Aman Dwivedi

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Education

University of California, Davis — Davis, CA
Master of Science in Computer Science, GPA: 3.94 — *2024 – 2026*
- Advanced Coursework: Computer Security, Operating Systems, Computer Architecture, Program Verification

University of Arizona — Tucson, AZ
Bachelor of Science in Computer Science, Minor in Mathematics, GPA: 4.0 — *2020 – 2024*
- Advanced Coursework: Algorithms & Data Structures, Database Design, System Programming & Unix, Linear Algebra
- Achievements: Summa Cum Laude, 2x Highest Academic Distinction, $140,000 Merit Scholarship

Experience

Graduate Student Researcher — August. 2025 – Present
University of California, Davis | Python | Linux | NCCL | RCCL | Code — *Davis, CA*
- Investigating communication model co-design for large-scale diffusion transformers by integrating UCCL's RDMA-based peer-to-peer engine into xDiT to enable SM-free KV cache transfers and reduce inference latency.
- Designing and conducting reproducible benchmarks to evaluate distributed image and video generation across heterogeneous GPU clusters, quantifying communication bottlenecks and scalability trade-offs.
- Optimizing KV cache transfer mechanisms in diffusion transformer inference by leveraging low-overhead RDMA communication to minimize GPU load and end-to-end latency.

Graduate Student Researcher — Apr. 2025 – Present
University of California, Davis | C | Linux | Bash | Code — *Davis, CA*
- Researching advanced tiered memory management systems to address performance bottlenecks in datacenter applications.
- Implementing prefetch thread mechanism for HeMem systems to proactively migrate pages from NVM to DRAM, optimizing application performance and memory utilization by 10% in predictable patterns.
- Conducting performance analysis and benchmarking using GUPS and GAPBS, validating 10% boost in performance.

Software Developer — Mar. 2023 – Jan. 2024
Lunar and Planetary Laboratory | Python (Django) | Flutter | Postgres — *Tucson, AZ*
- Contributed to Sample Analysis and Management Information System (SAMIS) development for NASA OSIRIS-Rex mission to digitize and streamline asteroid sample data workflows for over 250 scientists.
- Engineered cross-platform mobile application (SATA) and desktop web application (SADA) enabling scientists to collect, manage, and visualize more than 100,000 experimental data of the asteroid sample efficiently.
- Architected API endpoints to handle complex scientific data workflows and support mission-critical operations.
- Enhanced database performance by creating SQL view for frequently executed analytical queries, reducing query execution time by 25%.

Undergraduate Research Assistant — Oct. 2023 – May 2024
University of Arizona | Python (Matplotlib) | Fortran | Selenium — *Tucson, AZ*
- Supported flood prediction research initiative aimed at improving early warning systems and emergency response planning for more than 50,000 residents in the Pima County.
- Automated hydrological data collection by developing web scraping bot to extract, clean, and process rainfall measurements from 36 water gauges across ALERT monitoring network.
- Modernized CHRE2D urban flood simulation model by translating legacy Fortran code spread across 15 modules into object-oriented Python application for enhanced maintainability.
- Designed interactive data visualizations with custom grid rendering for irregular computational meshes, displaying water flow velocity, direction patterns, and depth variations, enhancing flood analysis accuracy by 35%.

Teaching Assistant — Aug. 2021 – Mar. 2025
University of California, Davis & University of Arizona — *Davis, CA & Tucson, AZ*
- Led discussion sections and office hours for mathematics and computer science courses facilitating learning for over 350 students across Discrete Structures, Software Development, and Programming, improving student performance by 20%.

Projects

LLM-Aided Overview | Code
- Built a full-stack documentation platform with Letta AI agent, Python (Flask) backend, and Next.js frontend to enhance developer onboarding and knowledge transfer.

Charitap | Code
- Engineered a micro-donation platform that lets users round up their everyday purchases and automatically donate the spare change to a charity of their choice, using a Chrome Extension and leveraging Stripe API for transactions.

Formally Verified Round-Robin OS Scheduler | Code
- Implemented and formally verified a round-robin CPU scheduling algorithm in Dafny with mathematical proof verification to ensure correctness and safety properties, achieving 100% correctness verification.

Technical Skills

Languages: Python, C, Java, JavaScript, HTML, CSS, Dafny, Flutter
Databases: SQL, NoSQL, MongoDB, Postgres
Developer Tools: Linux, Jira, Git, Node.js, Bitbucket, AWS, Confluence, Streamlit