

## Open Position : Master's Degree Internship/PhD

**Title:** Software Robustness Evaluation for RISCv SoCs

### Detailed Subject

Evaluating software robustness against faults and external perturbations remain cumbersome and complicated to implement. Indeed, the most effective methods require executing the program while injecting faults reflecting the underlying possible fault model (fault occurring in the architectural state of the processor executing the program for example). Such approach requires a complex setup, both in term of software (workload, test data), a fault injection platform, and long injection campaigns.

In this Internship we will explore the development new methods based on basic-block decomposition and decomposition of a program. Each basic block has to be tested independently therefore eliminating the need to execute completely the program for each fault injected.

Recomposition will be performed using the control-flow graph of the program and appropriate sequence generator. Preliminary study has been performed on a small sorting program and have shown encouraging results opening the opportunity for a larger application. Deeper failure classification will be performed, in particular with respect to ISO26262 guideline for software. Also link with other software robustness evaluation methods will be explored like abstract interpretation.

Experiments will be performed on a RISCv processor for which a large base of software is available as well as a platform for simulation and FPGA fault injection. Application targeted will encompass embedded automotive software or security related software.

This Internship is planned as the first step toward a 3-year PhD project to be done jointly with an Industrial Partner (CIFRE Thesis)

### Organisation

This project is planned as a 4/6 Month Master's Degree internship, ideally followed by a PhD on the same theme.

Starting dates are flexible but within 2023 H1

Salary will follow standard French rates.

### Application

Please submit application to [michele.portolan@grenoble-inp.fr](mailto:michele.portolan@grenoble-inp.fr)



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