Proceedings of the

20th International Workshop on Software and Compilers for Embedded Systems

SCOPES 2017

www.scopesconf.org

Proceedings of the

20th International Workshop on Software and Compilers for Embedded Systems

SCOPES 2017

June 12-13, 2017
Schloss Rheinfels
St. Goar, Germany

Sponsors

EDAA

In cooperation with

ACM SIGBED

Editor

Sander Stuijk, Eindhoven University of Technology, The Netherlands

Table of Contents

Preface

Dear Colleague,

Welcome to Sankt Goar and the SCOPES workshop. This year we are presenting a workshop program that features many interesting talks on all aspects related to the design of modern embedded systems. I hope that you will find our program interesting, stimulating and exciting.

The influence of embedded systems is constantly growing. Increasingly powerful and versatile devices are developed and put on the market at a fast pace. Their functionality and number of features is increasing, and so are the constraints on the systems concerning size, performance, energy dissipation and timing predictability. To meet all these constraints, multi-processor systems on a chip (MPSoCs) are becoming popular in embedded systems. In order to meet the performance and energy constraints of embedded applications, heterogeneous architectures incorporating functional units optimized for specific functions are commonly employed. This technological trend has dramatic consequences on the parallelization, mapping, compiler and design technology used to develop these systems. The SCOPES workshop focuses on the software generation process for these modern embedded systems. Topics of interest include all aspects of the compilation and mapping process of embedded single and multi-processor systems.

SCOPES received a total of 9 research papers coming from many different countries in Europe, North-America, Asia, Middle-East, Africa, and Australia. Each paper has been reviewed by at least three independent reviewers to ensure the quality of the workshop. Each reviewer provided a score together with detailed comments and suggestions on how to improve the overall quality of each paper. After an on-line meeting, the program committee has decided to accept 6 papers out of these 9 submissions. This gives an acceptance rate of 66% which is similar to earlier editions of the SCOPES workshop. It also reflects our commitment to only select high quality papers for presentation at our workshop.

In addition to the research papers, the workshop features also 11 research presentations. The idea of research presentations was previously used at the Map2MPSoC workshop. After the merger of SCOPES and Map2MPSoC this idea has been continued in the SCOPES workshop program. Research presentations show research results relevant to the topics addressed by the workshop. These presentations may be based on on-going work or research results that have previously been presented in other forums. Research presentations may include a short publication in the SCOPES proceedings. Therefore all submitted presentations have undergone a light review.

In conclusion, I would like to thank the members of the program committee and the external reviewers for their contribution to the quality of this workshop. I would also like to thank all authors for choosing SCOPES as the workshop where to report your research and your contributions to the scientific community. Finally, I would like to thank our sponsors for their support to SCOPES 2017. I wish all of you a fruitful conference and a pleasant stay in Sankt Goar.

Sander Stuijk
SCOPES 2017 Program Chair
Eindhoven University of Technology, NL
s.stuijk@tue.nl

Committee

- **General Chair**
  Henk Corporaal
  Eindhoven University of Technology, NL
- **Program Chair**
  Sander Stuijk
  Eindhoven University of Technology, NL
- **Publicity Chair**
  Peter Marwedel
  Dortmund University of Technology, DE
- **Program Committee**
  - Akash Kumar
    TU Dresden, DE
  - Anca Molnos
    CEA-LETI, FR
  - Andrea Marongiu
    University of Bologna, IT
  - Andreas Krall
    TU Vienna, AT
  - Andy Pimentel
    University of Amsterdam, NL
  - Armin Größlinger
    University of Passau, DE
  - Ben Juurlink
    TU Berlin, DE
  - Carlo Galuzzi
    Maastricht University, NL
  - Christian Haubelt
    University of Rostock, DE
  - Dimitrios Soudris
    NTUA, GR
  - Eugenio Villar
    University of Cantabria, ES
  - Frank Hannig
    University of Erlangen, DE
  - Heiko Falk
    TU Hamburg-Harburg, DE
  - Henri-Pierre Charles
    CEA-LETI, FR
  - Jan Haase
    Helmut-Schmidt-Universität, DE
  - Jean-Pierre Talpin
    INRIA, FR
  - Jürgen Teich
    University of Erlangen, DE
  - Luis Miguel Pinho
    Polytechnic Institute of Porto, PO
  - Marco Bekooij
    NXP Semiconductors, NL
  - Nikil Dutt
    University of Irvine, USA
  - Rainer Leupers
    RWTH Aachen, DE
  - Soheil Ghiasi
    UC Davis, USA
  - Timothy Jones
    University of Cambridge, UK
  - Todor Stefanov
    Leiden University, NL
  - Shafique Mohammed
    TU Wien, AC
  - Jan van Lunteren
    IBM, CH
  - Marc Pouzet
    Université Pierre et Marie Curie, FR
  - Timothy Bourke
    INRIA, FR

- **External Reviewers**
  - Martin Bruestel
  - Daniel Maier
  - Dimosthenis Masouros
  - Benjamin Beichler
  - Franz-Josef Streit
  - Maria Auras-Rodriguez
  - Philipp Gysel
  - Milan Copic
  - Jan Lucas
  - Peter Brand
  - Thomas Göthel
  - Daniel Gis
  - Amit Singh

Sponsors

SCOPES 2017 is kindly supported and sponsored by the following institutions:

- ACM SIGBED

  `http://www.acm.org/sigbed`

- European Design and Automation Association, EDAA

  `http://www.edaa.com`