Tridib Banik

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Highlights of Qualifications

- Currently enrolled in the **Software Engineering Co-op** undergrad program at McMaster University, eligible for a **12 to 16-month internship** starting in **Spring 2026**.
- Active team member in the **Battery Workforce Challenge** BMS Software sub-team for **18+** months, focusing on **model-based design**, **system integration**, and **simulation** of a full-scale battery pack for a light-duty EV.
- Career interests: **Embedded Systems Engineering**, **Operating Systems**, **DevOps**.

Education

Bachelor of Engineering, Software Engineering Co-op **Sept. 2023 – Apr. 2028**
McMaster University, Hamilton, ON

- **Relevant Courses:** Databases in IBM DB2 SQL, Software Testing in Java and JUnit, OOP in Java, Operating Systems in Linux and C, Software Requirements & Security, Concurrent System Design.

Skills

Languages: Java, C, Python, SQL (PostgreSQL, IBM DB2), HTML, CSS, Bash, ARM64 Assembly.

Tools & Frameworks: GitLab CI/CD, JUnit, Maven, Linux, TCP/IP, MATLAB, Simulink.

Professional Skills: Effective communication, project management, problem-solving, critical thinking.

Work Experience

Research Assistant **June 2025 – Present**
McMaster University, Hamilton, ON

- Co-authored a research paper analyzing **embedded memory constraints** for safety-critical BMS software, benchmarking subsystem resource usage to drive improvements in system **reliability** and **efficiency**.
- Engineered and validated **model-based control algorithms** (**Contactor Control, Cell Balancing, AC/DC Fast Charging**) using **Simulink**, ensuring compliance with formal competition **software requirements**.

Teaching Assistant (Integrated Cornerstone Design Projects in Engineering) **Jan. 2026 – Present**
McMaster University, Hamilton, ON

- Mentoring **40+ students** through a semester-long material selection project, providing **technical guidance** on **objective trees**, **metrics**, **regulatory compliance**, **decision matrices** for wastewater filtration systems.
- Verifying **student calculations (Material Performance Index, Eco-audit)** and **engineering justifications** against **project requirements**, delivering **constructive feedback** for **milestone refinement**.

Projects

TrafficLightRL | Python, OpenAI Gymnasium, Stable-Baselines3 in PyTorch **Jan. 2025 – Mar. 2025**

- Co-developed a dynamic traffic light optimization system using **Reinforcement Learning** to optimize **traffic signal timing**, utilizing **simulation environments** to reduce **congestion** and **emissions**.
- Validated the model's performance on a **high-fidelity digital replica** of the Sarnia Rd. & Philip Aziz Ave. intersection, presenting the results on congestion reduction at the **Canadian Undergrad Conference on AI**.

CI/CD for Simulink Model Verification | GitLab, Simulink, Simulink Test **Nov. 2024 – Jan. 2025**

- Forked a project from MathWorks and validated Simulink models using **GitLab**, gaining experience in setting up **GitLab Runner**, managing **CI/CD variables**, and optimizing **automated workflows**.
- Automated the **CI/CD pipeline** for Simulink models, streamlining the **verification**, **build**, **test**, **packaging**, and **deployment** stages, and utilizing **Test Manager** and **Model Advisor** to generate reports.

BlackJack Game | C, Bash, YAML, GitHub **Nov. 2024 – Dec. 2024**

- Developed the **core logic engine** for a Blackjack application in **C**, implementing robust game state management using a finite state machine (FSM) within a **collaborative Agile environment**.
- Engineered **Bash scripts** achieving **100% test coverage** and **automating artifact generation workflows**.