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## Welcome to IJCAI-01

IJCAI-01, the Seventeenth International Joint Conference on Artificial Intelligence, is sponsored by the International Joint Conferences on Artificial Intelligence, Inc. (IJCAII) and the American Association for Artificial Intelligence (AAAI).

IJCAII sponsors biennial conferences on artificial intelligence, which are the main forums for presenting AI research results to the international AI community. Previous conference sites were Washington D.C., USA (1969), London, England (1971), Stanford, California, USA (1973), Tbilisi, Georgia, USSR (1975), Cambridge, Massachusetts, USA (1977), Tokyo, Japan (1979), Vancouver, British Columbia, Canada (1981), Karlsruhe, Germany (1983), Los Angeles, California, USA (1985), Milan, Italy (1987), Detroit, Michigan, USA (1989), Sydney, Australia (1991), Chambéry, Savoie, France (1993), Montréal, Québec, Canada (1995), Nagoya, Japan (1997), and Stockholm, Sweden (1999). IJCAI-03 will be held in Acapulco, Mexico in 2003.

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IJCAI-01 gratefully acknowledges the generous contributions of the following corporations and organizations:

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David Mike Hamilton, Director, Live Oak Press





The IJCAI Award for Research Excellence and the Computers and Thought Award are made by the IJCAI Board of Trustees, upon recommendation by the IJCAI Awards Selection Committee, which consists this year of

Michael Georgeff (San Francisco, USA)

Henry Kautz (Seattle, USA)

C. Raymond Perrault (Menlo Park, USA, Chair)

J. Ross Quinlan (Sydney, Australia)

Erik Sandewall (Linköping, Sweden)

The IJCAI Awards Selection Committee receives advice from members of the IJCAI Awards Review Committee, who comment on the accuracy of the nomination material and provide additional information about the nominees. The IJCAI Awards Review Committee is the union of the former Trustees of IJCAI, the IJCAI-01 Advisory Committee, the Program Chairs of the last three IJCAI conferences, and the past recipients of the IJCAI Award for Research Excellence and the IJCAI Distinguished Service Award, with nominees excluded.

## IJCAI Award for Research Excellence

The IJCAI Award for Research Excellence is given at the IJCAI conference to a scientist who has carried out a program of research of consistently high quality, yielding several substantial results. Past recipients of this award are John McCarthy (1985), Allen Newell (1989), Marvin Minsky (1991), Raymond Reiter (1993), Herbert Simon (1995), Aravind Joshi (1997), and Judea Pearl (1999).

The winner of the 2001 IJCAI Award for Research Excellence is Donald Michie, Professor Emeritus of Machine Intelligence at the University of Edinburgh, Edinburgh, Scotland. Professor Michie is recognized for his contributions to Machine Learning, Robotics, and Knowledge-Based Systems. He will deliver a lecture from 5:45-6:45pm on Thursday, August 9 in Ballroom 6 B/C, sixth level.

## IJCAI Computers and Thought Award

The Computers and Thought Award is presented at IJCAI conferences to outstanding young scientists in artificial intelligence. The award was established with royalties received from the book "Computers and Thought", edited by Edward Feigenbaum and Julian Feldman; it is currently supported by income from IJCAI funds.

Past recipients of this honor have been Terry Winograd (1971), Patrick Winston (1973), Chuck Rieger (1975), Douglas Lenat (1977), David Marr (1979), Gerald Sussman (1981), Tom Mitchell (1983), Hector Levesque (1985), Johan de Kleer (1987), Henry Kautz (1989), Rodney Brooks (1991), Martha Pollack (1991), Hiroaki Kitano (1993), Sarit Kraus (1995), Stuart Russell (1995), Leslie Kaelbling (1997), and Nicholas Jennings (1999).

The winner of the 2001 IJCAI Computers and Thought Award is Daphne Koller, Assistant Professor at the Department of Computer Science of Stanford University, Stanford, USA. Professor Koller is recognized for her contributions to the theory and practice of probabilistic reasoning, machine learning, and computational game theory. She will deliver a lecture from 5:45-6:45pm in Ballroom 6 B/C, sixth level.



## The Donald E. Walker Distinguished Service Award

The IJCAI Distinguished Service Award was established in 1979 by the IJCAI Trustees to honor senior scientists in AI for contributions and service to the field during their careers. Previous recipients have been Bernard Meltzer (1979), Arthur Samuel (1983), Donald Walker (1989), Woodrow Bledsoe (1991), Daniel G. Bobrow (1993) and Wolfgang Bibel (1999).

In 1993, the IJCAI Distinguished Service Award was renamed the Donald E. Walker Distinguished Service Award in memory of the late Donald E. Walker, who shaped the IJCAI organization as its long-time Secretary-Treasurer.

At IJCAI-01, the Donald E. Walker Distinguished Service Award will be given to Barbara Grosz, Gordon McKay Professor for Computer Science at Harvard University, Cambridge, USA. As a pioneering researcher in discourse and collaboration in natural language, Professor Grosz is recognized for her outstanding service to the international AI community as President of AAAI (1993-95) and as Chair of IJCAI (1989-1991), and for her contribution to enhancing the role of women in science. The award will be given during the opening ceremony, Monday, August 6, 5:00 pm in Ballroom 6 B/C, sixth level.

## Distinguished Paper Award

The IJCAI-01 Distinguished Paper Award will be given to Thomas Eiter and Thomas Lukasiewicz for their paper entitled "Complexity Results for Structure-Based Causality".

This paper analyzes the computational complexity of causal relationships in Pearl's structural models, where it focuses on causality between variables, event causality, and probabilistic causality. In particular, it analyzes the complexity of the sophisticated notions of weak and actual causality by Halpern and Pearl. In the course of this, it also proves an open conjecture by Halpern and Pearl, and establishes other semantic results. To the authors' knowledge, no complexity aspects of causal relationships have been considered so far, and their results shed light on this issue.

The authors will present their paper on Tuesday, August 7 from 5:00 – 5:30 PM in Meeting Room 606, sixth level.

## The IJCAI-01 Conference is composed of various complementary programs:

- ◆ the **Technical Program**, August 7–10, including technical paper presentations by top scientists in the field, invited speakers and award winners.
- ◆ the **Tutorial Program**, August 5–6
- ◆ the **Workshop Program**, August 4–6

- ◆ the **Exhibition**, including the **AAAI Robot Competition and Exhibition** and **National 2001 Botball Tournament** (2 days), August 7–9

### COLLOCATED EVENTS

- ◆ the **Thirteenth Conference on Innovative Applications of Artificial Intelligence**, IAAI-01, August 7–9, Meeting Room 602, Washington State Convention & Trade Center

- ◆ **AAAI/SIGART Doctoral Consortium**, August 5–6, West Ballroom A, Sheraton Seattle Hotel
- ◆ **RoboCup 2001** will be held in Exhibit Hall 4A next to the **IJCAI-01 Exhibition**, August 4 – 10, Washington State Convention & Trade Center
- ◆ **RoboCup 2001 Symposium**, August 7–8, Ballroom 6A, Washington State Convention & Trade Center
- ◆ the **Seventeenth Conference on Uncertainty in Artificial Intelligence (UAI 2001)**, August 2 – 5, University of Washington

# C O N F E R E N C E - A T - A - G L A N C E

CONFERENCE DAY	M O R N I N G	A F T E R N O O N	E V E N I N G
<b>Thursday, August 2</b>	UAI 2001		RoboCup Opening Reception
<b>Friday, August 3</b>	UAI 2001	Registration ( <i>opens at 1:00 pm</i> )	
<b>Saturday, August 4</b>	Registration Workshops ( <i>see page 6</i> ) RoboCup Round Robin Competition UAI 2001		
<b>Sunday, August 5</b>	Registration Workshops Tutorials ( <i>see page 8</i> ) AAAI/SIGART Doctoral Consortium RoboCup Round Robin Competition UAI 2001		
<b>Monday, August 6</b>	Registration Workshops Tutorials AAAI/SIGART Doctoral Consortium RoboCup Round Robin Competition		Opening Ceremony, Reception
<b>Tuesday, August 7</b>	Registration Technical Program ( <i>see page 12</i> ) Keynote Speaker IAAI-01 Exhibition/Robot Competition & Exhibition/Botball RoboCup Symposium & RoboCup Junior Competition		Computers and Thought Lecture AAAI Fellows Dinner RoboCup Poster Session/Reception
<b>Wednesday, August 8</b>	Registration Technical Program Special Events ( <i>see page 9</i> ) IAAI-01 Exhibition/Robot Competition & Exhibition/Botball RoboCup Symposium & RoboCup Junior Finals		Conference Banquet
<b>Thursday, August 9</b>	Registration Technical Program IAAI-01 Exhibition/Robot Competition & Exhibition RoboCup Quarter-Finals, Semi Finals IJCAII Business Meeting RoboCup Junior Workshop		Research Excellence Lecture RoboCup Farewell Dinner
<b>Friday, August 10</b>	Registration Technical Program RoboCup	Special Events	Technical Program

