PREFACE

The ACACES summer school wants to create an opportunity to learn new things and to meet new people. We believe that the 12 courses and the two invited talks – all by world class experts – suffice to reach the first goal.

The second goal is a bigger challenge. How can we bring the participants in contact with as many other participants of the summer school in one week? To reach this goal, we arranged to have all meals and coffee breaks together, there are long breaks, and very importantly – we organize a poster session on Wednesday afternoon.

The basic idea is that you can present your own research to the other participants, and that you learn more about the other participants’ research. We have put the poster session in the middle of the week so that people with a common research interest still have enough time during the rest of the week to discuss their mutual research interest, hopefully resulting in a long lasting research collaboration and joint research contributions. So, the poster session will help you in further developing your professional network, this is what HiPEAC is all about.

There will be 85 posters presented during the poster session. You will not have time to discuss them all during one afternoon. Therefore, we have collected the abstracts in a book of abstracts. The abstracts in this book were not reviewed as we did not want to exclude anybody from participating in the poster session, and from making new contacts. The sole purpose of the book is to prepare your visit to the poster session. You can in advance select the posters you want to discuss and then visit them (the order of posters on the posters panels is the same as in the book). If you present a poster yourself, make sure that you spend about 50% of your time at your poster, and the other 50% visiting other posters.

I wish you a very productive poster session

Koen De Bosschere
Summer School Organizer
CONTENTS

Communication Sensitive Load Balancing of Irregular MPI Applications
Jörg Keller, Mudassar Majeed, Christoph Kessler 1

Merge Sort for Systems with Multiple GPUs
Ivan Tanasic, Lluis Vilanova, Marc Jorda, Javier Cabezas, Isaac Gelado, Nacho Navarro 5

Efficient Pedestrian Detection Based on Viola-Jones Method using GPUs
Matina Maria Trompouki, Nacho Navarro 9

GPU Execution-Time Estimation with Models and Helper-Threads
Gert-Jan van den Braak, Bart Mesman, Henk Corporaal 13

A Decoupled Access/Execute Architecture for Mobile GPUs
Jose Maria Arnau, Joan-Manuel Parcerisa, Polychronis Xekalakis 17

An Analytic Model for Multi-core Adaptive Optimization
Khaled Alnowaiser, Jeremy Singer 21

Adaptive runtime selection of polyhedral codes for GPU+CPU
Jean-François Dollinger, Vincent Loechner, Philippe Clauss 25

Synthesis of Memory Hierarchies using the Polyhedral Model
Vasilis Vasiliadis, Muhsen Owaida 29

Symbolic Loop Parallelization of Static Control Programs
Alexandru Tanase, Frank Hannig, Juergen Teich 33

Mapping Parallelism for Heterogeneous Architectures
Kiran Chandramohan 37

Programming in a Parallel and Heterogeneous Computing Era
Cedric Nugteren and Henk Corporaal 39

Multi-Program Optimization for Heterogeneous Systems using Parallel Skeletons
Alexander Collins 43

Parallel Processing Framework for Communication Intensive Applications on Multicore and Manycore Architectures
Servesh Muralidharan, David Gregg 47

High-Level Language Support for Heterogeneous Manycore Architectures
Enes Bajrovic, Martin Sandrieser, Sigfried Benkner, Sabri Pllana 51

FasTm Race Checker
Ismail Kuru, Hassan Salehe Matar, Gokcen Kestor, Serdar Tasiran 53
FasTSibling Race Checker

Hassan Salehe Matar, Ismail Kuru, Gokcen Kestor, Serdar Tasiran

Kuda: The Split Race Checker

Can Bekar, Tayfun Elmas, Semih Okur, Serdar Tasiran

High-Level lock-less programming for Multicore

Fabio Tordini, Marco Aldinucci, Massimo Torquati

SPC3 PM: A Multi-threaded Parallel Software Development Environment for Multi-Core Processors

Muhammad Ali Ismail

OpenCL and OpenMP on Multi-core CPUs

Jie Shen, Jianbin Fang, Henk Sips, Ana Lucia Varbanescu

A High-Performance Back-End for Vectorized Applications

Simon A. F. Lund

A Novel Architecture and Simulation for Executing Decoupled Threads in Future 1 kilo-core Chips

Ho Nam, Antoni Portero, Alberto Scionti, Roberto Giorgi

Simulation infrastructure for the next kilo-x86-64 Chips

Antoni Portero, Alberto Scionti, Marco Solinas, Ho Nam, Roberto Giorgi

Sniper: Scalable and Accurate Parallel Multi-Core Simulation

Wim Heirman, Trevor Carlson, Lieven Eeckhout

Power-Aware Multi-Core Simulation for Early Design Stage Hardware/Software Co-Optimization

