RISC-V Performance Analysis

- **Deadline**: Dec. 1, 2018
- **Career levels**: PhD student
- **Keywords**: Compilation, Computer architecture, Runtime performance / Optimisation

Description

Embecosm provides services developing Free and Open Source (F/OSS) compilers for companies around the world. The architectures for which we develop compilers range from the smallest deeply embedded processors to the largest high performance computer systems. Our specialities include machine learning compilers, superoptimization, security enhanced compilers and compilers optimized to generate energy efficient code.

RISC-V is an open-source ISA, with a proliferation of open-source and proprietary implementations. Some of the well-known open-source implementations include PicoRV32, Rocket Chip and the PuLP Platform. This internship project seeks to carry out a comprehensive analysis of the performance of open-source RISC-V compilers and CPU implementations using a rigorous and repeatable methodology.

Previous work at Embecosm using the BEEBS benchmarks found that RISC-V targets in GCC and LLVM were competitive with the ARM targets on code size. Since then, GNU and LLVM toolchains for RISC-V have been accepted for inclusion in upstream repositories, and their development continues apace.

The expected outputs of the project are:

- An evaluation of the code speed and code size of RISC-V toolchains and implementations.
- An open-source framework for reproducing the results of the project on an ongoing basis.
- Publication and dissemination of the results through blog posts, application notes, and conference presentations.
- The understanding gained from the project will feed into Embecosm’s open-source RISC-V toolchain development, with the goal of addressing performance issues identified during the project.

The project will be interest to students with an interest in any of the following: compilers, benchmarking, performance analysis, computer architecture, reproducible research.

Timing

The duration of the internship is 3 months. We are flexible on the start date - the start date can be between the beginning of July and the end of August.

Location

Embecosm’s head office in Lymington, UK. Lymington can be reached by a 40-minute train journey from Southampton airport.

United Kingdom

To apply please contact graham.markall(at)embecosm.com