# Workshop Program (By Invitation Only)



## By Invitation Only

The workshops will take place Saturday August 4 – Monday, August 6. They are arranged in nine tracks centered around broad research topics and problem domains. Participation is limited to those determined by the workshop organizers prior to the conference. Workshops will be held in the Washington State Convention & Trade Center and the Sheraton Seattle Hotel.  
*Workshop Chair: Peter van Beek*



Track	Saturday • August 4
<b>Track "Agent"</b> Agent-Based Systems	
<b>Track "CON"</b> Constraints	<b>CONS-2: Distributed Constraint Reasoning</b> Marius-Calin Silaghi Meeting Room 613, Sixth Level, Washington State Convention & Trade Center
<b>Track "KRR"</b> Knowledge Representation and Reasoning	<b>KRR-2: Abductive Reasoning</b> Antonis Kakas and Francesca Toni Meeting Room 615, Sixth Level, Washington State Convention & Trade Center
<b>Track "ML"</b> Machine Learning and Data Mining	<b>ML-5: Wrappers for Performance Enhancement in KDD</b> William H. Hsu Juniper Room, Second Floor, Sheraton Seattle Hotel
<b>Track "ONTOL"</b> Ontologies	<b>ONTOL-1: Ontology Learning</b> Alexander Maedche, Steffen Staab, Claire Nedellec, and Ed Hovy Meeting Room 616, Sixth Level, Washington State Convention & Trade Center <b>ONTOL-2: Ontologies and Information Sharing</b> Heiner Stuckenschmidt West Ballroom B, Second Floor, Sheraton Seattle Hotel
<b>Track "PRO"</b> Planning and Robotics	<b>PRO-1: Reasoning with Uncertainty in Robotics</b> Dieter Fox and Alessandro Saffiotti Meeting Room 617, Sixth Level, Washington State Convention & Trade Center <b>PRO-3: Planning with Resources</b> Alexander Nareyek Meeting Room 619, Sixth Level, Washington State Convention & Trade Center
<b>Track "TASK"</b> Task-centered	<b>TASK-1: AI in Mobile Systems</b> Rainer Malaka Meeting Room 620, Sixth Level, Washington State Convention & Trade Center
<b>Track "WEB"</b> Web	<b>WEB-2: Intelligent Techniques for Web Personalization</b> Sarabjot Singh Anand and Bamshad Mobasher West Ballroom A, Second Floor, Sheraton Seattle Hotel
<b>Other Topics</b>	<b>OTTO-2: Empirical Methods in AI</b> Holger H. Hoos and Thomas G. Stütze Cedar Room, Second Floor, Sheraton Seattle Hotel

# Workshop Program (continued)



Sunday • August 5	Monday • August 6
<p><b>AGENT-1: Spatial and Temporal Reasoning with “Agents” Focus</b> Frank D. Anger, Hans W. Guesgen and Gérard Ligozat Cedar Room, Second Floor, Sheraton Seattle Hotel</p>	<p><b>AGENT-2: Autonomy, Delegation, &amp; Control: Interacting with Autonomous Agents</b> Henry Hexmoor, Cristiano Castelfranchi, Rino Falcone and Michael Cox West Ballroom B, Second Floor, Sheraton Seattle Hotel</p>
	<p><b>AGENT-3: Economic Agents, Models, and Mechanisms</b> Amy Greenwald and Peter Wurman Meeting Room 611, Sixth Level, Washington State Convention &amp; Trade Center</p>
<p><b>CONS-1: Modeling and Solving Problems with Constraints</b> Christian Bessière Meeting Room 613, Sixth Level, Washington State Convention &amp; Trade Center</p>	
<p><b>KRR-3: Nonmonotonic Reasoning, Action and Change</b> Michael Thielscher and Mary-Anne Williams Juniper Room, Second Floor, Sheraton Seattle Hotel</p>	
	<p><b>KRR-1: Knowledge Management and Organizational Memories</b> Nada Matta and Rose Dieng-Kuntz Aspen Room, Second Floor, Sheraton Seattle Hotel</p>
	<p><b>KRR-4: Inconsistency in Data and Knowledge</b> Leopoldo Bertossi and Jan Chomicki Meeting Room 612, Sixth Level, Washington State Convention &amp; Trade Center</p>
<p><b>ML-1: Adaptive Text Extraction and Mining</b> Nicholas Kushmerick Meeting Room 616, Sixth Level, Washington State Convention &amp; Trade Center</p>	<p><b>ML-2: Learning from Temporal and Spatial Data</b> Miroslav Kubat and Katharina Morik Meeting Room 615, Sixth Level, Washington State Convention &amp; Trade Center</p>
	<p><b>ML-3: Text Learning: Beyond Supervision</b> Andrew McCallum Meeting Room 616, Sixth Level, Washington State Convention &amp; Trade Center</p>
	<p><b>ML-4: Knowledge Discovery from Distributed, Heterogeneous, Dynamic, Autonomous Data Sources</b> Vasant Honavar Meeting Room 617, Sixth Level, Washington State Convention &amp; Trade Center</p>
<p><b>ONTOL-2 continued: Ontologies and Information Sharing</b> Heiner Stuckenschmidt West Ballroom B, Second Floor, Sheraton Seattle Hotel</p>	
	<p><b>ONTOL-3: IEEE Standard Upper Ontology</b> Adam Pease Meeting Room 618, Sixth Level, Washington State Convention &amp; Trade Center</p>
<p><b>PRO-1 continued: Reasoning with Uncertainty in Robotics</b> Dieter Fox and Alessandro Saffiotti Meeting Room 617, Sixth Level, Washington State Convention &amp; Trade Center</p>	<p><b>PRO-2: Planning under Uncertainty and Incomplete Information</b> Allesandro Cimatti, Hector Geffner, Enrico Giunchiglia and Jussi Rintanen Meeting Room 619, Sixth Level, Washington State Convention &amp; Trade Center</p>
<p><b>TASK-3: AI and Manufacturing</b> Daniel M. Gaines Meeting Room 618, Sixth Level, Washington State Convention &amp; Trade Center</p>	<p><b>TASK-2: Configuration</b> Timo Soinen Meeting Room 620, Sixth Level, Washington State Convention &amp; Trade Center</p>
<p><b>TASK-4: Knowledge and Reasoning in Practical Dialogue Systems</b> Kristiina Jokinen, Lars Ahrenberg, Jan Alexandersson and Arne Jönsson Meeting Room 619, Sixth Level, Washington State Convention &amp; Trade Center</p>	
<p><b>WEB-1: E-Business and the Intelligent Web</b> Alun Preece and Dan O’Leary Meeting Room 620, Sixth Level, Washington State Convention &amp; Trade Center</p>	
<p><b>OTTO-3: Effective Interactive AI Resources</b> Russell Greiner Meeting Room 615, Sixth Level, Washington State Convention &amp; Trade Center</p>	<p><b>OTTO-1: Stochastic Search Algorithms</b> Holger H. Hoos and Thomas G. Stützle Douglas Room, Second Floor, Sheraton Seattle Hotel</p>



The IJCAI-01 Tutorial Program features 20 four-hour tutorials, each covering a concentrated technical topic of current or emerging interest. Tutorials will be presented by experienced researchers and practitioners expert in the corresponding subject area. All tutorials will be held on the sixth level of the Washington State Convention & Trade Center.

*Tutorial Chair:* Michael Wellman

## AAAI/SIGART Doctoral Consortium

The sixth AAAI/SIGART Doctoral Consortium will be held Sunday and Monday, August 5-6, from 8:30 AM – 6:00 PM in West Ballroom A of the Sheraton Seattle Hotel. The Doctoral Consortium provides an opportunity for a group of PhD students to discuss and explore their research interests and career objectives in an interdisciplinary workshop together with a panel of established researchers.

AAAI and ACM/SIGART gratefully acknowledge grants from Microsoft Research and the National Science Foundation, Knowledge and Cognitive Systems Program, which partially support student travel to the event.

