Manishika Balamurugan

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Education

University of Michigan - Ann Arbor Expected May 2027

Bachelor of Science in Computer Science & Biopsychology, Cognition, and Neuroscience. ***(GPA: 3.91/4.00)*** *Ann Arbor, MI*

- **Honors:** Rogel Scholar (Full Ride), William J. Branstrom Prize (Top 5%), University Honors
- **Relevant Coursework:** Data Structures & Algorithms, Computer Organization, Discrete Math, Statistics, Linear Algebra, Web Systems

Experience

Sartorius Jan 2026 – May 2026, Aug 2026 – Dec 2026

Student Software Engineer, UM CoE Multidisciplinary Design Program *Ann Arbor, MI*

- Designing and implementing containerized backend architecture (Docker, Node.js) for remote monitoring and control of laboratory systems.
- Building secure REST APIs enabling real-time device telemetry and parameter updates.
- Developing a React-based web dashboard for live status visualization and remote configuration.
- Integrating a hardware simulator to support development and automated testing without physical devices.
- Collaborating with industry engineers to align system design with commercial product lines.

Michigan Daily Sep 2025 – present

Web Developer *Ann Arbor, MI*

- Redesigned frontend gameplay components for Ann Arbor Geoguessr-style game using Svelte and TypeScript, improving interactivity and performance.
- Built a custom daily game generation system backed by SQL for daily publication for thousands of daily readers.

Projects

Replica of GPT-2 | ***PyTorch***

- Implemented a GPT-2–style Transformer from scratch, including multi-head self-attention and positional encodings.
- Built a custom training loop, optimizer, and evaluation pipeline.

Brain Tumor Detection & Classification | ***PyTorch***

- Achieved 99.7% binary and 95.7% multi-class accuracy with CNNs (ResNet34, ConvNeXt).
- Applied transfer learning, augmentation, and evaluation metrics.

AI-Powered Student Life Dashboard | ***FastAPI, JavaScript, React***

- Built a full-stack web application using FastAPI and React with NLP-based AI assistants.
- Designed REST APIs and frontend state management for real-time user interactions.

Research

Computational & Cognitive Neuroscience Lab, University of Michigan Aug 2024 – Present

Research Assistant *Ann Arbor, MI*

- Built and maintained R-based data processing pipelines for MRI datasets, ensuring reproducibility and accuracy.
- Conduct preprocessing, quality control, and statistical analysis for hundreds of samples.
- Trained an internal AI assistant to streamline literature review and lab communication workflows.

Regenerative Imaging Laboratory, University of Pittsburgh May 2025 – Aug 2025

Research Fellow *Pittsburgh, PA*

- Analyzed hippocampal connectivity in 18 brains using diffusion MRI and tractography software.
- Wrote MATLAB scripts for clustering neural connections and modeling network patterns.

Technical Skills

Languages: Python, C++, JavaScript, TypeScript, SQL, C, R
Frameworks/Libraries: React, Node.js, FastAPI, PyTorch, Svelte, scikit-learn, OpenCV
Tools: Docker, Git, Jupyter, REST APIs, MATLAB
ML/DS: CNNs, Transformers, Transfer Learning, Data Pipelines