



Workshop on Approximate Computing

Paderborn, Germany

October 15 - 16, 2015

<http://approximate.uni-paderborn.de>

Preliminary Program

Workshop Venue: Building O, Lecture Hall O2

Thursday

9:00 – 9:15 Welcome

9:15 – 10:15 Session 1: Cross-Layer Perspectives

Invited Talk: Approximate Computing Across the Stack: Devices and Circuits

Kaushik Roy, Purdue University, West Lafayette, IN, USA

Invited Talk: Approximate Computing Across the Stack: Architecture and Systems

Anand Raghunathan, Purdue University, West Lafayette, IN, USA

10:15 – 10:45 Coffee Break

10:45 – 12:15 Session 2: Hardware Opportunities and Challenges

Invited Talk: Leveraging Approximate Computing in Better-than-Worst-Case Designs

Adit Singh, Auburn University, Auburn, AL, USA

Test and Reliability Challenges for Approximate Circuitry

Ilija Polian, University of Passau, Germany

Shifting the Analog-Digital Boundary in Signal Processing: Should We Use Mixed-Signal Approximate Computing?

Christoph Scheytt, Abdul R. Javed, University of Paderborn, Germany

12:15 – 13:45 Lunch

13:45 – 15:15 Session 3: Communication and Compilers

Approximate Communication in Parallel Applications for Resource-Constrained Embedded Systems

Olaf Neugebauer, Michael Engel, Peter Marwedel, TU Dortmund, Germany

Compiler Analyses and Optimizations for Approximate Computing Systems

Michael Engel, TU Dortmund, Germany

SqueezCL: Squeezing OpenCL Kernels for Approximate Computing on Contemporary GPUs

Atieh Lotfi¹, Abbas Rahimi¹, Hadi Esmaeilzadeh², Rajesh K. Gupta¹, ¹UC San Diego, CA, USA,

²Georgia Institute of Technology, Atlanta, GA, USA (presented by Fabian Oboril, KIT, Germany)

15:15 – 15:45 Coffee Break

15:45 – 17:15 Session 4: Approximate Arithmetic

Invited Talk: A Comparative Study of Approximate Adders and Multipliers

Jie Han, University of Alberta, Edmonton, AB, Canada

Approximate Adder Structures on FPGAs

Andreas Becher, Jorge Echavarria, Daniel Ziener, and Juergen Teich, FAU Erlangen-Nuernberg, Germany

A Generic Adder Model with Variable Approximation Modes

Muhammad Shafique¹, Waqas Ahmad², Rehan Hafiz², Jörg Henkel¹, ¹Karlsruhe Institute of Technology (KIT), Germany, ²National University of Sciences and Technology, Islamabad, Pakistan

Walking Tour and Workshop Dinner

Friday

9:00 – 10:30 Session 5: Design Strategies

Designing Inexact Systems Efficiently using Elimination Heuristics

Akash Kumar, TU Dresden, Germany

Approximate Computing as a Search Problem

Zdenek Vasicek, Radek Hrbacek and Lukas Sekanina, Brno University of Technology, Czech Republic

Using Binary Decision Diagrams in the Design Flow of Approximate Computing

Mathias Soeken^{1,2}, Daniel Große¹, Arun Chandrasekharan¹, Rolf Drechsler^{1,2}, ¹University of Bremen, Germany, ²DFKI Bremen, Germany

10:30 – 11:00 Coffee Break

11:00 – 13:00 Session 6: Algorithmic and Language Support

ABFT with Probabilistic Error Bounds for Approximate and Adaptive-Precision Computing Applications

Claus Braun and Hans-Joachim Wunderlich, University of Stuttgart, Germany

Probabilistic Programs - A Natural Model for Approximate Computations

Nils Jansen, Benjamin Lucien Kaminski, Joost-Pieter Katoen, Christoph Matheja, and Federico Olmedo, RWTH Aachen, Germany

Interval Derivative Based Significance Analysis

J. Deussen, J. Riehme, U. Naumann, RWTH Aachen, Germany

Property-based extraction of requirements on approximate hardware

Marie-Christine Jakobs, Marco Platzner, Tanja Tornede, Tobias Wiersema, Heike Wehrheim, University of Paderborn, Germany

13:00 – 14:30 Lunch

14:30 – 16:00 Session 7: Memories and More

Leveraging Approximate Computing for Improving STT-MRAM Write Efficiency

Azadeh Shirvanian, Fabian Oboril, Mehdi Tahoori, Karlsruhe Institute of Technology (KIT), Germany

Resilience-Driven STT-RAM Cache Architecture for Approximate Computing

Muhammad Shafique¹, Felipe Sampaio², Bruno Zatt³, Sergio Bampi², Jörg Henkel¹, ¹Karlsruhe Institute of Technology (KIT), Germany, ²Federal University of Rio Grande do Sul (UFRGS), Brazil, ³Federal University of Pelotas (UFPEL), Brazil

Integration of Approximate Computing in today's Systems: From Hardware to Algorithmic Level

Michael Bromberger, Wolfgang Karl, Karlsruhe Institute of Technology (KIT)