T U T O R I A L O V E R V I E W			
Sunday • August 5		Monday • August 6	
SA	9 am – 1 pm	SP	2 pm – 6 pm
<b>(SA1)</b> <b>AI Techniques for Knowledge Management</b> Stefan Decker and Steffen Staab Meeting Room 602	<b>(SP1)</b> <b>Agent Communication for Knowledge Based Electronic Markets</b> Benjamin Grosz and Yannic Labrou Meeting Room 607	<b>(MA1)</b> <b>Developing Search Algorithms for Quantum Computers</b> Tad Hogg Meeting Room 606	<b>(MP1)</b> <b>Ant Algorithms and Swarm Intelligence</b> Marco Dorigo Meeting Room 607
<b>(SA2)</b> <b>Economically Founded Multiagent Systems</b> Tuomas Sandholm Meeting Room 606	<b>(SP2)</b> <b>Computer Games</b> John E. Laird and Michael van Lent Meeting Room 602	<b>(MA2)</b> <b>Distributed Knowledge-Based Search</b> Jörg Denzinger Meeting Room 609	<b>(MP2)</b> <b>Integration of Operations Research and AI Constraint-Based Techniques for Combinatorial Optimization</b> Michela Milano Meeting Room 608
<b>(SA3)</b> <b>Neural-Net Architectures for Pattern Recognition</b> Miroslav Kubat Meeting Room 607	<b>(SP3)</b> <b>Philosophical Foundations: Some Key Questions</b> Aaron Sloman and Matthias Scheutz Meeting Room 606	<b>(MA3)</b> <b>Empirical Methods for AI and CS</b> Paul Cohen, Ian Gent, and Toby Walsh Meeting Room 608	<b>(MP3)</b> <b>Knowledge Markup and Resource Semantics</b> Harold Boley, Stefan Decker, and Michael Sintek Meeting Room 602
<b>(SA4)</b> <b>Phase Transitions and Structure in Combinatorial Problems</b> Carla P. Gomes, Tad Hogg, Toby Walsh, and Weixiong Zhang Meeting Room 608	<b>(SP4)</b> <b>Stochastic Search Algorithms</b> Holger H. Hoos and Thomas Stützle Meeting Room 608	<b>(MA4)</b> <b>Integrating Lisp with the World</b> Vladimir A. Kulyukin Meeting Room 607	<b>(MP4)</b> <b>Practical Machine Learning for Software Engineering</b> Tim Menzies Meeting Room 606
<b>(SA5)</b> <b>Question Answering</b> Dan Moldovan and Sanda Harabagiu Meeting Room 609	<b>(SP5)</b> <b>Systems that Adapt to their Users</b> Anthony Jameson Meeting Room 609	<b>(MA5)</b> <b>Machine Learning for Categorization of Text Documents and Web Pages</b> Fabrizio Sebastiani & Alessandro Sperduti Meeting Room 602	<b>(MP5)</b> <b>Tractability in Qualitative Spatial and Temporal Reasoning</b> Hans Guesgen, Gerard Ligozat, and Frank Anger Meeting Room 609



## IJCAI-01 Official Opening Ceremony and Reception

The Opening Ceremony will start at 5:00 PM, Monday, August 6 in Ballroom 6 B/C, followed by a reception at the Museum of Flight from 6:30 - 9:00 PM. The Opening Ceremony will be chaired by Hector Levesque, the Conference Chair of IJCAI-01. The reception will be hosted by The Boeing Company and Microsoft Corporation.

*Shuttle service will be provided to the Museum of Flight on Gray Line of Seattle passenger coaches.* Departures to the Museum of Flight begin at 5:45 PM and continue until 6:30 PM at the Convention Center Tunnel. Departures for downtown Seattle hotels begin at 9:00 PM.

### Museum of Flight

The Museum of Flight captures the story of flight from the dawn of aviation to the Space Age and houses 54 of the world's most historic airplanes — authentic and in mint condition. Dozens of full-size aircraft are suspended from the ceiling of the steel and glass Great Gallery and appear to fly overhead in formation. At ground level visitors can examine up close such intriguing airplanes as the Blackbird spy plane and America's first presidential jet — the original Air Force One. The magnificently restored "Red Barn," the birthplace of The Boeing Company, is an 80 year-old step back in history. Yet, from the hands-on air traffic control tower exhibit, which overlooks Boeing Field, today's prop planes and jumbo jets can be viewed coming and going.

## Technical Program

The IJCAI-01 Technical Program includes talks by 3 IJCAI-01 award winners, 4 invited speakers, 3 special events, and presentations of 197 papers, including 13 distinguished presentations that are further described below. The technical program will be held in the Washington State Convention & Trade Center. The detailed program follows on pages 12-19.

*Program Chair:* Bernhard Nebel

## Distinguished Presentations

The International Joint Conference on Artificial Intelligence 2001 will have a special "distinguished presentation" track. In order to give IJCAI attendees a better picture of what is going on in the various subareas of AI, and to counter the fragmentation of the

field, 13 distinguished recent presentations from international conferences in robotics, vision, knowledge representation, machine learning, planning and other areas have been selected to be presented again at IJCAI. These papers either received "best paper" awards at the respective conferences or were nominated as outstanding work by the PC Chairs/committee members or the IJCAI PC members. To make these research results accessible to a general AI audience, a significantly extended presentation of each of them will be given.

In addition to the presentation at the conference, the authors revised and extended their papers for a book co-edited by Gerhard Lakemeyer and Bernhard Nebel to be published by Morgan Kaufmann. This book is intended as a showcase of the state of the art in AI. In order to make the book as accessible as possible to a wide range of people interested in AI, the authors have been asked to broaden the scope of their presentation so that the paper does not just focus on the particular results, but also introduces the respective research area, its history, milestones, open issues, etc. To ensure the highest standards, each paper will be reviewed by an eminent scholar in the respective field.

## Keynote Address

Tuesday, August 7  
11:40 AM - 12:40 PM  
Ballroom 6 B/C, sixth level

### Bill Gates, Microsoft Corporation



**AI IN THE  
COMPUTING  
EXPERIENCE:  
CHALLENGES AND  
OPPORTUNITIES**

**Bill Gates** is chairman and chief software architect of Microsoft Corporation, the worldwide leader in software, services and Internet technologies for personal and business computing. The company is committed to a long-term view, reflected in its investment of more than \$3 billion on research and development in the current fiscal year. Under Gates' leadership, Microsoft's mission has been to continually advance and improve software technology and to make it easier, more cost-effective and more enjoyable for people to use computers.

## SPECIAL EVENTS

### The HAL 9000 Computer and the Vision of 2001: A Space Odyssey

David G. Stork, *Ricoh California Research Center and Stanford University*

Wednesday, August 8  
11:40 am - 12:40 pm  
Room 608

## SPECIAL SHOWING

### STANLEY KUBRICK'S 2001: A Space Odyssey

Wednesday, August 8  
1:30 pm, Ballroom 6 B/C

### Artificial Intelligence Competitions, Boon or Bane?

*Moderator:*

Steve Chien, Ph.D., *Jet Propulsion Laboratory*

Wednesday, August 8  
11:40 am - 12:40 pm  
Room 609

In recent years, the numerous AI-related competitions in various areas have included deduction (CADE), auctions, timeseries prediction, and planning. One view is that these competitions focus research and encourage quantifiable forward progress. Another view is that they emphasize implementation and sterile problem-solving and stifle truly innovative advances. This panel will discuss the competitions — with a focus on pros and cons experienced by the respective communities. Audience interaction will be encouraged.

### The Semantic Web Elephant: What Do the Blind Men See?

*Moderator:*

Professor James Hendler,  
*University of Maryland*

Friday, August 10  
11:40 am - 12:40 pm  
Ballroom 6 B/C

A number of researchers in a widely diverse set of fields are starting to probe into a new area — the semantic web. Researchers are looking at this from the point of view of knowledge representation, web agents, new web languages, and the creation of high level ontologies on the web. Are these researchers myopically exploring competing visions or is there an emerging consensus as to what a semantic web can really be?



**Philip R. Cohen**

Center for Human-Computer Communication, Oregon Graduate Institute

## Multimodal Interaction: Principles, Practice, Impact, and Challenges

FRIDAY, AUGUST 10, 8:30-9:30AM  
BALLROOM 6 B/C, SIXTH LEVEL

A new generation of multimodal systems is emerging in which the user is able to employ natural communication modalities, including spoken language and pen-based gesture, in addition to the usual graphical user interface technologies. To build such systems, we adopt the principle of using the strengths of one modality to overcome weaknesses in another. We discuss how to design multimodal systems according to this principle, and how to build robust multimodal architectures that employ it at runtime in a unification-based framework. These design and architectural principles will be illustrated through QuickSet — a handheld, collaborative, multimodal system that allows continuous speech and pen-based gesturing as input. QuickSet uses a fault-tolerant distributed agent architecture, runs on PC's, and is scalable from wearable to wall-sized systems. To assess the impact of multimodal interaction, we will describe a study comparing the use of a map-based graphical user interface and multimodal interaction. After discussing reasons why graphical user interfaces fail to satisfy users in high stress environments, we present a new version of the QuickSet technology that attempts to support them through a tangible multimodal user interface. Finally, we will discuss the challenges that await researchers when we try to support multimodal interaction among people.



**Joseph Y. Halpern,**  
Cornell University

## Plausibility Measures: A General Approach for Representing Uncertainty

TUESDAY, AUGUST 7, 8:30-9:30AM  
BALLROOM 6 B/C, SIXTH LEVEL

Halpern discusses a new formalism for reasoning about uncertainty called plausibility. Plausibility is a

generalization of probability: the plausibility of a set is just an element of some arbitrary partial order (instead of being an element of  $[0,1]$ , as in the case of probability). Halpern shows that plausibility can be used to give insight into belief and belief change, default reasoning, decision rules, and (if time permits) when the technology of Bayesian networks can be applied to a representation of uncertainty. Some of this work is joint with Nir Friedman.



