ASM 2003—A Double Anniversary in Sicily

ASM 2003 and this volume constitute a double landmark in the short history of the Abstract State Machine method for the design and the analysis of complex software/hardware systems. The volume contains the Proceedings of the 10th *International Workshop on Abstract State Machines* (ASM 2003), held in Taormina (Sicily) from March 3rd to March 7th, 2003. The anniversary edition of this workshop was the first one held in Italy, the country where Yuri Gurevich, in his influential 1986 and 1990 Spring lectures in Pisa, explained for the first time his ideas about generalizing Turing's thesis by a resource-bound-aware model of computation[1], and the country where the first of an ever growing series of European Ph.D. and habilitation theses was written (1989–1992)[2] which apply ASMs to real-life computing systems or develop their theoretical foundation further. It was also 10 years ago, in Sicily, that the fundamental Lipari Guide[3] saw the light, namely at the Lipari Summer School which in 1993 was devoted to *Specification and Validation Methods*.

The previous editions of the international workshop series on Abstract State Machines were held in the following European cities: Dagstuhl, Germany (2002); Las Palmas de Gran Canaria, Spain (2001); Monte Verità, Switzerland (2000); Toulouse, France (1999); Magdeburg, Germany (1998); Cannes, France (1998, 1997); Paderborn, Germany (1996); and Hamburg, Germany (1994).

ASM 2003 aimed at enforcing two valuable traditions of ASM workshops. In the first place ASM 2003 was devoted to both the theory and the multiple real-life applications of ASMs, with the goal to provide a forum for a survey and a critical evaluation of the current academic and industrial developments of the ASM method, aiming at a fruitful interaction between theory and practice. As organizers we were eager to maintain at ASM 2003 the vivid, frank but fair style of scientific disputation which has characterized past editions of the workshop.

The second concern of ASM 2003 was to offer a moment of reflection upon the place the ASM method occupies in the field of Computer Science, paying attention in particular to the relation of the method to similar or complementary system development and analysis approaches. This was also one of the reasons why in the past half of the ASM workshops were held as part of larger computer science conferences: ASM 2001 as part of Eurocast'01, ASM 1999 as part of FME'99, ASM 1998 in Magdeburg as part of GI-Jahrestagung, and ASM 1994 as part of the IFIP World Congress. The goal is to pave the way for an integration of

[1] For historical details see: E. Börger, The origins and the development of the ASM method for high level system design and analysis, *J. of Universal Computer Science*, 8(1):2–74, 2002.

[2] E. Riccobene, *Modelli Matematici per Linguaggi Logici*, Ph.D. thesis, University of Catania, Academic year 1991/92.

[3] Y. Gurevich, Evolving Algebras 1993: Lipari Guide, In E. Börger, editor, *Specification and Validation Methods*, pages 9–36. Oxford University Press, 1995.

ASM-based modeling, validation and verification techniques into current system engineering methods, truly enriching them (certainly not only rephrasing them in ASM terms), and to identify new challenges for the ASM method.

In fact the invited lectures of ASM 2003 covered not only internal progress and new frontiers for ASMs (lectures by Yuri Gurevich, Microsoft Research, Redmond, USA, and Egon Börger, University of Pisa, Italy), but also some areas of major challenges for new applications of the ASM method:

- object-oriented, component-based design and program verification techniques (lecture by Bertrand Meyer, ETH, Zürich, Switzerland),
- mobile computing (lecture by Gruia-Catalin Roman, Washington University in St. Louis, USA),
- testing (lectures by Antonia Bertolino, ISTI at the Italian Research Council, Pisa, Italy and Klaus Havelund, NASA Research Center, USA),
- concurrency techniques (lecture by Perdita Stevens, University of Edinburgh, UK),
- refinement techniques (lecture by John Derrick, University of Kent, Canterbury, UK).

The contributed *research papers* and *short presentations* of work in progress developed ASM applications and the theory further and contributed to the themes of the invited lectures. The reader will find modeling and analysis work for new kinds of systems (among others for knowledge management, information services, database systems, UML, abstract encryption, the new Java memory model, quantum algorithms), comparative studies of different methods and tools for system description (e.g., big-step and small-step semantics, expression evaluation principles in various programming languages, the MDG tool, ASMs as a platform for the analysis of distributed production control systems at multiple levels of abstraction), advances in the theory of ASMs (analysis of turbo ASMs, decidability problems, support for recursion) and in teaching ASMs, testing, model-checking, etc. In addition ASM 2003 featured industrial experience reports and tool demonstrations.

We thank Uwe Glässer (Simon Fraser University, Vancouver, Canada) and Anatol Slissenko (University 12, Paris, France) for having organized as part of ASM 2003 a round table discussion on the challenging theme of rigorous mathematical models of real time in distributed computing. We also thank the speakers of the round table: Ernst-Rüdiger Olderog (University of Oldenburg, Germany), Andreas Prinz (DResearch Digital Media Systems, Berlin, Germany), and Susanne Graf (Verimag, Grenoble, France). As formulated by Uwe Glässer and Anatol Slissenko, the round table on time in specifications discussed some vision of the following and related topics:

- What are the types of timed systems to consider? What are time constraints and operations over time that arise in practice?
- How are timed systems specified and implemented in practice and what kind of specification languages are demanded or desired by practical specifications?

- How is time represented in existing specification languages? What are the domains of application of these languages and what timed systems are outside these domains?
- Continuous versus discrete time: what are the practical and theoretical advantages or disadvantages of using these models of time?
- What are the theoretical problems in defining the semantics of timed systems?
- How should we represent and simulate time in ASM and ASML?

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November 2002

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