William Deye

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Education

University of California, Los Angeles **Expected June 2027**

B.S. Mathematics of Computation (Math and Computer Science) GPA: 3.7

Relevant Coursework: Software Construction, Data Structures and Algorithms, Computer Organization, Big Data/Databases, Mathematical Modeling, Probability and Statistics, Number Theory, Linear Algebra

Experience

National Institute of Standards and Technology **Gaithersburg, Maryland**

Guest Researcher September 2024 – Present

- Engineered fast numerical algorithms in MATLAB to solve partial integro-differential equations modeling Biological Field Effect Transistors, achieving **1000x** accuracy improvement over existing methods.
- Designed a specialized high-efficiency stable quadrature and time-stepping routines, reducing computation time by **99%**. First author to paper for submission to a numerical analysis journal, *Numerische Mathematik* with 200k+ downloads.

Summer Undergraduate Research Fellow June 2024 – September 2024

- Implemented a neural network with machine learning to model differential equations using custom optimization algorithms and various analytical and numerical methods.
- Analyzed model convergence in MATLAB. Compiled data and showcased findings and custom analytical and numerical techniques.
- Chosen out of 100+ summer interns to continue as a part time guest researcher throughout the year.

Projects

MedRelay (Agentic AI Full-stack Web App) | *Flask, MongoDB, Tailwind CSS, Contextus.ai, HTML*

- **Architected** an end-to-end, multi-agent AI system from the ground up, **defining** the core logic and interaction between four distinct agents to cut healthcare administrative task time by 95% and errors by 70%.
- **Led** the full-stack development and **designed** the system architecture, making key technical decisions on the Flask backend, MongoDB database schema, and frontend dashboard to ensure rapid deployment in a 36-hour timeframe.
- **Owned** the product vision for a key feature—a web-crawling search agent—that located and populated over 10 unique insurance forms, a critical component for eliminating manual data entry.
- Secured 2nd place overall and 1st in track against 100+ teams at HopHacks, winning $1000 in prizes for successfully building and demoing a complete, end-to-end solution.

WasteWatchers.app | *React, Django, SQL, AWS, Tensorflow*

- Engineered a real-time analytics pipeline that trained an LSTM model on CDC wastewater data from a 15,000-column SQL database with an end-to-end latency of under 15 minutes, providing health officials with near-instant insights.
- Accelerated predictive model training time by 90% by optimizing data preprocessing with Pandas/NumPy and leveraging CUDA-accelerated TensorFlow.
- Automated CI/CD deployment on AWS EC2 with secure Nginx proxy and serverless Lambda tasks, enabling reproducible cloud infrastructure. capable of handling over **5,000+** concurrent requests via optimized EC2 and Nginx configuration

Multi-threaded Mandelbrot Renderer | *C++, SDL2, Graphical User Interface*

- Designed a high-performance, low-latency Mandelbrot Set renderer using the SDL library that utilizes multiprocessing.
- Implemented a synchronized queue of functions with atomics and mutexes.

Open Source Contributions

Tmux-Powerline (3.6k Stars)

- Fixed multi-platform bugs and added default feature segments to improve usability.
- Merged **10+** commits via GitHub, enhancing core modules in both shell and Python.

SymPy (13.7k Stars)

- Debugged unit test failures in SymPy's LaTeX parsing engine, enhancing expression accuracy and parser reliability.

Technical Skills

- JavaScript/React, NextJS, CSS, NodeJS, Material UI, Python, SQL, Postgres, Java, C/C++, Matlab, Bash, PyTorch, TensorFlow, Linux, AWS EC2, RDS, DuckDB, SQLite, Apache Kafka, Map Reduce, MongoDB, Redis Cache, Salesforce, Microsoft Office, Power BI