CPC 2021 Advanced Program

All Times Central European Time (CEST)

Wednesday, June 16, 2021

13:45 – 14:00 Opening Session by Prof. João M. P. Cardoso, FEUP, Porto, Portugal

14:00 – 15:00 Keynote Presentation:

Title: Compiler enabled optimizations for restricted hardware and software-hardware co-designs
Speaker: Prof. Alexandra Jimborean, University of Murcia, Spain
Chair: Prof. Paul Kelly, Imperial College of Science and Medicine, London, UK

15:00 – 15:15 Short Break

15:15 – 16:45 Session W1: Code Generation and Source-to-Source Techniques
Chair: Dr. Pedro C. Diniz, INESC-ID, Lisbon, Portugal

Joao Bispo (FEUP, Porto, Portugal)
C/C++ source-to-source made easy

Jose Moreira, Kit Barton, Peter Bergner, Puneeth Bhat, Nemanja Ivanovic, Satish Sadasivam and Bill Schmidt, IBM Research, USA (IBM Research, USA)
Exploiting the new Power ISA matrix math instructions through compiler built-ins

Paul Kelly, Mehedi Paribartan and Freddie Witherden, (Imperial College of Science and Medicine, London, UK)
Using Register Packing for Small Sparse Matrix Multiplication

16:45 – 17:15 Networking Break

17:15 Symposium Adjourned

Thursday, June 17, 2021

13:45 – 14:00 Opening Session

14:00 – 15:00 Keynote Presentation:

Title: Testing Compiler Effectiveness
Speaker: Prof. David Padua, Univ. of Illinois at Urbana Champaign, Illinois, USA
Chair: Prof. Basilio Fraguela, Universidade A Coruña, Spain

15:00 – 15:15 Short Break

15:15 – 17:15 Session T1: Performance-Oriented Transformations and Techniques
Chair: Prof. Jorge Barbosa, FEUP, Porto, Portugal

Jack Turner, Michael O'Boyle and Elliot Crowley (univ. of Edinburgh, UK)
Neural Architecture Search as Program Transformation Exploration

George Bisbas, Fabio Luporini, Mathias Louboutin, Rhodri Nelson, Gerard Gorman and Paul Kelly (Imperial College of Science and Medicine, London, UK)
Temporal blocking of finite-difference stencil operators with sparse “off-the-grid” sources

Daniele Cattaneo, Michele Chiari, Gabriele Magnani, Nicola Fossati, Stefano Cherubin and Giovanni Agosta (Politecnico di Milano, Milano, Italy., IBT Systems s.r.l., Italy, Edinburgh Napier University, Edinburgh, United Kingdom)
Towards Precision Tuning of Parallel Applications: An Integration Report

Basilio B. Fraguela and Diego Andrade (Univ. da Coruña, Spain)
The UPC++ DepSpawn library for data-flow computing

17:15 – 17:45 Networking Break

17:45 Symposium Adjourned

Friday, June 18, 2021

13:45 – 14:00 Opening Session

14:00 – 15:00 Keynote Presentation:

Title: Some Humans Generate Better Code Than Compilers or Machines: Leveraging Their Expertise
Speaker**:** Prof. Nelson Amaral, Univ. of Alberta, Canada
Chair: Prof. Michael Gerndt, TU Muenchen, Germany

15:00 – 15:15 Short Break

15:15 – 17:15 Session F1: Programming Models and Applications
Chair: Prof. João Bispo, FEUP, Porto, Portugal

Pablo Antonio Martínez, José Manuel García and Gregorio Bernabé (Univ. of Murcia, Spain)s
Towards an Efficient Unified Programming Model for Heterogeneous Computing

Mohak Chadha, Anshul Jindal and Michael Gerndt (TU Muenchen, Germany)
Accelerating Compute-Intensive Serverless Functions

James Garland and David Gregg (trinity College, Ireland)
HOBFLOPS CNNs: Hardware Optimized Bitslice-Parallel Floating-Point Operations for Convolutional Neural Networks (University of Edinburgh, UK)

Arturo Gonzalez-Escribano, Yuri Torres de La Sierra, Francisco J. Andújar and Gabriel Rodriguez-Canal (univ. of Valladolid, Spain)
Portability and efficiency in the runtime of the Controller heterogeneous programming model: The example of FPGAs

17:15 – 17:45 Networking Break

17:45 – 19:15 Panel Session

Panelists:

Prof. Alexandra Jimborean, University of Murcia, Spain
Prof. Nelson Amaral, Univ. of Alberta, Canada
Dr. Oleksandr Zinenko, Google Inc, Paris, France

Chair: Prof. Paul Kelly, Imperial College of Science and Medicine, London, UK

The Role of Compiler for Parallel Computing in the Future

Over the last years there has been a push towards custom solutions and even high-profile applications with specific languages and frameworks (like TensorFlow). What do you think is the role of Compilers for these specific-domains, and what features should the language exhibit to allow compilers (and other productivity tools) to support predictable performance, correctness and security? Will we see the rise of a myriad of domain-specific languages and the corresponding compilers? In addition, there has been a wide application of ML and Data Mining techniques to software repositories begging the question: “Are we really going to need that many programmers with concurrent programming skills in the future”, and “What are the valued skills of the future programmers?” Most of us, in Academia, have struggled with how to keep up with the fast pace in this field, and are constantly faced with the challenges on how to best prepare our students on topics of compilation and translation for future computing technologies. What does the Panel think the disruptive models are or will be, beyond Quantum Computing, that will require us to think beyond existing languages?

19:15 Symposium Closing