**Manuela Veloso**  
Carnegie Mellon University

## The Challenges and Advances in Teams of Autonomous Agents in Adversarial Environments

THURSDAY, AUGUST 9, 8:30-9:30AM  
BALLROOM 6 B/C, SIXTH LEVEL

The research and development of teams of intelligent software agents and robots have fascinated RoboCup researchers for the last five years. We have actively researched on the integration of reasoning, perception, and action in teams of agents that need to face adversarial environments. Robotic soccer offered a pioneering concrete task for this research, both for software agents and robots. RoboCup today involves several new directions, including simulation and robot rescue tasks and humanoid robots. In this talk, Veloso will go in detail over the research challenges underlying teams of distributed software agents, small robots with off-board vision and computer control allowed, and fully autonomous robots and Sony legged robots. We have witnessed RoboCup significantly advancing the scientific state of the art of multiagent and multirobot systems. Veloso will introduce the main contributions, including robot design, multiagent learning, behavior architectures, perception, communication, localization, and opponent behavior modeling and recognition.



**Wolfgang Wahlster,**  
German Research Center for Artificial Intelligence (DFKI), Germany

## Robust Translation of Spontaneous Speech: A Multi-Engine Approach

WEDNESDAY, AUGUST 8, 8:30AM-9:30AM  
BALLROOM 6 B/C, SIXTH LEVEL

Verbmobil is a speaker-independent and bidirectional speech-to-speech translation system for spontaneous dialogs that can be accessed via GSM mobile phones. It handles dialogs in three business-oriented domains, with context-sensitive translation between four languages (English, German, Japanese, and Chinese). We show that in Verbmobil's multi-blackboard and multi-engine architecture the results of concurrent processing threads can be combined in an incremental fashion. We argue that all results of concurrent processing modules must come with a confidence value, so that statistically trained selection modules can choose the most promising result. Packed representations together with formalisms for underspecification capture the uncertainties in each processing phase, so that the uncertainties can be reduced by linguistic, discourse and domain constraints as soon as they become applicable. One of the main lessons learned from the Verbmobil project is that the problem of speech-to-speech translation can only be cracked by the combined muscle of deep and shallow processing approaches.





## IAAI-01 Conference

AUGUST 7 – 9, 2001

MEETING ROOM 602, SIXTH LEVEL,  
WASHINGTON STATE CONVENTION & TRADE CENTER

*IAAI-01 attendance is free to all IJCAI-01 registrants.*

The Thirteenth Annual Conference on Innovative Applications of Artificial Intelligence (IAAI-2001) continues the IAAI tradition of serving as one of the premier venues for current work on artificial intelligence applications. As always, this year's conference features an outstanding selection of papers on deployed applications that use AI techniques, as well as papers on emerging technologies relevant to the design and development of AI applications. The 12 papers presented at the conference were selected from 37 papers submitted by authors from more than 12 countries. Five of these papers describe deployed applications, providing case studies on the design, management, and deployment of real-world systems incorporating AI technologies. The remaining seven papers discuss emerging technologies, work whose goal is the development of technologies relevant to the design and development of systems using AI technology. In addition to the 12 technical papers, IAAI-2001 also provides attendees of both conferences with three invited talks and a panel.

Artificial intelligence continues to be an exciting and profitable area of investigation for people interested in building software systems that operate in realistic environments incorporating a range of uncertainties and complexities. We are eager to see what future innovations may further follow from the work presented at this year's conference.

## Program Committee

**Haym Hirsh**, Chair, Rutgers University

**Steve Chien**, Cochair, Jet Propulsion Laboratory

Bruce Buchanan, University of Pittsburgh

Robert S. Englemore, Stanford University

Usama Fayyad, digiMine

Ronen Feldman, Clearforest Corporation

Randall Hill, USC/Institute for Creative Technologies

Neil Jacobstein, Teknowledge Corporation

Craig Knoblock, USC/Information Sciences Institute

Alain Rappaport, Carnegie Mellon University

John Riedl, University of Minnesota

Charles Rosenberg, Carnegie Mellon University

Ted Senator, DARPA/ISO.

Howard Shrobe, Massachusetts Institute of Technology

Reid Smith, Schlumberger Limited

Shirley Tessler, Aldo Ventures, Inc.

Ramasamy Uthurusamy, General Motors Corporation

Marilyn Walker, AT&T Labs-Research

## IAAI-01 Invited Talks



**Ken Biller**  
Executive Producer,  
"Star Trek: Voyager"

### AI in Sci Fi: Imagining the Sentient Machine

TUESDAY, AUGUST 7, 3:10 – 4:10 PM

MEETING ROOM 602, SIXTH LEVEL

Could a computer ever be a person? Beyond the ability to perform complex tasks, what attributes would it need — personality, emotion, self-awareness? Can these ephemeral qualities be programmed, and if so, at what point does the creation become more human than hardware? Though these are questions that have certainly been asked by ethicists as well as scientists, this discussion will approach these issues from a unique perspective: that of the science fiction writer. Using specific episodes of the television series "Star Trek : Voyager" as a jumping off point, we'll explore the creative process of inventing characters and story-lines that illuminate these themes — a process that may eerily mirror the challenges faced by scientists trying to create artificial intelligence.

Ken Biller has spent the past six years writing, directing, and producing episodes of "Star Trek: Voyager," and most recently served as that series Executive Producer. His other credits include "The X-Files" and the telefilm "The Last Man on Planet Earth." He is a graduate of Brown University.



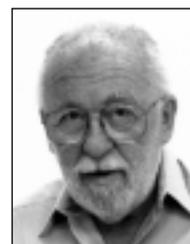
**Rodney A. Brooks**  
Director, MIT Artificial  
Intelligence Laboratory,  
Fujitsu Professor of  
Computer Science and  
Chairman & Chief Technical  
Officer, iRobot Corp

### Mass Market Intelligent Robots

THURSDAY, AUGUST 9, 11:40 AM – 12:40 PM

MEETING ROOM 602, SIXTH LEVEL

At iRobot Corporation we have been pushing intelligent robots into the mass market. The AI component differentiates them from the rest of the field but there are other equally difficult issues: costs, market creation, market penetration, and distribution.



**Harold Cohen**  
Professor Emeritus, UCSD,  
Senior Research Professor,  
Center for Research in  
Computing and the Arts,  
UCSD

### Decoupling Art and Affluence

THURSDAY, AUGUST 9, 2:00 – 3:00 PM

MEETING ROOM 602, SIXTH LEVEL

In theory, a truly creative art-making program would have the potential to challenge the traditional hegemony of money over art. AARON, believed by many - but not by its author - to be such a program, has gone some way towards that goal, but raises unanswered questions about both the nature of creativity and the cultural functions of art.

### IAAI-O 1 Personalization Panel

*Moderator:* John Reidl, Associate Professor, University of Minnesota, and Chief Scientist, Net Perceptions.

TUESDAY, AUGUST 7, 4:30 – 5:30 PM

MEETING ROOM 602, SIXTH LEVEL

Personalization has been revolutionizing the way shoppers find products to buy and information seekers find the information they seek. Advanced personalization systems use AI techniques to create Web services that transparently adapt themselves to fit the interests of their visitors. This panel will be of interest to people who want to understand what personalization is all about, who are interested in the algorithms behind personalization, or who are interested in social questions about the widespread use of personalization. The panel includes experts in personalization algorithms, advanced personalization applications, and the ways in which personalization is changing interaction on the Internet. We expect spirited discussion around why personalization is so important, the best ways to do personalization, and social issues surrounding personalization.



Please see pages 13, 15 and 17 for schedule.

