

Theorem Prover Definitions for Cache Verification

Internship Opportunity

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We seek a qualified intern to join a team working on full verification of cache coherence protocols, from St Andrews and Edinburgh, as part of the C3 project¹.

Description

Verifying the correctness of cache protocols is a challenging concurrent systems problem. In attacking this problem, we want to use theorem provers for full confidence and scalability. This internship is about a vital component of such a project, getting formal descriptions of modern protocols into a form usable by theorem provers. Specifically, much work in cache design is done on simulators such as gem5, whose SLICC² is a Domain Specific Language for generating state machine descriptions. We would like to port models in this DSL automatically to a form suitable for use by theorem provers, such as Coq³ (alternatively, you might target Isabelle⁴, or Lem⁵). Thus, this is a form of a compiler from one language (SLICC) to another (Coq).

An understanding of DSLs in C++, and some basic familiarity with types, and mathematical logic are desirable but not essential.

Details

This is a 8 week internship, to be completed between May and August. The exact times are flexible. Pay is £250/week.

How to apply

I am happy to consider students from any year as long as they can demonstrate sufficient knowledge and experience. If you are interested, please reply before Friday 13 May with:

- Your name, degree and year;
- Any relevant experience; and
- A statement of interest that describes why you think you would be a good fit for this internship.

Applications are particularly welcome from women, who are under-represented in research posts at the University. The University of St Andrews is committed to promoting equality of opportunity for all, which is further demonstrated through its working on the Gender and Race Equality Charters and being awarded the Athena SWAN award for women in science, HR Excellence in Research Award and the LGBT Charter:

<http://www.st-andrews.ac.uk/hr/edi/diversityawards/>

¹<http://gow.epsrc.ac.uk/NGBOViewGrant.aspx?GrantRef=EP/M027317/1>

²<http://www.gem5.org/SLICC>

³<https://coq.inria.fr>

⁴<https://isabelle.in.tum.de/>

⁵<http://www.cl.cam.ac.uk/~pes20/lem/>