

## GPU and FPGA challenge for MSc and PhD students



While going through my email, I found out about the third "HiPEAC Student Heterogeneous Programming Challenge". Unfortunately the deadline was last week, but just got an email: if you register by this weekend (17 September), you can still join.

EDIT: if you joined, be sure to comment in early November how it was. This would hopefully motivate others to join in next year. You just started your MSc/PhD in the area of compilation and computer architecture? Then you probably have heard that heterogeneous systems are the future and the only way to ensure increasing computing performance. Did you already program such a system? Excellent, you are just the candidate we seek! You did not? No problem, this will be an excellent opportunity to familiarise yourself with them!

Following the continuing success of Heterogeneous Programming Challenge at the Computing Systems Week in Zagreb earlier this year, we are organising another follow-up event at the upcoming HiPEAC Computing Systems Week in Stuttgart (25-27th Oct). We will again provide you with a problem and your task will be to make it run as fast as you possibly can! How? That is entirely up to you! No restrictions will be imposed! What architecture? Again, up to you! GPU, that is fine! FPGA, go for it! Multicore APU system with dedicated GPU and FPGA board? Now we're talking! You have a heterogeneous programming framework? Now is the time to test it out! The only restriction is: this is a student only event (Professors and PostDocs are very welcome to advise, but team member can only be students).

This session's problem has been selected in cooperation with Samsung. It is the: Five-Point Relative Pose Problem [[see this PDF](#)]. Samsung uses this problem as part of a system that calculates the camera position in a 360 degree video environment. Thus, this is not just a nice academic problem, but actually one that matters in real life! The important performance measure for this algorithm is the obtained frequency, i.e. how many 5 point pose estimation can you perform per second? But other metrics could be of interest as well, e.g. energy consumption, memory consumption, etc.

There are reference implementations available in OpenCV and OpenGV, so why not compare the performance of your implementation against them. In addition Tommaso Maestri from Samsung might be able to help you with further questions.

You first need to investigate the problem and existing implementations. After that everything is up to you. Choose an algorithm. Choose a platform. Choose an implementation. Choose a framework. After you have optimised everything there is to optimise, we

would like you to prepare a short presentation explaining your strategy, overcome obstacles and show how fast it now runs. We plan to present the results at the upcoming Computing Systems Week in Stuttgart (pending approval by HiPEAC). There you will be able to discuss your results with HiPEAC students from all of Europe. In addition, we hope to select a panel of senior HiPEAC members from industry and academia to provide you with feedback on your approach.

In order to give every HiPEAC university a chance to present their results, we would like to ask you to create only up to two teams per university and select a leader that will present the result (either in person or via a video link). Each team is able to implement as many different approaches as they like and present them in one short presentation.

Please contact us, if you would like to form more than two teams per institution or a team with members from different institutions.

Similar to previous events, we hope that we can provide some financial assistance for team leaders to attend the event in Stuttgart.

Important dates:

- 6 17 Sep: Register your team by emailing the team name, member names and emails to the organisers.
- Wed, 25 Oct, 14:00 - 15:30: present your results in Stuttgart

Questions? Please contact one of the organisers: Chris Fensch <c.fensch@hw.ac.uk>, Marisa Gil <marisa@ac.upc.edu>, and Georgios Goumas <goumas@cslab.ece.ntua.gr> .

If you register, let us know. If you win, also.