aug. 2020
Eagle Scout | *Boy Scouts of America (Troop 147, Yucca Council)* — Feb. 2009