# One year post-doc position:
# Virtualization in the context of multi-processor systems on a chip

## Duration, location and staff

The position starts either december 1st 2013 or january 1st 2014, for a duration of one year.
The work will take place in the TIMA laboraroty, System Level Synthesis group, downtown Grenoble, France.
Staff involved: Nicolas Fournel (TIMA Lab), Olivier Gruber (LIG) and Frédéric Pétrot (TIMA lab)

## Summary

Systems-on-a-Chip (SoC) are more and more important in computing systems, with the integration of the various subsystems becoming the number one challenge. Albeit the integration techniques have evolved drastically in the last decade, the definition of the frontier between peripheral devices and the kernel of the operating system, structuring how input/output operations occur at runtime, has remained mostly stable. However, we believe that there is value in revisiting this frontier. Taking benefit from the large body of research in virtualization technology, this projects proposes to adapt the idea developed in the Xen virtualization framework to the MPSoC context.

## Project Description

A major part of any Instruction Set Architecture (ISA) is the definition of the frontier between peripheral devices and the kernel of the operating system, structuring how input/output operations occur at runtime. Surprisingly enough, this frontier has remained mostly unchanged since the very first days of computers: peripheral (also called intellectual properties or IPs) are still exposing registers as the way to control them to the operating systems. We believe there are major benefits to be gained from revisiting this frontier, especially for MPSoC (Multi-Processors Systems on Chip). In fact, we believe the current driver-device frontier hinders innovation, for both software and hardware, and this project aims at rethinking the hardware/software interface, based on co-design and virtualization techniques.

## Prerequisit

The candidate should have either a strong computer architecture and good operating system background, or a good computer architecture and strong operating system background. Knowledge of micro-kernel and hypervisor architectures is a plus, as is knowlegde of electronic system level simulation techniques.
Very good coding skills are required, as is the mastering of development and cross-development environments under linux.

## People involved & Funding

This project has been selected among a large number of project by the AGIR board that gathers scientists from the University of Grenoble-Alpes and finances a post-doc position for 1 year, the gross salary per month is 2 379.97 €.