Graduation Project proposal

**Company:** NXP Semiconductors

**Supervisor(s) at company (name + e-mail addresses):**

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**University**

**Supervisor(s) at university (name + e-mail addresses; TU/e will look for suitable supervisors if left blank):**

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**Project title (or topic):**

Fault injection mechanisms for validating dependability of automotive systems

**Short project description:**

Fault injection is widely used for validating dependability of computer systems, [https://en.wikipedia.org/wiki/Fault_injection](https://en.wikipedia.org/wiki/Fault_injection). These techniques have been successfully applied to testing both hardware and software. Essentially, a fault injection mechanism is a system or testbench extension to artificially inject faults. The system-under-test is then expected to detect the fault and possibly recover from it. In the automotive industry, the ISO26262 standard, [https://en.wikipedia.org/wiki/ISO_26262](https://en.wikipedia.org/wiki/ISO_26262), became a de-facto standard for functional safety of electronic systems, including software. The ISO26262 defines the fault injection as a test method for the system integration and unit level testing.

The goal of this graduation project is to extend an automated driving (AD) platform, [https://en.wikipedia.org/wiki/Automated_driving_system](https://en.wikipedia.org/wiki/Automated_driving_system), with fault injection mechanisms. The platform is a hardware-in-the-loop simulator, including NXP BlueBox [https://www.nxp.com/products/processors-and-microcontrollers/arm-based-processors-and-mcus/s32-automotive-platform/nxp-bluebox-autonomous-driving-development-platform:BLBX](https://www.nxp.com/products/processors-and-microcontrollers/arm-based-processors-and-mcus/s32-automotive-platform/nxp-bluebox-autonomous-driving-development-platform:BLBX) and a truck platooning application, [https://www.youtube.com/watch?v=R08mg0XmbS0](https://www.youtube.com/watch?v=R08mg0XmbS0). The project will focus on system-level faults targeting software components, such as OSes, drivers, applications, and hardware components, such as processors, sensors, network, power supply.

For this project, we’re looking for an excellent engineer:

1. you are fluent in C and Python
2. you work in GNU/Linux
3. you prefer quality to features
4. you value people higher than processes and code higher than documents

**Technical assignment:**

1. Study state-of-the art in fault injection techniques in computing systems
2. Design and implement software and hardware based fault injection mechanisms
3. Design and implement illustration techniques for the fault injection and handling
4. Assess code and hardware coverage achievable with implemented fault mechanisms

**Business assignment***:

None.

*This part is only relevant for graduation projects carried out by students of the EIT ICT Labs ([www.ictlabs.eu](http://www.ictlabs.eu)) variant of the Embedded Systems program. In addition to the MSc thesis about the technical aspects of their graduation project, these students need to write a short additional report discussing the business-related aspects of their graduation project. Please fill in this part if you wish your project proposal to be considered for this option.*