Preface

Recently, the area of autonomous agents and multiagent systems (MAS) has grown into a promising technology offering a credible alternative for the design of intelligent and cooperative systems. Several efforts have been made by academic researchers, by industrials and by several standardization consortiums in order to provide novel tools, methods and frameworks to establish the necessary standards for a wide use of MAS as a technology in its own right and not only as a new paradigm.

However, until now the main focus of the MAS community has been on the development of *formal and informal tools* (e.g. MASIF as OMG specifications, FIPA), *concepts* (e.g. concerning mental or social attitudes, communication, cooperation, organization, mobility) and *techniques* (e.g. AUML, modal languages, verification techniques) in order to *analyze and specify multiagent systems*.

We are convinced that the next step will concern the development of programming languages and tools which can effectively support MAS programming and *implement key concepts of multiagent systems in a unified framework*. The success of agent oriented system design is guaranteed if we can bridge the gap between analysis and implementation, and thus develop powerful and general purpose programming technology such that the concepts and specifications for multiagent systems can be easily and directly implemented.

This technology should include *agent based programming languages, tools and techniques*: these were the themes of the Dagstuhl seminar *Programming Multi Agent Systems Based on Logic* (see [2] and the recent [1]), where the focus was on logic-based approaches. During the seminar, the idea came up to broaden the scope beyond logic-based frameworks and thus ProMAS came into being.

ProMAS 2003, the *First International Workshop on Programming Multiagent Systems: Languages, Frameworks, Techniques and Tools*, was held in July 2003, in Melbourne (Australia) as an associated event of AAMAS 2003: the main international conference dedicated to autonomous agents and multiagents systems. ProMAS 2003 (`http://www.cs.uu.nl/ProMAS`) was the first international workshop dedicated to MAS programming and it will be followed this year by ProMAS 2004, which will also take place within AAMAS 2004 (July 2004 in New York City, USA).

ProMAS 2003 was an invaluable opportunity that brought together leading researchers from both academia and industry to discuss the design of programming languages for multiagent systems. In particular, the workshop promoted the discussion and exchange of ideas concerning the concepts, properties, requirements, and principles that are important for future programming technology for multiagent systems.

This volume of the LNAI series constitutes the official (post-) proceedings of ProMAS 2003. It presents the main conclusions of the ProMAS event. Besides eight high quality papers selected among the (fifteen) submitted papers, we also invited three leading researchers working in industry. While the workshop

papers represent mainly basic research, the invited papers describe work that is applied in various industrial applications. The eleven papers in this volume can be roughly divided into the following three groups.

Programming MAS: This section consists of three papers. *Keith Decker* describes in his paper a new vision for programming multiagent systems and presents a toolkit for MAS applications: DECAF. *Rick Evertsz et al.* describe how to implement industrial applications of MAS using their system JACK. *Jörg Müller et al.* relate the problem of programming software agents with designing executable business processes.

Languages for MAS: This section consists of three papers. *Rafael Bordini et al.* relate AgentSpeak, a planning language for autonomous agents, to a general purpose Java model checker. They consider the important problem of verifying multiagent programs. *Amal el Fallah Seghrouchni et al.* describe a computational language for autonomous and intelligent mobile agents. *Mehdi Dastani et al.* introduce a programming language for cognitive agents that have beliefs, goals, plans. The syntax and semantics of this programming language are presented.

Principles and Tools for MAS: This section consists of five papers. *Paul Scerri et al.* present a proxy architecture and team oriented programming method that allow effective coordination between large teams of heterogeneous agents. *Shamimaby Paurobally et al.* consider methods and tools to develop agent interaction protocols. They can be used to bridge the gap between intuitive developments and formal specifications. *Martin Kollingbaum and Timothy Norman* are concerned with agent architectures and aim to bridge the gap between analysis and programming (or theory and practice) of agent systems. *Martin Dinkloh and Jens Niemis* present a graphical tool which helps in integrating the design and implementation of agent conversations. Finally, *Bruno Mermet et al.* introduce a method for designing and validating multiagent systems.

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March 2004   Mehdi Dastani
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References

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