

**E-MuCoCoS**

# 2016 Workshop on Exascale Multi/Many Core Computing Systems (E-MuCoCoS)

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## Overview

Exascale computing will revolutionize computational science and engineering by providing 1000x the capabilities of currently available computing systems, while having a similar power footprint. The HPC community is working towards the development of the first Exaflop computer after reaching the Petaflop milestone in 2008. There are concerns that computer designs based on existing multi-core and many-core solutions will not scale to Exascale considering technical challenges (such as, productivity, energy consumption or reliability) and reasonable economic constraints. Therefore, novel multi-core and many-core solutions are required to reach Exascale.

The E-MuCoCoS workshop series focuses on multi/many core languages, system software and architectural solutions for extreme-scale systems towards Exascale. The topics of the workshop include but are not limited to:

- Methods and tools for preparing applications for Exascale
- Extreme-scale data analysis and visualization
- Extreme-scale performance visualization, analysis, modeling, and tuning
- Adaptive run-time systems for extreme-scale
- Architectures for extreme-scale computing

E-MuCoCoS 2016 is organized in conjunction with the International Supercomputing Conference (ISC), Frankfurt, Germany, June 23, 2016.

Earlier editions of E-MuCoCoS workshop have not emphasized extreme-scale computing and the workshop was known as MuCoCoS. Previous MuCoCoS workshops include MuCoCoS 2014 (Porto, PT), MuCoCoS 2013 (Edinburgh, UK), MuCoCoS 2012 (Salt Lake City, US), MuCoCoS 2011 (Seoul, KR), Mu-CoCoS 2010 (Krakow, PL), MuCoCoS 2009 (Fukuoka, JP), and MuCoCoS 2008 (Barcelona, ES).

## Program Chairs

Sabri Pllana    Linnaeus University, SE

Achim Streit    Karlsruhe Institute of Technology, DE

## Program Committee

Erika Abraham	RWTH Aachen University, DE
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Sabri Pllana	Linnaeus University, SE
Achim Streit	Karlsruhe Institute of Technology, DE
Hiroyuki Takizawa	Tohoku University, JP
Samuel Thibault	LaBRI, Universite Bordeaux 1, FR

## Program

E-MuCoCoS 2016 workshop program included two keynotes, four selected speakers, and two invited talks of the European Exascale projects. The academic keynote speech was given by Ivona Brandić, who is Professor at the Vienna University of Technology and member of the Young Academy of Austrian Academy of Sciences. Hans-Christian Hoppe, who is Principal Engineer with Intel and director of the ExaCluster Lab at Jülich Supercomputing Centre, gave the industrial keynote speech.

In what follows in this section we list the workshop program.

### – **Session 1: Towards Exascale Computing**

Chair: Sabri Pllana (LNU, SE)

#### – *Welcome to E-MuCoCoS 2016*

Sabri Pllana (LNU, SE) and Achim Streit (SCC, KIT, DE)

#### – *Academic Keynote: Exascale System Management - What can we learn from efficient management of Ultra-scale Distributed Systems?*

Ivona Brandić (Vienna University of Technology, AT)

#### – *Extreme-Scale In-Situ Visualization of Turbulent Flows on IBM Blue Gene/Q JUQUEEN*

Jens Henrik Göbbert (Jülich Supercomputing Centre, DE)

#### – *Behavioral Emulation for Scalable Design-Space Exploration of Algorithms and Architectures*

Nalini Kumar (University of Florida, US)

#### – *Energy Efficient Runtime Framework for Exascale Systems*

Yousri Mhedheb (Karlsruhe Institute of Technology, DE)

#### – *Work Distribution of Data-parallel Applications on Heterogeneous Systems*

Suejb Memeti (Linnaeus University, SE)

– **Session 2: Invited Talks of European Exascale Projects**

Chair: Achim Streit (SCC, KIT, DE)

- Industrial Keynote: *Intel HPC Co-Design Activities in Europe*  
Hans-Christian Hoppe (Intel Deutschland GmbH, DE)
- *EPiGRAM: Preparing Message-Passing and PGAS Programming Models for Exascale*
- Stefano Markidis (KTH, SE)
- *AllScale: Closing the Performance Gap with Modern C++*  
Thomas Heller (Friedrich-Alexander-Universität Erlangen-Nürnberg, DE)