The successful candidate will engage in explorative scientific research in the field of decentralized
experimenterd on the architectures and tools available in the Cairn and Pacap groups and within the
compilers). The techniques developed by the postdoc will be
WCET computation, computer architecture and compilers, Cairn for automatic parallelization,
we foresee two research directions that look promising, not yet fully explored in the literatures and
memory banks, NoC) and management of the hierarchy (on-chip memory and caches). Among others,
special attention will be paid to the reduction of interference on shared resources (bus access,
selected are designed with both performance and predictability in mind, and are good
candidates to run critical real-time software. Examples of such architectures are the Karray MPPA
many-core architecture (http://www.kalrayinc.com) or the Recore many-core hardware
(http://www.recoresystems.com/).

Key words
Compilers, Real-time, Multi-core, Computer architecture, Worst-case execution time estimation

Involved groups
The post-doc will be supervised by people from the PACAP group (Isabelle Puaut) and the Cairn group
(Steven Derrien)

Assignment
The objective of this postdoc position will be to design and implement techniques, enabling the
calculation of tight Worst-Case Execution Time (WCET) estimates on many-core architectures. Proposed
techniques will optimize existing mapping/scheduling techniques to better control the
hardware with the objective of reducing the WCET estimate of parallel applications. In particular,
special attention will be paid to the reduction of interference on shared resources (bus access,
memory banks, NoC) and management of the hierarchy (on-chip memory and caches). Among others,
we foresee two research directions that look promising, not yet fully explored in the literatures and
not yet available in Pacap/Cairn joint work.

- Automatic mapping of data structures on memory banks to avoid contentions
- Configuration of Network on Chip (NoC) to reduce data transfer time (e.g. application
  specific routing, static calculation of TDMA slots to reduce worst-case end-to-end data
  transfer latency)

The supervisors will be members of the Pacap and Cairn research groups (Pacap for expertise on
WCET computation, computer architecture and compilers, Cairn for automatic parallelization,
computer architecture and compilers). The techniques developed by the postdoc will be
experimented on the architectures and tools available in the Cairn and Pacap groups and within the
H2020 Argo project (e.g. GeCos source-to-source optimization environment, Heptane WCET
estimation tool, mapping and scheduling tools developed in both groups).

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Applications. 13th International workshop on Worst-Case Execution Time Analysis, July 2013.
manycore/mppa-256/

Main activities
The successful candidate will engage in explorative scientific research in the field of decentralized
systems and algorithms, with focus on browser-based deployment and application.

Skills
- Ability to conduct research autonomously in a collaborative setting.
- Self-initiative, curiosity and experimental rigor.
- Excellent ability to express oneself clearly and convincingly in both written and oral English.
- A genuine drive to expand one's knowledge and horizons.
- Excellent experimental and programming skills.
- A good grasp of current research questions in distributed systems and/or distributed algorithms research.

Benefits package
- Subsidized catering service
- Partially-reimbursed public transport

Remuneration
Post-doc: monthly gross salary amounting to 2653 euros