

NoCArc Program at a Glance

December 1, 2012

08.30 – 08.45	Opening (M. Palesi & T. Mak)
08.45 – 10.00	Keynote (Alex Yakovlev)
10.00 – 10.30	Coffee break
10.30 – 12.00	<i>Session I</i> Emerging Architectures and Technologies
12.00 – 13.30	Lunch
13.30 – 15.00	<i>Session II</i> 3D Design
15.00 – 15.30	Coffee break
15.30 – 17.30	<i>Session III</i> Arbitration, Routing and Link Design
17.30 – 17.35	Closing remarks

Sessions Assignments

Session I - Emerging Architectures and Technologies

(Chair: **Chrysostomos Nicopoulos**,
University of Cyprus, Cyprus)

Network on Metachip Architectures

Ismo Hänninen, Wayne Buckhanan, Gary Bernstein and Michael Niemier

Surface Wave Communication Systems for On-chip and Off-Chip Interconnects

Ammar Karkar, Terrence Mak, Alex Yakovlev, Tong Kenneth and Raa'Ed Aldujaily

A Structural Analysis of Evolved Complex Networks-on-Chip

Haera Chung, Anusha Pai Asnodkar and Christof Teuscher

Session II – 3D Design

(Chair: **Jing-Jia Liou**, *National Tsing Hua University, Taiwan*)

Power Efficiency of Wavelength-Routed Optical NoC Topologies for Global Connectivity of 3D Multi-Core Processors
Luca Ramini and Davide Bertozzi

Partially Adaptive and Plane-Balanced Routing Algorithms for 3D Networks-on-Chip

Nizar Dahir, Terrence Mak, Alex Yakovlev, Ra'Ed Al-Dujaily and Petros Missailidis

A High-Efficiency Low-Cost Heterogeneous 3D Network-on-Chip Design

Thomas Canhao Xu, Pasi Liljeberg, Juha Plosila and Hannu Tenhunen

Session III – Arbitration, Routing and Link Design

(Chair: **Alex Yakovlev**, *Newcastle University, UK*)

Junction Based Routing: A Scalable Technique to Support Source Routing in Large NoC Platforms

Shabnam Badri, Rickard Holsmark and Shashi Kumar

Position-Based Weighted Round-Robin Arbitration for Equality of Service in Many-Core Network-on-Chips

Hanmin Park and Kiyoungh Choi

Variability-Tolerant NoC Link Design

Eman Kamel, Mohamed El-Kharashi and Mohamed Abuelyzeed

Low Power Flitwise Routing in an Unidirectional Torus with Minimal Buffering
Jörg Mische and Theo Ungerer



5th International Workshop on Network on Chip Architectures (NoCArc 2012)



December 1, 2012
Vancouver, BC, Canada

Held in conjunction with the 45th Annual IEEE/ACM International Symposium on Microarchitecture (MICRO-45)

Advance Program

Welcome Message

We would like to welcome you to the 5th International Workshop on Network on Chip Architectures (NoCArc 2012) held on December 1, 2012, in conjunction with the 45th Annual IEEE/ACM International Symposium on Microarchitecture (MICRO-45), December 1-5, 2012, Vancouver, BC, Canada.

The main goal of NoCArc Workshop series is to provide a focused forum for researchers to present and discuss innovative ideas and solutions related to design and implementation of complex multi- and many-core SoCs which use NoC as communication infrastructure.

This year the workshop received 22 submissions. The authors were coming from 20 different countries spreading all over the world. This demonstrates the international visibility of NoCArc. All the papers were reviewed by four individual reviewers. The deliberations were conducted by the Program Committee electronically. The Program Committee has selected 10 papers for presentation at the Workshop. The papers were judged based on their originality, quality and relevance to the subject area of NoCArc. In addition to the ten regular papers, the program of the workshop has been enriched by a keynote talk by Prof. Alex Yakovlev from Newcastle University, UK.

The organizers would like to thank all of those who submitted papers for consideration, the Program Committee members for their invaluable contributions, and the MICRO-45 Organizing Committee for giving us the opportunity to host NoCArc 2012 Workshop.

The Organizers and TPC Chairs

Maurizio Palesi, *Kore University, Italy*

Terrence Mak, *The Chinese University of Hong Kong*

Keynote Talk

Alex Yakovlev, *Newcastle University, UK*

Developing Survival Instincts in Computing Systems

(Chair: Terrence Mak, *The Chinese Univ. of Hong Kong*)

Abstract: Complex information and communication systems have been studied for a long time. Many approaches and methodologies exist to date. Amongst the properties of interest in those studies the prominent place is occupied by the property of systems to stay alive and functional in spite of harsh environmental conditions that may surround them. They are considered mostly in the scope of information processing, and to a lesser extent in the domain of resource availability, for example, the availability of energy. This talk will look at the first glimpses of, perhaps, still naive, approaches to building computing systems whose power sources can be defined in a wide band of modes. Such systems will effectively need survival instincts as part of their intrinsic characteristics. An important element of this new design discipline is a close proximity of the design methods required for power conditioning and those necessary for computational blocks as the latter form the load for the power chain. This proximity and associated holistics drives for co-design, which involves new methods for modelling, simulation, synthesis and hardware and software implementation. This talk will address a number of paradigms for such designs, such as energy-modulated computing, power-proportional, power-adaptive and elastic system design, and present examples of problems formulated and solutions obtained in the context of research on the new generation of systems with energy-harvesting.

Bio: Alex Yakovlev is a Dream Fellow of Engineering and Physical Sciences Research Council (EPSRC), United Kingdom, to investigate different aspects of energy-modulated computing. He received D.Sc. in 2006 from Newcastle University, where he is a professor and leads the Microelectronic Systems Design research group at the School of Electrical and Electronic Engineering. His main interests and publications are in the field of modelling and design of asynchronous, concurrent, real-time, low-power and dependable systems. He has published four monographs and more than 300 papers in academic journals and conferences, and has managed over 25 research contracts.

Technical Program Committee

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