TIME	BALLROOM 6 B/C	ROOM 606	ROOM 607	ROOM 608
8:30 AM – 9:30 AM	<p><i>Invited Talk: Plausibility Measures: A General Approach for Representing Uncertainty</i> Joseph Y. Halpern, Cornell University</p>			
<b>9:30 AM – 10:00 AM COFFEE BREAK</b>				
10:00 AM – 11:30 AM	<p><i>Distinguished Presentation:</i> <b>Learning Theory and Language Modeling</b> David McAllester and Robert E. Schapire  (10:00 – 11:00 AM)</p>	<p><b>COGNITIVE ROBOTICS</b> A Logical Account of Causal and Topological Maps Emilio Remolina and Benjamin Kuipers <b>Online-Execution of ccGolog Plans</b> Henrik Grosskreutz and Gerhard Lakemeyer <b>An On-line Decision-Theoretic Golog Interpreter</b> Mikhail Soutchanski</p>	<p><b>LOGIC PROGRAMMING</b> A-System: Problem Solving through Abduction Antonis Kakas, and Bert Van Nuffelen and Marc Denecker <b>A Comparative Study of Logic Programs with Preference</b> Torsten Schaub and Kewen Wang <b>Reasoning with infinite stable models</b> Piero A. Bonatti</p>	<p><b>NATURAL LANGUAGE GENERATION</b> <b>Title Generation for Machine-Translated Documents</b> Rong Jin and Alexander G. Hauptmann <b>Dealing with Dependencies between Content Planning and Surface Realisation in a Pipeline Generation Architecture</b> Kalina Bontcheva and Yorick Wilks <b>Narrative Prose Generation</b> Charles Callaway and James Lester</p>
11:40 AM – 12:40 PM	<p><i>Keynote Address:</i> <b>AI in the Computing Experience: Challenges and Opportunities</b>  Bill Gates, Microsoft Corporation</p>			
<b>12:40 PM – 2:00 PM LUNCH</b>				
2:00 PM – 3:00 PM	<p><i>Distinguished Presentation:</i> <b>Probabilistic Algorithms for Mobile Robot Mapping</b> Sebastian Thrun, Wolfram Burgard and Dieter Fox</p>	<p><b>REINFORCEMENT LEARNING AND MULTI-AGENT SYSTEMS</b> <b>Reinforcement Learning in Distributed Domains: Beyond Team Games</b> David H. Wolpert, Joseph Sill, and Kagan Tumer <b>Fast Concurrent Reinforcement Learners</b> Bikramjit Banerjee, Sandip Sen, and Jing Peng</p>	<p><b>MARKOV DECISION PROCESSES</b> <b>Adaptive Control of Acyclic Progressive Processing Task Structures</b> Stéphane Cardon, Abdel-Ilhah Mouaddib, Shlomo Zilberstein, and Richard Washington <b>An Improved Grid-Based Approximation Algorithm for POMDPs</b> Rong Zhou and Eric A. Hansen</p>	<p><b>LIFELIKE CHARACTERS</b> <b>A Layered Brain Architecture for Synthetic Characters</b> Damian Isla, Robert Burke, Marc Downie, and Bruce Blumberg <b>Behavior Planning for a Reflexive Agent</b> Berardina De Carolis, Catherine Pelachaud, Isabella Poggi, and Fiorella de Rosis</p>
3:10 PM – 4:10 PM	<p><i>Distinguished Presentation:</i> <b>A First-Order Davis-Putnam-Logeman-Loveland Procedure</b> Peter Baumgartner</p>	<p><b>MULTI-AGENT SYSTEMS APPLICATIONS</b> <b>An Agent Architecture for Multi-Attribute Negotiation</b> Catholijn M. Jonker and Jan Treur <b>A Multiagent System for Helping Urban Traffic Management</b> L.A. Garcia and F. Toledo</p>	<p><b>INDUCTIVE LOGIC PROGRAMMING</b> <b>Of-Implication: Soundness and Refutation Completeness</b> Floriana Esposito, Nicola Fanizzi, Stefano Ferilli, and Giovanni Semeraro <b>The Levelwise Version Space Algorithm and its Application to Molecular Fragment Finding</b> Luc De Raedt and Stefan Kramer</p>	<p><b>VISION I</b> <b>VAMBAM: View and Motion-based Aspect Models for Distributed Omnidirectional Vision Systems</b> Hiroshi Ishiguro and Takuichi Nishimura <b>Resolving Ambiguities to Create a Natural Computer-Based Sketching Environment</b> Christine Alvarado and Randall Davis</p>
<b>4:10 PM – 4:30 PM COFFEE BREAK</b>				
4:30 PM – 5:30 PM	<p><i>Distinguished Presentation:</i> <b>Planning with Generic Types</b> Derek Long and Maria Fox</p>	<p><b>STRUCTURE-BASED CAUSALITY</b> <b>Causes and Explanations: A Structural-Model Approach—Part II: Explanations</b> Joseph Y. Halpern and Judea Pearl  <b>Distinguished Award Paper: Complexity Results for Structure-Based Causality</b> Thomas Eiter and Thomas Lukasiewicz</p>	<p><b>TEMPORAL REASONING</b> <b>A Complete Classification of Complexity in Allen's Algebra in the Presence of a Non-Trivial Basic Relation</b> Andrei Krokhin, Peter Jeavons, and Peter Jonsson <b>Interval-based Reasoning with General TBoxes</b> Carsten Lutz</p>	<p><b>VISION II</b> <b>Perceptual Texture Space Improves Perceptual Consistency of Computational Features</b> Huizhong Long and Wee Kheng Leow <b>Fuzzy Conceptual Graphs for Matching Images of Natural Scenes</b> Philippe Mulhem, Wee Kheng Leow, and Yoong Keok Lee</p>
5:45 PM – 6:45 PM	<p><i>IJCAI Computers and Thought Award Lecture</i> Daphne Koller, Stanford University</p>			

ROOM 609	ROOM 611	ROOM 612	IAAI ROOM 602
<b>9:30 AM – 10:00 AM COFFEE BREAK</b>			
<p><b>COMPLEXITY ANALYSIS</b>  <b>Complexity of Nested Circumscription and Abnormality Theories</b>                      Marco Cadoli, Thomas Eiter, and Georg Gottlob</p> <p><b>A Perspective on Knowledge Compilation</b>                      Adnan Darwiche and Pierre Marquis</p> <p><b>Phase Transitions of PP-Complete Satisfiability Problems</b>                      Delbert Bailey, Victor Dalmau, and Phokion G. Kolaitis</p>	<p><b>NEURAL NETWORKS</b>  <b>Knowledge Extraction from Local Function Networks</b>                      Kenneth McGarry, Stefan Wermter, and John MacIntyre</p> <p><b>Violation-Guided Learning for Constrained Formulations in Neural-Network Time-Series Predictions</b>                      Benjamin W. Wah and Minglun Qian</p> <p><b>Mobile Robot Learning of Delayed Response Tasks through Event Extraction: A Solution to the Road Sign Problem and Beyond</b>                      Fredrik Linäker and Henrik Jacobsson</p>	<p><b>GAMES</b>  <b>Iterative Widening</b>                      Tristan Cazenave</p> <p><b>Temporal Difference Learning Applied to a High-Performance Game-Playing Program</b>                      Jonathan Schaeffer, Markian Hlynka, and Vili Jussila</p> <p><b>Satisficing and Learning Cooperation in the Prisoner's Dilemma</b>                      Jeff Stimpson, Michael A. Goodrich, and Lawrence C. Walters</p>	<p><b>Constraint-Based Modeling of Interoperability Problems using an Object-Oriented Approach (Emerging Technology)</b>                      Mohammed H. Sqalli and Eugene C. Freuder</p> <p><b>Electric Elves: Applying Agent Technology to Support Human Organizations (Emerging Technology)</b>                      H. Chalupsky, Y. Gil, C. A. Knoblock, K. Lerman, J. Oh, D. V. Pynadath, T. A. Russ, and M. Tambe</p> <p><b>Interchanging Agents and Humans in Military Simulation (Deployed Application)</b>                      C. Heinze, S. Goss, T. Josefsson, K. Bennett, S. Waugh, I. Lloyd, G. Murray, and J. Oldfield</p>
<b>12:40 PM – 2:00 PM LUNCH</b>			
<p><b>SEARCH</b>  <b>A backbone-search heuristic for efficient solving of hard 3-SAT formulae</b>                      Olivier Dubois and Gilles Dequen</p> <p><b>Backbones in Optimization and Approximation</b>                      John Slaney and Toby Walsh</p>	<p><b>NEURAL NETWORKS</b>  <b>NORN Finance Forecaster – A Neural Oscillatory-based Recurrent Network for Finance Prediction</b>                      Raymond Lee and James Liu</p> <p><b>A General Updating Rule for Discrete Hopfield-Type Neural Network with Delay</b>                      Shenshan Qiu, Eric C.C. Tsang, Daniel S. Yeung, and Xizhao Wang</p>	<p><b>WEB APPLICATIONS</b>  <b>A Web-based Intelligent System for the Daya Bay Contingency Plan in Hong Kong</b>                      James Liu, Raymond Lee, and Jane You</p> <p><b>ExpertClerk: Navigating Shoppers' Buying Process with the Combination of Asking and Proposing</b>                      Hideo Shimazu</p>	<p><b>An Open Architecture for Multi-Domain Information Extraction (Emerging Technology)</b>                      Thierry Poibeau</p> <p><b>Scaling Up Context-Sensitive Text Correction (Emerging Technology)</b>                      Andrew J. Carlson, Jeffrey Rosen and Dan Roth</p>
<p><b>SEARCH</b>  <b>Cooperative Search and Nogood Recording</b>                      Cyril Terrioux</p> <p><b>Search on High Degree Graphs</b>                      Toby Walsh</p>	<p><b>PROBABILISTIC REASONING</b>  <b>IBAL: A Probabilistic Rational Programming Language</b>                      Avi Pfeffer</p> <p><b>Approximate inference for first-order probabilistic languages</b>                      Hanna Pasula and Stuart Russell</p>	<p><b>WEB SEARCH</b>  <b>Preference-Based Configuration of Web Page Content</b>                      Carmel Domshlak, Ronen I. Brafman, and Solomon Eyal Shimony</p> <p><b>Keyword Spices: A New Method for Building Domain-Specific Web Search Engines</b>                      Satoshi Oyama, Takashi Kokubo, Toru Ishida, Teruhiro Yamada and Yasuhiko Kitamura</p>	<p><i>Invited Talk:</i>  <b>AI in Sci Fi: Imagining the Sentient Machine</b>                      Kenneth Biller</p>
<b>4:10 PM – 4:30 PM COFFEE BREAK</b>			
<p><b>SATISFIABILITY</b>  <b>Backjumping for Quantified Boolean Logic Satisfiability</b>                      Enrico Giunchiglia, Massimo Narizzano, and Armando Tacchella</p> <p><b>Solving Non-Boolean Satisfiability Problems with Stochastic Local Search</b>                      Alan M. Frisch and Timothy J Peuniez</p>	<p><b>STATISTICAL PROCESSING OF NATURAL LANGUAGE GRAMMARS</b>  <b>Refining the Structure of a Stochastic Context-Free Grammar</b>                      Joseph Bockhorst and Mark Craven</p> <p><b>Automatically Extracting and Comparing Lexicalized Grammars for Different Languages</b>                      Fei Xia, Chung-hye Han, Martha Palmer, and Aravind Joshi</p>	<p><b>MACHINE LEARNING</b>  <b>Learning on the Phase Transition Edge</b>                      Alessandro Serra, Attilio Giordana, and Lorenza Saitta</p> <p><b>A Simple Additive Re-weighting Strategy for Improving Margins</b>                      Fabio Aiolli and Alessandro Sperduti</p>	<p><i>Invited Panel:</i>  <b>Personalization Technologies</b>                      Moderator: John Riedl</p>