Souradip Sarkar, Wim Heirman, Trevor E. Carlson, Ibrahim Hur, Lieven Eeckhout

Simulation Driven Design Space Exploration

Harry Wagstaff

Design Space Exploration of Hybrid Ultra Low Power Branch Predictors

Matthew Bielby, Miles Gould, Nigel Topham

Modelling HW/SW Co-Designed Processors

Jose Cano, Aleksandar Brankovic, Rakesh Kumar, Darko Zivanovic, Demos Pavlou, Kyriakos Stavrou, Enric Gibert, Alejandro Martinez, Gem Dot, Fernando Latorre, Alex Barcelo, Antonio Gonzalez

Low-overhead I-Cache modeling using instruction-reuse profiles

Muneeb Khan, Andreas Sembrant, Erik Hagersten

Bandwidth Bandit: Understanding Memory Contention

David Eklov, Nikos Nikoleris, David Black-Schaffer, Erik Hagersten
MRU-Tour: A concept to be applied in Last-Level Cache replacement
Alejandro Valero, Julio Sahuquillo, Salvador Petit, Pedro Lopez, José Duato

Heterogeneous Architectures and Networks-on-Chip Design and Simulation
Simone Corbetta, Davide Zoni, William Fornaciari

Simulation of Resource-Aware Applications on Heterogeneous Architectures
Sascha Roloff, Frank Hannig, Jürgen Teich

Resource Management in Massively Parallel Architectures
Syed Mohammad Asad Hassan Jafri, Juha Plosila, Kolin Paul, Ahmed Hemani, Hannu Tenhunen

Nexus++: A Hardware Task Manager for the StarSs Programming Model
Tamer Dallou, Ben Juurlink

Evaluation of Different Task Scheduling Policies in Multi-Core Systems with Reconfigurable Hardware
Mahyar Shahsavari, Zaid Al-Ars, Koen Bertels

The BarbequeRTRM: A resource manager for reconfigurable applications on Multi/Many-Core
Patrick Bellasi, Giuseppe Massari, William Fornaciari

Dynamically Reconfiguring through Phase Detection on FPGA
Kang Cai, Stamatis Kavvadias, Alberto Scionti, Claudio Scordino, Paolo Gai, Roberto Giorgi

Analyzing the Design Space of Commercial FPGA Synthesis and Mapping Tools
Christian Brugger, Matthias Balzer, Dominic Hillenbrand

Exploring the Hardware-Software Interface using an FPGA-based Research Platform
Robert Norton, Simon Moore

VESYLA: APragma Based High Level Synthesis Tool for Coarse Grain Reconfigurable Architectures
Nasim Farahini, Shuo Li, Omer Malik, Muhammad Ali Shami, Ahmed Hemani

NAROUTO: A Framework for exploration of 3D Heterogeneous FPGA Architectures
Harry Sidiropoulos, Kostas Siozios, Dimitrios Soudris

Formic: A Cost-Efficient Scalable FPGA-based Evaluation Board
Spyros Lyberis, George Kalokerinos, Michalis Lygerakis, Iakovos Mavroidis, Vassilis Papaeftathiou, Manolis Katevenis, Dionisios Pneumatikatos, Dimitris Nikolopoulos

FPGA implementations of piecewise affine functions based on multi-resolution hyperrectangular partitions
Francesco Comaschi, Bart Gervuit, Alberto Oliveri, Maurice Heemels, Marco Storace
An FPGA based Accelerator for Encrypted File Systems  
*Adrian Matoga, Ricardo Chaves, Pedro Tomas, Nuno Roma*  
177

Real-Time Video Restoration using FPGA Devices  
*Tomasz Szydzik, Gustavo Callico, Antonio Nunez*  
181

Patmos: Time-predictable VLIW Processor  
*Sahar Abbaspourseyedi*  
185

Multi-core architectures for parallelized hard real-time applications  
*Milos Panic, Marco Paolieri, Eduardo Quinones, Jaume Abella, Julian Wolf, Theo Ungerer, Sascha Uhrig, Zlatko Petrov, Francisco J. Cazorla*  
187

Controlling execution time variability using COTS for mission critical systems  
*Jingyi Bin, Arnaud Grasset, Daniel Garcia Perez, Sylvain Girbal, Philippe Bonnot, Alain Merigot*  
191

Parallelization of Nested Loop Programs for Real-Time Multicore Systems  
*Stefan J. Geuns, Joost P.H.M. Hausmans, Marco J.G. Bekooij*  
195

Expressing Parallelism and Timing in Embedded Real-time Applications  
*Sören Braunstein*  
197

Threats to Time Predictability on AMBA Bus  
*Javier Jalle, Eduardo Quinones, Luca Fossati, Marco Zulianello, Francisco J. Cazorla*  
201

