

Job Description

Post title and post number	Firmware Engineer (Particle Physics Group) - 52067
Organisation advertising Description	School of Physics and Astronomy
Post number	52067
Full-time/Part-time	Full-time
Duration of post	24 months
Post is open to:	Internal and external candidates
Grade	7
Salary	Starting salary is normally in the range £28,982 to £37,768. With potential progression once in post to £40,082 a year.
Additional information	For informal enquiries please contact either: Professor Paul Newman Email: P.R.Newman@bham.ac.uk
Terms and conditions	Administrative and Other Related
Closing date	Sunday 13 th December 2015

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 future trigger electronics for the upgrade of the ATLAS experiment at the CERN Large Hadron Collider.

Main Duties

This post will contribute to the development of a major research project for the particle physics group through the development of new techniques and solutions, implemented in highly specialised FPGA firmware, to control the complex electronics which the group is building.

The post holder will be expected to take the technical lead on the firmware development, which will involve coordinating contributions from other senior 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 priorities and 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-1 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 the Virtex-7 family of Xilinx FPGAs that will be used in the 'eFEX' feature extractor module and its tester modules.
- 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.

Person Specification

Essential criteria

- First degree in a relevant subject (e.g. physics, electronics 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.
- Willingness to travel for short periods within the UK and abroad.

Desirable criteria

- Higher degree in a relevant subject
- Previous firmware programming experience in a particle physics context
- Experience with high-speed FPGA-based electronics.
- Thorough understanding of digital electronics design
- Good presentation and inter-personal skills.

Planning and Organising

- Required to organise the multiple aspects of the firmware development, to adhere to rigid deadlines for review points and final delivery schedule. This will include the development of policies, procedures and plans and will require an ability to adapt rapidly to changes in priorities.
- Ability to progress several initiatives concurrently and to plan effectively over short and long timescales.
- To direct and make effective use of support from technical staff and, to some extent, other researchers.

Decision Making Skills

- Independently conceive and develop algorithm implementations and solutions in highly specialised firmware.
- Contribute strongly, in consultation with internal and international external collaborators, to the specification of the electronics.

Internal/External Relationships

- Interact effectively with internal and international external colleagues who have physics, electronics engineering and software backgrounds. This will take place at multiple levels, from influencing project direction and decision making in consultation with academic colleagues to daily/weekly directing of technical staff.
- Contact and negotiate with external contractors over equipment specifications and fault diagnoses.
- Give regular presentations and updates at internal and external meetings.