

## Preface

This volume comprises the papers accepted for plenary presentation at ICAPS 2004, the Fourteenth International Conference on Automated Planning and Scheduling. The annual ICAPS conference series was formed in 2003 by merging two biannual conferences, namely the International Conference on Artificial Intelligence Planning and Scheduling (AIPS) and the European Conference on Planning (ECP). ICAPS continues the traditional high standards of these venues as well as their rich and stimulating programs.

The 37 papers included in this volume were selected from a record of 119 submissions that were rigorously reviewed by the Program Committee. The papers present the latest theoretical and empirical advances in the field, covering the full spectrum of topics in planning and scheduling. They range from new theoretical frameworks and algorithms to practical implementations in a variety of domains. This year, ICAPS extended its scope by reaching out to research communities that were underrepresented at ICAPS in the past. The proceedings therefore contain, in addition to papers on classical symbolic planning, more papers on search, probabilistic planning, and scheduling than in previous years.

The Program Committee has identified among the accepted papers a group of outstanding candidates for the ICAPS awards. A subset of the Program Committee, selected carefully to avoid conflicts of interest, reviewed the candidates and selected the winners. We are pleased to present the ICAPS 2004 Best Paper Award to Ronen Brafman and Jörg Hoffmann for their paper, "Conformant Planning via Heuristic Forward Search: A New Approach." The paper, "Multiple Pattern Databases," by Robert Holte, Jack Newton, Ariel Felner, Ram Meshu-

lam, and David Furcy is a runner-up for the award. Two papers are sharing the ICAPS 2004 Honeywell Best Student Paper Award. We are pleased to present this award to Malte Helmert for the paper, "A Planning Heuristic Based on Causal Graph Analysis," and to Rong Zhou and Eric Hansen for the paper, "Breadth-First Heuristic Search." The paper, "Trading Places: How to Schedule More in a Multi-Resource Oversubscribed Scheduling Problem," by Laura Barbulescu, Adele Howe, Darrell Whitley, and Mark Roberts is a runner-up for the award.

In addition to presentations of the accepted papers, the technical session includes three invited talks by distinguished speakers. Patrick Doherty (Linköping University) presents "Advanced Research with Autonomous Unmanned Aerial Vehicles," Michela Milano (Università di Bologna) presents "Artificial Intelligence Meets Operations Research: A Constraint Programmer's Point of View," and Reid Simmons (Carnegie Mellon University) presents "Planning for an Uncertain Future." The ICAPS program also includes five half-day tutorials offered on June 3: "Constraint Satisfaction for Planning and Scheduling," "Planning and Learning," "Planning on the Web," "Planning Using Partially Observable Markov Decision Processes," and "Robot Motion Planning." We thank our tutorial speakers José-Luis Ambite, Roman Barták, Daniel Bernstein, Daniel Borrajo, Zhengzhu Feng, Eric Hansen, Lydia Kavrakı, Craig Knoblock, Andrew Ladd, Manuela Veloso, and Rong Zhou for their presentations. The program also includes three workshops held on June 4: "Connecting Planning Theory with Practice," "Integrating Planning into Scheduling," and "Planning and Scheduling for Web and Grid Services." We thank our workshop cochairs José-Luis Ambite, Susanne Biundo, Jim Blythe, Mark Boddy, Amedeo Cesta, Peter Jarvis, and Stephen F.

Smith for organizing these three stimulating workshops.

ICAPS 2004 hosts the Fourth International Planning Competition with an expanded two-track program. The classical track continues the tradition of evaluating planning systems using deterministic challenge domains. It is organized by Stefan Edelkamp (University of Dortmund) and Jörg Hoffmann (Albert-Ludwigs-Universität). The new probabilistic planning track evaluates planning systems that can cope with uncertainty about the outcomes of actions. This track is organized by Michael Littman (Rutgers University) and Håkan Younes (Carnegie Mellon University). The planning competitions are an important venue; they promote a better understanding of existing planning techniques and foster the exchange of benchmark problems and algorithms within the community. We thank the organizers for this important service.

This year's conference is colocated with the Ninth International Conference on Principles of Knowledge Representation and Reasoning (KR 2004), the Tenth International Workshop on Nonmonotonic Reasoning (NMR 2004), and the International Workshop on Description Logic (DL 2004). The first day of our technical sessions is a joint ICAPS/KR day featuring our mutual invited speaker, Patrick

Doherty, and six technical papers from each conference. We are also holding jointly the ICAPS/KR Festival on June 5 that includes our Doctoral Consortium, demonstrations of planning systems, and presentations of the results of the International Planning Competitions.

The success of ICAPS relies on the generous contributions of the members of the Organizing Committee, the Program Committee, and the auxiliary reviewers. We thank them all for an outstanding job. Lloyd Greenwald and John Novatnack at Drexel University maintained our paper submission and review software. We thank them for performing this time consuming service and helping us solve promptly numerous technical difficulties. Carol Hamilton and the entire AAAI staff provided invaluable assistance. Finally, we thank our sponsors for their generosity: National Science Foundation (NSF), Air Force Office of Scientific Research (AFOSR), Research Institute for Advanced Computer Science (RIACS), Computational Sciences Division at NASA Ames Research Center, NASA Jet Propulsion Laboratory (JPL), Defense R&D Canada, Canadian Space Agency, National ICT Australia (NICTA), American Association for Artificial Intelligence (AAAI), and Honeywell.

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