

Avni Badiwale

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Education

University of Wisconsin - Madison

Bachelor of Science in Computer Science & Mathematics

Madison, Wisconsin

Sep 2024 - May 2027

Work Experience

Epic Systems

CaTS Software Development Intern

Verona, Wisconsin

May 2025 - Present

- Singlehandedly built an interactive, campus-wide webmap published on the employee homepage with an October 28th launch, expected to be regularly used by more than 15K employees.
- Facilitated cross-team collaboration between Facilities, who provided the map data, and Internal Projects, who designed the site.
- Utilized ArcGIS SDK for JS with a React front-end and C# backend for SQL logic with universal room search.
- Led a migration from Webpack 4 to Vite/Esbuild to fix ArcGIS dependency resolution - its deprecated toolchain was incompatible with ArcGIS's modern packages - unblocking the map integration, and reducing build times.

Google Summer of Code at OpenMS

Open Source Software Development Intern [Project](#)

Remote (based in Germany)

May 2025 - September 2025

- Integrated Apache Arrow into OpenMS by authoring a cross-platform CMake build macro automating source extraction, compilation, and installation on Windows, Linux, and macOS.
- Enhanced OpenMS CI/CD pipelines (GitHub Actions, Docker, Bioconda) to manage new Arrow dependencies and ensure reproducible builds and tests.
- Designed and implemented a lossless, low-latency mzML-to-Parquet converter in C++, extending OpenMS capabilities to support columnar storage and full metadata preservation.

Smith Research Group at UW-Madison

Software Developer and Computational Proteomics Researcher

Madison, Wisconsin

February 2025 - Present

- Researched and prototyped novel positional encoding algorithms for mass spectrometry data to enhance protein identification accuracy in deep learning models.
 - Authored comprehensive Jupyter Notebook tutorials documenting mass spectra encoding methods for machine learning, streamlining onboarding for future lab members.
 - Produced educational Manim animations providing geometric interpretations of complex embedding techniques, making proteomics ML concepts more accessible.
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Personal Projects

mzML to Parquet Converter (CLI Tool for Big Data Experiments)

[PyquetMS](#) | [Published](#)

Quickstart: `pip install pyquetms`

- Efficient conversion pipeline that converts mzML to Apache Parquet to shrink storage, speed up I/O, and enable fast columnar queries with libraries like Spark, Dask, and pandas.
- Designed to unlock large-scale meta-analysis and ML on the vast public mzML corpus by standardizing schema/metadata and supporting batch processing.

StockFetch (Aesthetic Command Line Stock Analysis Tool)

[Stockfetch](#) | [Published](#)

Quickstart: `pip install stockfetch`

- Cross-platform stock fetching utility, shipped with intricate ASCII/ANSI rendering of all NYSE-traded stocks.
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Extracurricular Activities

- **NumFOCUS AI in Science Sprint** - Participated in a weekly conference with experts, exploring ethical applications of AI to advance bioinformatics subfields.
- **Model UN** - Member of the WiscoMUN traveling team with experience competing in prior conferences at Harvard and Georgetown. Vice Chair at WHSMUN, our high school conference.
- **Capital One Tech Summit** - 30 students selected, engaged in technical workshops with a fintech hackathon.