

CHIST-ERA Call 2013 Pre-announcement

The CHIST-ERA Call 2013 will be published in the second half of October and will target research in the following topics:

- “Adaptive Machines in Complex Environments“
- “Heterogeneous Distributed Computing“

The details of the research targeted in the call have been defined by the research community itself during the CHIST-ERA conference, an event that was open to all interested researchers. You can find more information about the conference in the [open letter to the attendants of the conference](#). It also contains the list of researchers, interested in the themes, who attended.

This document gives an overview of the research themes that have emerged during the conference (see pages 2 and 3).

Researchers are encouraged to start discussing possible projects with prospective partners abroad. The call will require that projects are submitted by international consortium with partners in at least three of the following countries (additional partners from other countries may be part of a consortium if they can secure they own funding):

- Austria
- Belgium (Flanders)
- France
- Italy
- Latvia
- Luxembourg
- Poland
- Romania
- Switzerland
- Turkey
- United Kingdom

Please note that this pre-announcement is for information purposes only and does not create any obligation for the CHIST-ERA consortium or for any of the participating funding agencies. No further information will be given until the call is published.

Ist Topic: Adaptive Machines in Complex Environments

Autonomous systems are set to play an ever-increasing role in society, for example, in service robotics, assistive technologies, advanced manufacturing and many other sectors. To perform effectively and safely, these autonomous systems must be adaptive and perceptive to human requirements.

Several major themes emerged during the workshop. Some of these themes addressed specific technical challenges that were considered particularly significant by the delegates. Other themes were socio-technical in nature and recognised the importance of political, economic, societal, legal and environmental factors in advancing the state of the art.

- **Dealing with uncertainty**
This theme includes modelling and planning under uncertainty. It also includes resilient approaches to recognising, dealing with, and learning from, errors and inconsistent sensor data.
- **Knowledge representation and reasoning**
This theme includes techniques for the integration of logic and probabilistic reasoning, reasoning for spatial-temporal phenomena and non-monotonic reasoning. It also includes semantic technologies and cognitive modelling for adaptive systems.
- **Embodiment, perception, cognition and interaction**
This theme includes human-machine interaction and embodied intelligence. It also includes developmental approaches to sensorimotor control, coordination and learning.
- **Verification methods**
This theme includes experimental validation of theory, effective model checking and simulation of adaptive systems. It includes the use of these approaches to ensure that machines are trustworthy and that privacy is preserved.
- **System integration, interoperability and composability**
This theme includes the integration of high-level reasoning and low-level controls, including between agents. It also includes the design and development of communication and coordination mechanisms and protocols for the integration of system components, and resource allocation.

In addition to the specific research challenges that were identified, the delegates highlighted the importance of adopting a systems-based approach and working collaboratively across different fields of research within ICST and beyond. The importance of benchmarking was also highlighted by the delegates. Biologically-inspired and brain-inspired approaches are transversal to the themes.

2nd Topic: Heterogeneous Distributed Computing

Heterogeneous distributed systems have the potential to increase computational performance while reducing energy consumption. The increase in the number of devices per capita and the challenge of processing ever-increasing amounts of data require new approaches involving researchers working across system levels.

A number of research themes emerged during the workshop. Across these themes, delegates highlighted the importance of increasing the mutual understanding between hardware-focused and software-focused research communities.

- **Programming models and tools**

This theme includes new programming models, abstractions and tools for software development, in particular to abstract from physical devices and connectivity, and to obtain high performance across platforms. It also includes verification and resource management.

- **Data movement and management**

This theme includes techniques for the streaming and placement of data across platforms, data reduction techniques and inferences.

- **Monitoring and optimisation techniques**

This theme includes optimisation of the performance/energy-efficiency trade-off, pervasive monitoring techniques, application of machine learning techniques and runtime code restructuring.

- **Dependability and resilience**

This theme includes the design and development of fault-tolerant, reliable and secure heterogeneous distributed systems. It also includes security from malicious behaviour.

Delegates highlighted the importance of taking a system-wide perspective in order to ensure accountability and interoperability across the different layers of the system. Energy-efficiency was also highlighted by the delegates as an important cross-cutting topic.