

# Propose a vacation student project for Summer 2020

This call is now closed

The deadline for making your proposal(s) was 18:00 Friday 13 March 2020.

This form is for one project proposal, so to propose multiple projects please submit a separate form for each project. Any queries, do ask - Toby.

Project supervisor email \*

dirk.koch@manchester.ac.uk

Title of the project \*

Hardware Trojans for FPGAs

Source of funding \*

- Department funding requested
- You have your own funding (e.g. research grant)

Objective of the project \*

Implement a Hardware Trojan on FPGAs that connects to the S-boxes of an AES core to trigger an attack in the form of power-hammering (wasting a huge amount of power). This shall crash an FPGA on detecting an encrypted trigger sequence. In addition, we will add countermeasures to our FPGA virus scanner framework.

Number of students requested (justify if > 1) \*

1

Start date, end date, total duration (weeks) \*

June 22nd, August 28th, 10 weeks

The benefit to the Department \*

Interesting research work which is planned to be published

The benefit to the student \*

Learn about new things, work on real-world problems

Skills needed by the student. \*

Understanding of digital circuits, ability to implement graph algorithms

Details of the work that the student would do \*

Understanding of the netlist format used by the FPGA tools from the vendor Xilinx and understanding of an actual netlist that contains an AES core. Identifying unused resources in that core and using those resources to add a hardware Trojan into the netlist and connecting the trigger of the Trojan to the AES core. For the attack itself, a tool has to be developed that can flood unused routing resources to create a high fanout net to be used for power-hammering. The project can build up on our tool GoAhead (written in C#) which provides a parser for netlists and functions for routing and netlist manipulations.

Infrastructure requirements and any required staff support other than the project supervisor \*

Any lab machine would do the job. The student is expected to be integrated into my research group during the project.

Supervision arrangements throughout the duration of the project (named staff and dates covering the entire duration) \*

Dirk Koch, entire time

Location of the project work (building/room) NB projects must be on-campus \*

Any lab would do the job.

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