Manishika Balamurugan

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Education

Bachelor of Science with Honors (GPA: 3.981) **August 2023 - present**
Biopsychology, Cognition, & Neuroscience. Computer Science.
University of Michigan- Ann Arbor
Relevant Coursework: Behavioral Neuroscience. Cognitive Psychology. General Chemistry. Molecular, Cellular, and Developmental Biology. Statistics and Data Analysis. Elementary Programming Concepts. Programming and Data Structures. Discrete Mathematics.
Anticipated Graduation Date: May 2027

Lincoln High School* **August 2019 - May 2023**
International Baccalaureate Program (GPA: 4.493)
Senior Thesis: *To what extent is prejudice developed in early childhood as a result of implicit racial bias?*
Senior Psychological Research Paper: *An Experiment Investigating the Effects of Conflicting Stimuli on Information Processing (Replication of Stroop, 1935)*
***Dual enrolled at the University of Nebraska-Lincoln** (GPA: 4.0) **August - December 2022**

Research

Regenerative Imaging Laboratory **May 2025 - present**
Research Fellow, University of Pittsburgh

- Working under Dr. Mike Modo, conducting research to model the hippocampus and its connectivity using diffusion MRI data and tractography methods.
- Presented at Summer Undergraduate Research Program Symposium in August 2025.

Computational & Cognitive Neuroscience Lab **August 2024 - present**
Research Assistant, University of Michigan

- Working under Dr. Thad Polk, conducting research regarding neural dedifferentiation in healthy vs MCI older adults.
- Responsible for participant screening, behavioral data entry, MRI data processing using Freesurfer, MRS quality control.
- Led project on training and implementing an AI assistant into lab.
- Presented at Undergraduate Research Opportunity Symposium in April 2025.

Personal Projects

Brain Tumor Detection & Classification Using Deep Learning
Developed deep learning models for brain tumor analysis, achieving 99.7% accuracy in binary detection and 95.7% in multi-class classification (glioma, meningioma, pituitary). Implemented ResNet34 and ConvNeXt-based models with PyTorch, applied data augmentation, class weighting, and transfer learning, and evaluated performance using confusion matrices, precision, recall, and F1-score metrics.

AI-powered Student Life Dashboard
Built an AI-powered web dashboard to support students' education, health, and wellness. Implemented interactive AI coaches on pages for to-dos, sleep, exercise, and wellness using NLP to provide personalized tips and real-time chat guidance. Developed the backend with FastAPI and frontend with React, demonstrating full-stack development, AI integration, NLP, and user-centric design.

Face Recognition Attendance System
Created a real-time attendance system using Python, OpenCV, and face recognition to identify individuals via webcam and log attendance with timestamps in CSV format. Enhanced security with automated email alerts sending snapshots of unknown faces using SMTP. Demonstrated skills in computer vision, automation, and third-party API integration.

Flight Price Prediction App
Built an interactive Streamlit app to predict flight prices using historical data. Utilized pandas and NumPy for data preprocessing and implemented a Random Forest Regression model with scikit-learn for accurate price forecasting. Showcased proficiency in machine learning, data analysis, and web app deployment.

Catch The Cat: A 2D Puzzle Game
Developed a 2D puzzle game in C++ using SFML, incorporating pathfinding algorithms and sprite animations. Implemented core mechanics such as user input handling, collision detection, and dynamic graphics, highlighting programming skills and algorithmic thinking.

Personal Portfolio Website (manishikab.github.io)
Built a responsive portfolio website using HTML, CSS, and Java, showcasing personal projects and technical skills. Implemented interactive features and structured content for clear presentation.

Awards

Rogel Award of Excellence Scholar
One of 75 students selected to receive full-ride scholarship for out-of-state students who are most likely to contribute significantly to the University of Michigan.

University Honors

Shining Student Tackling Advanced Research **April 2024**
Awarded to STAR scholar who takes initiative in building their research skills.

Rising Student Tackling Advanced Research **April 2024**
Awarded to STAR scholar who participates in community outreach to help promote equitable participation in the field of psychology.

William J. Branstrom Freshman Prize **March 2024**
Awarded to first-year students who rank in the top five percent of their class.

Extracurriculars

Nu Rho Psi **September 2024 - present**
University of Michigan Chapter of National Honors Society of Neuroscience.

Michigan Data Science Team **January 2024 - present**
Project teams focused on real-world problem solving and collaborative analysis.

Students Tackling Advanced Research (STAR) Program **January 2023 - May 2024**
STAR Scholar
One of 30 students selected to receive structured mentoring from faculty and graduate student mentors aimed to prepare students for academic research and graduate school.

Work Experience

Literacy Tutor **October 2023 - April 2024**
Bright Futures Schools in Ypsilanti, MI
Planned curricula for groups of students at different English levels to enhance literacy skills through one-on-one reading, comprehension problem sets, and encoding/decoding activities.

Skills

Programming Languages: C++, C, Python (NumPy, Pandas, scikit-learn, Matplotlib, Seaborn), R, JavaScript, HTML, CSS

Frameworks & Libraries: PyTorch, SFML, Streamlit, OpenCV, face_recognition, React, FastAPI

AI & Machine Learning: Deep Learning, NLP, Computer Vision, Data Analysis & Visualization

Neuroscience Software: MATLAB, Freesurfer, DSI-Studio

Tools: Git, Jupyter Notebook, Visual Studio Code, XCode