TIME	BALLROOM 6 B/C	ROOM 606	ROOM 607	ROOM 608
8:30 AM - 9:30 AM	<i>Invited Talk: Robust Translation of Spontaneous Speech: A Multi-Engine Approach</i> Wolfgang Wahlster, German Research Center for Artificial Intelligence (DFKI)			
<b>9:30 AM - 10:00 AM COFFEE BREAK</b>				
10:00 AM - 11:30 AM	<b>Distinguished Presentation:</b>  <b>D-Learning:</b> <i>What we can learn from dogs about building characters that can learn</i> Song-Yee Yoon, Bruce M. Blumberg, and Gerald E. Schneider  (10:00 - 11:00 AM)	<b>SPATIAL REASONING</b> Ambiguity-Directed Sampling for Qualitative Analysis of Sparse Data from Spatially-Distributed Physical Systems Chris Bailey-Kellogg and Naren Ramakrishnan  A Spatial Odyssey of the Interval Algebra: 1. Directed Intervals Jochen Renz  From Images to Bodies: Modelling and Exploiting Spatial Occlusion and Motion Parallax David Randell, Mark Witkowski, and Murray Shanahan	<b>BELIEF REVISION</b> On the Semantics of Knowledge Update Chitta Baral and Yan Zhang  Resource-bounded inference from inconsistent belief bases Pierre Marquis and Nadège Porquet  Weakening Conflicting Information for Iterated Revision and Knowledge Integration Salem Benferhat, Souhila Kaci, Daniel Le Berre, and Mary-Anne Williams	<b>NATURAL LANGUAGE - LEARNING FOR INFORMATION EXTRACTION</b> Adaptive Information Extraction from Text by Rule Induction and Generalisation Fabio Ciravegna  Relational Learning via Propositional Algorithms: An Information Extraction Case Study Dan Roth and Wen-tau Yih  Deriving a multi-domain information extraction system from a rough ontology Thierry Poibeau
11:40 AM - 12:40 PM	<b>Special Event: The HAL 9000 Computer and the Vision of 2001: A Space Odyssey</b> David G. Stork, Ricoh California Research Center and Stanford University			

## 1:30 PM 2001: A SPACE ODYSSEY

### IJCAI-01 Conference Banquet

Wednesday, August 8, 6:15-10:30 pm  
 Tillicum Village  
 Cost: \$75 per person

The journey to Tillicum Village begins at Piers 55 on Seattle's Grand Central Waterfront, where attendees will board a charter vessel to Blake Island at 6:15 pm. The cruise on Puget Sound out to the island arrives at about 7:15 pm. Visitors will be greeted by a Native American drummer, and then enter the

great cedar longhouse for an award-winning salmon feast. Tillicum Village salmon is cooked over an open fire on cedar stakes in the ancient Northwest Coast Native American fashion.

Following dinner, banquet attendees will enjoy "Dance on the Wind," a magnificent stage presentation that highlights some of the traditional dances, myths, and legends of the Northwest Coast in a magical and unforgettable setting. After "Dance on the Wind", the natural riches of Blake Island State Park can be enjoyed on its beautiful beaches and trails.



The Tillicum Village facility, which is a traditionally styled Northwest Coast Native American cedar longhouse, has many artifacts on display. The Gift Gallery in the longhouse has items that represent several different tribes, as well as many unique items crafted by Tillicum Village staff members.

At 9:30 pm attendees will board the chartered vessel at Blake Island marina for the return trip to Seattle, arriving back at pier 55 about 10:30 pm. The return trip offers magnificent views of the Seattle skyline from the beautiful waters of Elliott Bay.



6:15 PM - 10:30 PM IJCAI-01 Conference Banquet  
 Tillicum Village,  
 Blake Island, Puget Sound

**ROOM 609**

**ROOM 611**

**ROOM 612**

**IAAI ROOM 602**

**9:30 AM – 10:00 AM COFFEE BREAK**

**MULTI-AGENT SYSTEMS**

**Reflective Negotiating Agents for Real-Time Multisensor Target Tracking**  
Leen-Kiat Soh and Costas Tsatsoulis

**Stable Strategies for Sharing Information among Agents**  
Rina Azoulay-Schwartz and Sarit Kraus

**CAST: Collaborative Agents for Simulating Teamwork**  
John Yen, Jianwen Yin, Thomas R. Ioerger, Michael S. Miller, Dianxiang Xu, and Richards A. Volz

*Invited Panel:*  
**Artificial Intelligence Competitions, Boon or Bane**  
Moderator: Steve Chien, Jet Propulsion Laboratory

**CASE-BASED REASONING**

**Bridging the Lesson Distribution Gap**  
David W. Aha, Rosina Weber, Héctor Muñoz-Ávila, Leonard A. Breslow, and Kalyan Moy Gupta

**Minimizing Dialog Length in Interactive Case-Based Reasoning**  
David McSherry

**SIN: Integrating Case-based Reasoning with Task Decomposition**  
Héctor Muñoz-Ávila, David W. Aha, Dana S. Nau, Rosina Weber, Len Breslow and Fusun Yamal

**COMPLEXITY OF PLANNING**

**Complexity of Probabilistic Planning under Average Rewards**  
Jussi Rintanen

**Computational Complexity of Planning with Temporal Goals**  
Chitta Baral, Vladik Kreinovich, and Raúl Trejo

**A Simplifier for Propositional Formulas with Many Binary Clauses**  
Ronon Brafman

**TALPS: The T-AVB Automated Load Planning System (Deployed Application)**  
Paul S. Cerkez

**Token Allocation Strategy for Free-Flight Conflict Solving (Emerging Technology)**  
Géraud Granger, Nicolas Durand and Jean-Marc Alliot

**The RadarSAT-MAMM Automated Mission Planner (Deployed Application)**  
Benjamin D. Smith, Barbara E. Engelhardt and Darren H. Mutz



