Firmware Engineer (Particle Physics)

Position Details

School of Physics and Astronomy, University of Birmingham, Edgbaston, Birmingham UK

Full time starting salary is normally in the range £30,942 to £40,322. With potential progression once in post to £42,792 a year.

Grade 7, Full Time, Fixed Term Contract until the 30th September 2023

Closing date: 3rd January 2021

Job Summary

To contribute to the creation of knowledge, primarily by developing FPGA firmware as part of the particle physics group's commitment to develop the trigger and data-acquisition electronics for the upgrade of the ATLAS experiment at the CERN Large Hadron Collider and the DUNE experiment at the Fermilab Long Baseline Neutrino Facility.

Main Duties

• This post will contribute to the delivery of major particle physics research projects through the development of new techniques and solutions, implemented in highly specialised FPGA firmware, to control the complex electronics of experiments. The post holder will take the technical lead in aspects of the firmware development, which will involve coordinating contributions from other group members, with support from technical staff. Regular communication will be required with senior academics from Birmingham, other academic institutes and CERN, in order to understand the constantly developing requirements as the project evolves and to ensure that the necessary solutions are found. Contact with external industrial suppliers will also be required for tool development and optimisation. The post holder will constantly monitor the effectiveness of the procedures in use for the project development and recommend improvements accordingly.

Specifically, the post will entail the following.

• The design, simulation and implementation of firmware which contains algorithms for the Phase-II upgrade of the first level calorimeter trigger processor of the ATLAS experiment at the Large Hadron Collider. Firmware blocks will be written in VHDL using the Vivado design suite for Xilinx FPGAs.
• The design, simulation and implementation of firmware which contains algorithms for the data-acquisition system of the DUNE liquid argon time projection chamber readout. This will also be based on Xilinx FPGAs.
• To play a role (with internal and external collaborators) in the development of the specification of the associated algorithms and/or electronics.
• To present regular status reports at internal and international external meetings.
• To maintain the group’s up-to-date specialist understanding of developments in firmware design, both in industry and in particle physics experiments.
• To contribute to directing and supervising the group’s technicians and graduate students

Knowledge, Skills, Qualifications and Experience Required

Essential

• First degree in a relevant subject (e.g. electronics engineering, physics, or software engineering).
• Experience of the development of FPGA firmware.
• Very strong general programming skills.
• Experience with PCs running windows and linux.
• Good time and priority management.
• Excellent technical problem-solving skills.
• Flexibility and ability to travel for short periods within the UK and abroad.

Desirable

• Higher degree in a relevant subject
• Previous firmware programming experience in a particle physics context using VHDL / Verilog
• Previous experience with high-speed electronics in a particle physics context will be an advantage
• Experience with high-speed FPGA-based PCB design.
• Experience with a broad range of FPGAs (Intel / Altera as well as Xilinx)
• Thorough understanding of digital electronics design and board layout.
• Good presentation and inter-personal skills.

Informal enquiries to Dr Alan Watson, a.t.watson@bham.ac.uk or Prof. Paul Newman
p.r.newman@bham.ac.uk

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