Preface

These proceedings contain the papers presented at the 2008 NASA/ESA Conference on Adaptive Hardware and Systems (AHS 2008), held in Noordwijk, The Netherlands, on June 22-25, 2008. The purpose of the AHS 2008 conference is to bring together leading researchers from the adaptive hardware and systems community to exchange experiences and share new ideas in the field.

Adaptation reflects the capability of a system to maintain or improve its performance in the context of internal or external changes, such as uncertainties and variations during fabrication, faults and degradations, modifications in the operational environment, incidental or intentional interference, different users and preferences, modifications of standards and requirements, trade-offs between performance and resources, etc.

Adaptation at hardware levels increases the system capabilities beyond what is possible with software-only solutions, and a large number of adaptation features employing both analog and digital adjustments are becoming increasingly present in the most elementary system components. Algorithms, techniques, and their implementation in hardware are developed over a diverse variety of applications, such as adaptive communications (adapting to changing environment and interferences), reconfigurable systems on a chip and portable wireless devices (adapting to power limitations) or survivable spacecraft (adapting to extreme environments and mission unknowns).

The papers presented during the conference spanned many issues: fundamentals and theory, state-of-the-art adaptive technology in the area of analog/digita/mixed circuits, optical systems, and signal processing. This added to topics such as evolution of digital systems, design and development of reconfigurable devices, morphogenetic and cellular adaptive hardware, fault-tolerant and self-repair systems. This year the conference had a strong application focus with the topics mentioned above. The application areas addressed include sensing, image processing, communications, biometrics, and security systems.

A number of invited and special sessions were organised. These included invited and regular papers in emerging and/or key topics such as “Evolutionary and Self-Organizing and Adaptive Sensors, Actuators and Processing Hardware”; “Imaging for Forensics and Security: Algorithms and Architecture”; “FPGAs and Reconfigurable Architectures in Space”; and “Adaptive Wireless Networks”. The theme for a number of sessions such as “ESPA CENET: Evolvable Networks of Intelligent and Secure Integrated and Distributed Reconfigurable System-On-Chip Sensor Nodes for Aerospace Based Monitoring and Diagnostics” and “Reconfigurable Antennas” were continued this year due to strong interest and high quality submissions.

We would like to acknowledge the support and hard work of the many individuals who made AHS 2008 a reality. First, we thank the authors and the invited speakers for their high-quality contributions. We express our gratitude to the Program Committee for their gracious assistance in the refereeing process. We thank our organizers: the NASA Jet Propulsion Laboratory, the European Space Agency, and the University of Edinburgh.

We acknowledge and are grateful for the support from Program Managers at NASA JPL, ESA, and the University of Edinburgh.

Didier Keymeulen, Jet Propulsion Laboratory, USA (General Chair)
Martin Suess, European Space Agency, NL (Vice General Co-Chair)
Tughrul Arslan, University of Edinburgh, UK (Vice General Co-Chair)
Ahmet T. Erdogan, University of Edinburgh, UK (Technical Program Co-Chair)
David Merodio, European Space Agency, Netherlands (Technical Program Co-Chair)
Adrian Stoica, Jet Propulsion Laboratory, USA (Technical Program Co-Chair)