Tanmay Singla

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Education

Purdue University West Lafayette, IN

M.S. & B.S. in Computer Engineering, G.P.A: 3.9/4.0 *Aug'21 – Dec'26*

Relevant Coursework: *Networks, Computer Design, Artificial Intelligence, Compilers and Translators, ASIC Design, Computer security, Microprocessor Systems and Interfacing, Data Structures and Algorithms, Python for Data Science, System Design*

Awards: *Charles W. Brown ECE Scholarship, The Black Scholarship, and ECE Great Work Award*

TA: *ECE 369 - Discrete Mathematics, ENGR 130/131 - Transforming Ideas to Innovations, MA 266 - Differential Equations*

Professional Experience

Embedded Software Engineering Intern | *Lennox, Dallas, USA* June'25 – Present

- Developed a pipeline to automate test and software release process for thermostat firmware—supporting testing, releases, and documentation
- Improved runtime reliability and performance by adding multithreading, timeout detection, and OTA functionality
- Enhanced usability by integrating an AI-powered chatbot for intuitive, natural-language interaction

Embedded Software Engineering Intern | *Rheem Manufacturing Company, Georgia, USA* May'24 – Aug'24

- Designed a modular controls algorithm for Heating Control System for various Water Heaters; created simulation environment; performed test-driven development and validated the models using Simulink and C
- Coded the synthesis files for MATLAB-generated code to test the modules on hardware and internal tools
- Developed controls designs for new products based on the systems requirements, validated and tested the systems

SSC Research Assistant | *Duality Lab, Purdue University* May'23 – Aug'24

- **Project 1**: Conducted comparative analysis on JSM and ZTD_{JAVA} based on NIST ZTA principles, supporting the development of $\boldsymbol{ZTD_{SYS}}$ and $\boldsymbol{ZTD_{JAVA}}$ for third-party software security. Injected vulnerabilities onto third-party software suites to evaluate ZTD_{JAVA}'s performance for a paper accepted at ICSE'25
- **Project 2**: Analyzed data, developing a coding scheme to classify key insights on software signing practices. Investigated software signing adoption trends and challenges for 2 papers accepted at USENIX'25 & SOUPS'25
- **Project 3**: First author of an empirical study using LLMs to analyze historical software supply chain security failures—prompt-engineered GPT and Bard to classify compromise type, intent, nature, and impact; GPT achieved 68% accuracy and aided extraction of "lessons learned", accepted at ACM CCS SCORED'23

Hardware Engineering Intern | *Rheem Manufacturing Company, Indiana, USA* Aug'23 – Dec'23

- Collaborated with test engineers to design and construct test fixtures for PCB testing; gained exposure to controls hardware failure diagnostics, electrical validation testing, and component qualification processes
- Prepared and released engineering specifications, design schematics, and qualification documents

Projects

VFS — Software Lead | *System Design and integration, Python, ROS, PX4* Nov'24 – Present

- Leading avionics integration: ensured ground station, Jetson, flight controller communication for off-board controls
- Developing sensor fusion and autonomy pipeline integrating LiDAR, stereo cameras, RTK GNSS on Jetson for real-time navigation and obstacle avoidance using CV and depth estimation.
- Leveraging computer vision algorithms for obstacle avoidance using stereo imagery and depth estimation
- Working on the avionics team to drive hardware–software integration, component selection, battery management

FAIL: Analyzing Software Failures Using LLMs | *HTML/CSS, Django, OpenAI, AWS* Aug'24 – Present

- Interviewed engineers and found limited learning from software failures; identified need for automated tools
- Created a database of failure cases by extracting insights from news articles using LLMs and NLP techniques
- Developed https://softwarefailures.com/ to visualize incident trends and currently building an RAG-based chatbot to assist engineers in learning from historical failures

Technical Skills

- **Languages:** Python, C/C++, MATLAB, Verilog, Java, SQL, Swift, HTML/CSS, JavaScript
- **Frameworks & Libraries:** Django, ROS, Simulink, OpenCV, NumPy, Pandas, Scikit-learn
- **Tools & Platforms:** Git, Linux, STM32CP, TeraTerm, Docker, AWS, PostgreSQL, Jupyter, CreateML