# Shogo Nakamura

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## Experience

**Embedded Software Engineer II** May 2022 – Present

*Rivian Automotive* *Irvine, CA*

- Implemented supervisor task utilizing an external watchdog communicating over SPI that overlooks multiple tasks in a tricore ARM based system to verify execution sequence and timing.
- Led and executed safety critical features such as vehicle crash signaling, reaction to system reset due to an unresponsive task, and other sensitive features to keep the driver and passengers safe at any given time.
- Identified and addressed issue where a delay function became an infinite loop with extremely specific values causing run-time resets to occur at an extreme rare percentage.
- Utilized debugger and oscilloscope to modify system reactions before an unexpected reset to ensure vehicle remains in a safe state.

**Embedded Software Engineer I** January 2021 – May 2022

*Rivian Automotive* *Carson, CA*

- Worked closely with Electrical Engineering team to bring capabilities such as voltage to temperature conversion, hardware diagnostics through software, and populating test points for debugging.
- Provided API's that interacted with GPIO's and other device peripherals to various members of the team to interact and communicate with different parts of the system.
- Revised CAN database as well as source code to modify behavior of message transmission rate and payload to track data to improve feature stability.
- Added unit tests for various embedded functions using Google Test and Fake Function Framework with ability to view line coverage with generated HTML.

**Quality Assurance Engineer Intern** June 2018 – March 2020

*Prism Software* *Irvine, CA*

- Implemented 100+ test cases in Python3 for unit testing (PyTest) using the company's API which helped decrease regression testing time by more than 50%.
- Collaborated in developing a framework that installs the latest build, pulls the latest code changes from GitHub, executes over 400 test cases, emails the test results, and uploads the test results to Jira.

## Projects

**BME280 SPI Driver (ESP32)** | *C++* April 2024 – May 2024

- Wrote BME280 sensor driver that communicates over SPI and programmed on ESP32 using ESP-IDF.
- Implemented because GitHub has various implementations for I2C but very limited/none for SPI.
- Supports reading pressure, temperature, and humidity periodically with the ability to oversample if necessary.

**Embedded Linux (Beaglebone Black)** | *C* September 2023 – Present

- Manually configured Linux image using buildroot to learn and understand Bootloader, Kernel, and file system configurations.
- Created a TFTP server on the host Ubuntu machine to transfer files to the Beaglebone and write Linux image files (zImage and .dtb) directly to memory using memory write on U-boot.
- Wrote a simple Linux kernel module and modified build configuration files such as KConfig and Makefile to compile module directly into the source.

## Education

**University of California** Irvine, CA

*Bachelor of Science in Computer Science* *September 2017 – March 2020*

## Technical Skills

**Microcontrollers**: Aurix Tricore, Aurix 6 Core, ESP32, Beaglebone Black
**Languages**: C, Python3, C++
**Operating Systems**: SafeRTOS, FreeRTOS, Bare metal, Linux
**Software Tools**: Git, Jira, Jenkins, Gitlab, Google Test, Fake Function Framework, Vector tools
**Hardware Tools**: Debugger, Oscilliscope, Logic Analyzer, JTAG, Multimeter, PCAN (CAN/CAN-FD)