**I J C A I C O N F E R E N C E B A N Q U E T**

TIME	BALLROOM 6 B/C	ROOM 606	ROOM 607	ROOM 608
<b>8:30 AM – 9:30 AM</b>	<p><i>Invited Talk: The Challenges and Advances in Teams of Autonomous Agents in Adversarial Environments</i> Manuela Veloso, Carnegie Mellon University</p>			
<b>9:30 AM – 10:00 AM COFFEE BREAK</b>				
<b>10:00 AM – 11:30 AM</b>	<p><i>Distinguished Presentation:</i></p> <p><b>User-Oriented Evaluation Methods for IR: Case Study Based on Conceptual Models for Query Expansion</b> Jaana Kekäläinen and Kalervo Järvelin  (10:00 – 11:00 AM)</p>	<p><b>ROBOTICS</b></p> <p>Combining Probabilities, Failures and Safety in Robot Control Alberto Finzi and Fiora Pirri</p> <p>Heterogeneity in the Coevolved Behaviors of Mobile Robots: The Emergence of Specialists Mitchell A. Potter, Lisa A. Meeden, and Alan C. Schultz</p> <p>Agent-Based Control for Object Manipulation with Modular Self-reconfigurable Robots Jeremy Kubica, Arancha Casal, and Tad Hogg</p>	<p><b>ACTION AND CAUSALITY</b></p> <p>Updates, actions, and planning Andreas Herzig, Jerome Lang, Pierre Marquis, and Thomas Polacsek</p> <p>Causality and Minimal Change Demystified Maurice Pagnucco and Pavlos Peppas</p> <p>EPDL: A Logic for Causal Reasoning Dongmo Zhang and Norman Foo</p>	<p><b>PLANNING WITH INCOMPLETE INFORMATION</b></p> <p>Heuristic Search + Symbolic Model Checking = Efficient Conformant Planning Piergiorgio Bertoli, Alessandro Cimatti, and Marco Roveri</p> <p>Planning in Nondeterministic Domains under Partial Observability via Symbolic Model Checking Piergiorgio Bertoli, Alessandro Cimatti, Marco Roveri, and Paolo Traverso</p> <p>Planning as Model Checking for Extended Goals in Non-deterministic Domains Marco Pistore and Paolo Traverso</p>
<b>11:40 AM – 12:40 PM</b>	<p><i>Distinguished Presentation:</i></p> <p><b>Data Mining for Manufacturing Control: An Application in Optimizing IC Test</b> Tony Fountain, Thomas Dietterich, and Bill Sudyka</p>	<p><b>MULTI-AGENT SYSTEMS</b></p> <p>Multiagent Coordination by Probabilistic Cellular Automata T. D. Barfoot and G. M. T. D'Eleuterio</p> <p>Identifying the Scope of Modeling for Time-Critical Multiagent Decision-Making Sanguk Noh and Piotr J. Gmytrasiewicz</p>	<p><b>ACTION</b></p> <p>A Circumscriptive Formalization of the Qualification Problem G. Neelakantan Kartha</p> <p>Computing Strongest Necessary and Weakest Sufficient Conditions of First-Order Formulas Patrick Doherty, Witold Lukaszewicz, and Andrzej Szalas</p>	<p><b>COOPERATIVE BEHAVIOR</b></p> <p>Rational Competitive Analysis Moshe Tennenholtz</p> <p>Learning Procedural Knowledge to Better Coordinate Andrew Garland and Rick Alterman</p>
<b>12:40 PM – 2:00 PM LUNCH</b>				
<b>2:00 PM – 3:00 PM</b>	<p><i>Distinguished Presentation:</i></p> <p><b>Bayesian Inference of Visual Motion Boundaries</b> Michael J. Black and David J. Fleet</p>	<p><b>PROBABILISTIC REASONING</b></p> <p>Context-specific Sign-propagation in Qualitative Probabilistic Networks Silja Renooij, Simon Parsons, and Linda C. van der Gaag</p> <p>Max-norm Projections for Factored MDPs Carlos Guestrin, Daphne Koller, and Ronald Parr</p>	<p><b>DESCRIPTION LOGICS</b></p> <p>Identification Constraints and Functional Dependencies in Description Logics Diego Calvanese, Giuseppe De Giacomo, and Maurizio Lenzerini</p> <p>High Performance Reasoning with Very Large Knowledge Bases: A Practical Case Study Volker Haarslev and Ralf Moeller</p>	<p><b>PERCEPTION</b></p> <p>Discriminating Animate from Inanimate Visual Stimuli Brian Scassellati</p> <p>An Hybrid Approach to Solve the Global Localization Problem For Indoor Mobile Robots Considering Sensor's Perceptual Limitations Leonardo Romero, Eduardo Morales, and Enrique Sucar</p>
<b>3:10 PM – 4:10 PM</b>	<p><i>Distinguished Presentation:</i></p> <p><b>Understanding Belief Propagation and its Generalizations</b> Jonathan Yedidia, William Freeman, and Yair Weiss</p>	<p><b>QUALITATIVE REASONING FOR BIOLOGICAL SYSTEMS</b></p> <p>Qualitative Simulation of Genetic Regulatory Networks: Method and Application Hidde de Jong, Michel Page, Celine Hernandez, and Johannes Geiselmann</p> <p>Discrimination of Semi-Quantitative Models by Experiment Selection: Method and Application in Population Biology Ivayla Vatcheva, Olivier Bernard, Hidde de Jong, Jan-Luc Gouze, and Nicolaas J.I. Mars</p>	<p><b>SEARCH</b></p> <p>Incomplete Tree Search using Adaptive Probing Wheeler Ruml</p> <p>Heuristic Search in Infinite State Spaces Guided by Lyapunov Analysis Theodore J. Perkins and Andrew G. Barto</p>	<p><b>PERCEPTION</b></p> <p>Multimodal Integration - A Biological View Michael Coen</p> <p>Real-Time Auditory and Visual Multiple-Object Tracking for Robots Kazuhiro Nakadai, Ken-ichi Hidai, Hiroshi Mizoguchi, Hiroshi G. Okuno, and Hiroaki Kitano</p>
<b>4:10 PM – 4:30 PM COFFEE BREAK</b>				
<b>4:30 PM – 5:30 PM</b>	<p><i>Distinguished Presentation:</i></p> <p><b>New Tractable Classes From Old</b> David Cohen, Peter Jeavons, and Richard Gault</p>	<p><b>REINFORCEMENT LEARNING/ROBOTICS</b></p> <p>Multi-Agent Systems by Incremental Gradient Reinforcement Learning Alain Dutech, Olivier Buffet, and François Charpillet</p> <p>Robot Weightlifting By Direct Policy Search Michael T. Rosenstein and Andrew G. Barto</p>	<p><b>DOMAIN ANALYSIS FOR PLANNING</b></p> <p>One action is enough to plan Emmanuel Guéré and Rachid Alami</p> <p>Hybrid STAN: Identifying and Managing Combinatorial Optimisation Sub-problems in Planning Maria Fox and Derek Long</p>	<p><b>MACHINE LEARNING AND DATA MINING</b></p> <p>Faster Association Rules for Multiple Relations Siegfried Nijssen and Joost Kok</p> <p>A Simple Feature Selection Method for Text Classification Pascal Soucy and Guy W. Mineau</p>
<b>5:45 PM – 6:45 PM</b>	<p><i>IJCAI Research Excellence Lecture</i> Donald Michie, University of Edinburgh</p>			