DRAM Selection and Configuration for Real-Time Mobile Systems  
*Manil Dev Gomony, Christian Weis, Benny Akesson, Norbert Wehn, Kees Goossens*  
205

Memory-Map Selection for Firm Real-Time SDRAM Controllers  
*Sven Goossens, Benny Akesson, Kees Goossens*  
209

Optimizing DMA data transfers in embedded multi-core architectures  
*S. Saidi, P. Tendulkar, T. Lepley, O. Maler*  
213

The Data Transfer Engine: Towards a Software Controlled Memory Hierarchy  
*Victor Garcia, Alejandro Rico, Carlos Villaveja, Nacho Navarro, Alex Ramirez*  
215

Optimizing shared memory chip multiprocessors for future photonic interconnection networks  
*Anouk Van Laer, Philip Watts*  
219

Simple On-chip Optical Interconnection for Improving Performance in Clustered CMPs  
*Sandro Bartolini, Paolo Grani*  
223

Energy Efficiency in High Speed Interconnection Network  
*Hai Nguyen, Daniel Franco, Gonzalo Zarza, Emilio Luque*  
227
Ultra-Low Latency NoC testing via Pseudo-Random Test Pattern Compaction  
*Herve Tatenguem, Alessandro Strano, Vineeth Govind, Jaan Raik, Davide Bertozzi*

Multicast-based Partitioning Method for 3D NoCs supporting by a Minimal Adaptive Routing  
*Masoumeh Ebrahimi, Masoud Daneshtalab, Pasi Liljeberg, Juha Plosila, Hannu Tenhunen*

Burst-Aware HoL Blocking Avoidance  
*Jose Vicente Escamilla, Jose Flich Cardo, Pedro Garcia*

Dynamic Virtual Migration to Reduce Power Consumption in Multicore Embedded Systems  
*José Luis March, Julio Sahuquillo, Salvador Petit, Houcine Hassan, José Duato*

Slack and power efficiency on decoupled access - execute models  
*Konstantinos Koukos, Stefanos Kaxiras*

Tibidabo: an ARM-based HPC Cluster Prototype  
*Nikola Rajovic, Nikola Puzovic, Alex Ramirez*

Power, Thermal and Performance Modeling of Next-Generation Many-Core Platforms  
*Mohammadsadegh Sadri, Andrea Bartolini, Luca Benini*

CFEPROF: A function level energy profiler  
*Ioannis Manousakis*

Program Complexity Analysis via Source Code Instrumentation  
*Michael Kruse*

Memory coherence and compression in the vIrtical Project  
*Albert Esteve and Maria Soler, Maria Engracia Gomez, Jose Flich, Antonio Robles*

Memory coherence and compression in the vIrtical Project  
*Maria Engracia Gomez, Jose Flich, Antonio Robles, Albert Esteve, Maria Soler*

Scaling-down to embedded systems for dynamic compilation  
*Alexandre Carbon, Yves Lhuillier, Henri-Pierre Charles*

PEPPHER Composition tool  
*Usman Dastgeer, Lu Li, Christoph Kessler*

PEGASUS - New approach to hierarchical distributed programming  
*Adam Smyk*

Efficient on-chip pipelined streaming computations on scalable manycore architectures  
*Nicolas Melot, Christoph Kessler, Jörg Keller*

Dynamic Exploration of Data Transfers in WSS Decoder  
*Poona Bahrebar, Wim Heirman, Dirk Stroobandt*
Data Locality Modeling for Convolutional Neural Networks  
*Maurice Peemen, Henk Corporaal*

Simulation of Modelica Models on Parallel Architectures  
*Krislian Stavaker, Peter Fritzson*

An Adaptive Multi-Agent System for e-Commerce  
*Serban Radu, Adina Magda Florea*

Providing an efficient programming model for biologically inspired massively parallel architectures  
*Steven JT Marsh*

Realizing Parsimonious Systems through Inexact/Approximate Computing  
*Avinash Lingamneni, Christian Enz, Christian Piguet, Krishna Palem*

King Topologies And Fault-Tolerance  
*Emilio Castillo, Esteban Stafford, Fernando Vallejo, Jose Luis Bosque, Carmen Martinez, Cristobal Camarero, Ramon Beivide*

Exploiting Existing Redundancy in Checkpointed Register Alias Tables for Soft Error Detection and Correction  
*Fahrettin Koc, Kenan Bozdas, Burak Karsli, Oguz Ergin*

Working Conditions-Aware Fault Injection Technique  
*Ihsen Alouani, Smail Niar, Fadi Kurdahi*

Preliminary Concepts for a Graceful Degradation Manager in a Fault Tolerant by Design SoC  
*Stavros Tzilis, Ioannis Sourdis*

Use of Architecture Description Language ISAC for ASIP Design  
*L. Dolihal, A. Husar, Z. Prikryl, K. Masarik, T. Hruska*