ROOM 609	ROOM 611	ROOM 612	IAAI ROOM 602
<b>9:30 AM – 10:00 AM COFFEE BREAK</b>			
<p><b>CONSTRAINT SATISFACTION PROBLEMS</b></p> <p><b>Backtracking Through Biconnected Components of a Constraint Graph</b> Jean-François Baget and Yannic S. Tognetti</p> <p><b>A Constraint Satisfaction Approach to Parametric Differential Equations</b> M. Janssen, P. Van Hentenryck, and Y. Deville</p> <p><b>Improved bounds on the complexity of kb-consistency</b> Lucas Bordeaux, Eric Monfroy, and Frédéric Benhamou</p>	<p><b>NEURAL NETWORKS AND GENETIC ALGORITHMS</b></p> <p><b>Genetic Algorithm based Selective Neural Network Ensemble</b> Zhi-Hua Zhou, Jian-Xin Wu, Yuan Jiang, and Shi-Fu Chen</p> <p><b>Neural Logic Network Learning using Genetic Programming</b> Chew Lim Tan and Henry Wai Kit Chia</p> <p><b>Sensitivity Analysis of Multilayer Perceptron</b> D.S. Yeung, Xuequan Sun and Xiaoqin Zeng</p>	<p><b>DESCRIPTION LOGICS AND CONCEPTUAL GRAPHS</b></p> <p><b>Decision Procedures for Expressive Description Logics with Intersection, Composition, Converse of Roles and Role Identity</b> Fabio Massacci</p> <p><b>Ontology Reasoning in the SHOQ(D) Description Logic</b> Ian Horrocks and Ulrike Sattler</p> <p><b>The SG Family: Extensions of Simple Conceptual Graphs</b> Jean-François Baget and Marie-Laure Mugnier</p>	<p><b>Collaborative Kodama Agents with Automated Learning and Adapting for Personalized Web Searching (Emerging Technology)</b> Tarek Helmy, Satoshi Amamiya and Makoto Amamiya</p> <p><b>Natural Language Sales Assistant – A Web-Based Dialog System for Online Sales (Deployed Application)</b> Joyce Chai, Veronika Horvath, Nicolas Nicolov, Margo Stys-Budzikowska, Nanda Kambhatla, and Wlodek Zadrozny</p>
<p><b>CONSTRAINT SATISFACTION PROBLEMS</b></p> <p><b>Refining the Basic Constraint Propagation Algorithm</b> Christian Bessière and Jean-Charles Régin</p> <p><b>Making AC-3 an Optimal Algorithm</b> Yuanlin Zhang and Roland H.C. Yap</p>	<p><b>PROBABILISTIC LEARNING</b></p> <p><b>Active Learning for Structure in Bayesian Networks</b> Simon Tong and Daphne Koller</p> <p><b>Probabilistic Classification and Clustering in Relational Data</b> Ben Taskar, Eran Segal, and Daphne Koller</p>	<p><b>COGNITIVE MODELING — DIAGRAMATIC REASONING</b></p> <p><b>Formalizing Artistic Techniques and Scientific Visualization for Painted Renditions of Complex Information Spaces</b> Christopher G. Healey</p> <p><b>Visual Analogy in Problem Solving</b> Jim R. Davies and Ashok K. Goel</p>	<p><i>Invited Talk:</i></p> <p><b>Mass Market Intelligent Robots</b> Rodney A. Brooks, Director, MIT Artificial Intelligence Laboratory, Fujitsu Professor of Computer Science and Chairman &amp; Chief Technical Officer, iRobot Corporation</p>
<b>12:40 PM – 2:00 PM LUNCH</b>			
<p><b>CONSTRAINT SATISFACTION PROBLEMS</b></p> <p><b>Temporal Constraint Reasoning With Preferences</b> Lina Khatib, Paul Morris, Robert Morris, and Francesca Rossi</p> <p><b>A Hybrid Approach for the 0-1 Multidimensionnal Knapsack problem</b> Michel Vasquez and Jin-Kao Hao</p>	<p><b>CASE-BASED REASONING</b></p> <p><b>A Distributed Case-Based Query Rewriting</b> Maurizio Panti, Luca Spalazzi, and Loris Penserini</p> <p><b>Using Case-Base Data to Learn Adaptation Knowledge for Design</b> Jacek Jarmulak, Susan Craw, and Ray Rowe</p>	<p><b>MULTI-AGENT SYSTEMS</b></p> <p><b>Bundle Design in Robust Combinatorial Auction Protocol against False-name Bids</b> Makoto Yokoo, Yuko Sakurai, and Shigeo Matsubara</p> <p><b>CABOB: A Fast Optimal Algorithm for Combinatorial Auctions</b> Tuomas Sandholm, Subhash Suri, Andrew Gilpin, and David Levine</p>	<p><i>Invited Talk:</i></p> <p><b>Decoupling Art and Affluence</b> Harold Cohen, Professor Emeritus, UCSD, Senior Research Professor, Center for Research in Computing and the Arts, UCSD</p>
<p><b>CONSTRAINT SATISFACTION PROBLEMS</b></p> <p><b>The Exponentiated Subgradient Algorithm for Heuristic Boolean Programming</b> Dale Schuurmans, Finnegan Southey, and Robert C. Holte</p> <p><b>A New Method For The Three Dimensional Container Packing problem</b> Andrew Lim and Wang Ying</p>	<p><b>MACHINE LEARNING AND DATA MINING</b></p> <p><b>Adaptive Web Navigation for Wireless Devices</b> Corin R. Anderson, Pedro Domingos, and Daniel S. Weld</p> <p><b>Using Text Classifiers for Numerical Classification</b> Sofus Attila Macskassy, Haym Hirsh, Arunava Banerjee, and Aynur A. Dayanik</p>	<p><b>MULTI-AGENT SYSTEMS</b></p> <p><b>A software architecture for dynamically generated adaptive Web stores</b> Liliana Ardissono, Anna Goy, Giovanna Petrone, and Marino Segnan</p> <p><b>Modularity and Design in Reactive Intelligence</b> Joanna J. Bryson and Lynn Andrea Stein</p>	<p><b>Image-Feature Extraction for Protein Crystallization: Integrating Image Analysis and Case-Based Reasoning (Emerging Technology)</b> I. Jurisica, P. Rogers, J. Glasgow, S. Fortier, J. Luft, M. Bianca, R. Collins, and G. DeTitta</p> <p><b>CARMA: A Case-Based Range Management Advisor (Deployed Application)</b> Karl Branting, John Hastings and Jeffrey Lockwood</p>
<b>4:10 PM – 4:30 PM COFFEE BREAK</b>			
<p><b>SATISFIABILITY</b></p> <p><b>Balance and Filtering in Structured Satisfiable Problems</b> Henry Kautz, Yongshao Ruan, Dimitri Achlioptas, Carla Gomes, Bart Selman, and Mark Stickel</p> <p><b>Efficient Consequence Finding</b> Laurent Simon and Alvaro del Val</p>	<p><b>PROBABILISTIC REASONING</b></p> <p><b>Knowledge Processing under Information Fidelity</b> Wilhelm Rödder</p> <p><b>Constraints as Data: A New Perspective on Inferring Probabilities</b> Manfred Jaeger</p>	<p><b>MULTI-AGENT SYSTEMS</b></p> <p><b>Achieving Budget-Balance with Vickrey-Based Payment Schemes in Exchanges</b> David C. Parkes, Jayant Kalagnanam, and Marta Eso</p> <p><b>Agent-Human Interactions in the Continuous Double Auction</b> Rajarshi Das, James E. Hanson, Jeffrey O. Kephart, and Gerald Tesaro</p>	

TIME	BALLROOM 6 B/C	ROOM 606	ROOM 607	ROOM 608
8:30 AM – 9:30 AM	<p><i>Invited Talk: Multimodal Interaction: Principles, Practice, Impact, and Challenges</i> Philip R. Cohen, Center for Human-Computer Communication, Oregon Graduate Institute</p>			
<b>9:30 AM – 10:00 AM COFFEE BREAK</b>				
10:00 AM – 11:30 AM	<p><i>Distinguished Presentation:</i>  <i>Qualitative spatio-temporal representation and reasoning: a computational perspective</i> Frank Wolter and Michal Zakharyashev  (10:00 – 11:00 AM)</p>	<p><b>VISION</b> Learning Iterative Image Reconstruction Sven Behnke Efficient Interpretation Policies Ramana Isukapalli and Russell Greiner A Hierarchy of Boundary-based Shape Descriptors Richard Meathrel and Antony Galton</p>	<p><b>THEOREM PROVING</b> Splitting Without backtracking Alexandre Riazanov and Andrei Voronkov UNSEARCHMO: Eliminating Redundant Search Space on Backtracking for Forward Chaining Theorem Proving Lifeng He Theorem Proving with Structured Theories Sheila McIlraith and Eyal Amir</p>	<p><b>NATURAL LANGUAGE EXPLANATION AND ARGUMENTATION</b> Dialog-driven Adaptation of Explanations of Proofs Armin Fiedler Generating Tailored Examples to Support Learning via Self-Explanation Cristina Conati and Giuseppe Carenini An Empirical Study of the Influence of User Tailoring on Evaluative Argument Effectiveness Giuseppe Carenini and Johanna D. Moore</p>
11:40 AM – 12:40 PM	<p><i>Invited Panel:</i>  <i>The Semantic Web Elephant: What Do the Blind Men See?</i> Moderator: James Hendler, University of Maryland</p>	<p><b>LOGIC PROGRAMMING</b> A Framework for Declarative Update Specifications in Logic Programs Thomas Eiter, Michael Fink, Giuliana Sabbatini, and Hans Tompits Abduction in Logic Programming: A New Definition and an Abductive Procedure Based on Rewriting Fangzhen Lin and Jia-Huai You</p>	<p><b>UNCERTAINTY</b> Weakening Commensurability Hypothesis in Possibilistic Qualitative Decision Theory Adriana Zapico A Fuzzy Modal Logic for Belief Functions Lluís Godó, Petr Hájek, and Francesc Esteva</p>	<p><b>MULTI-AGENT SYSTEMS</b> The Fair Imposition Yoav Shoham and Moshe Tennenholtz Robust Multi-unit Auction Protocol against False-name Bids Makoto Yokoo, Yuko Sakurai, and Shigeo Matsuura</p>
<b>12:40 PM – 2:00 PM LUNCH</b>				
2:00 PM – 3:00 PM	<p><i>Distinguished Presentation:</i>  <i>Virtual Humans for Team Training in Virtual Reality</i> Jeff Rickel and W. Lewis Johnson</p>	<p><b>DIAGNOSIS</b> Distributed Monitoring of Hybrid Systems: A Model-Directed Approach Feng Zhao, Xenofon Koutsoukos, Horst Haussecker, James Reich, Patrick Cheung and Claudia Picardi Causal interaction: from a high-level representation to an operational event based representation Irène Grosclaude, Marie-Odile Cordier, and René Quiniou</p>	<p><b>ANSWER SET PROGRAMMING</b> Experimenting with Heuristics for Answer Set Programming Wolfgang Faber, Nicola Leone, and Gerald Pfeifer Graph Theoretical Characterization and Computation of Answer Sets Thomas Linke</p>	<p><b>COGNITIVE MODELING — CATEGORISATION</b> Reasoning about Categories in Conceptual Spaces Peter Gärdenfors and Mary-Anne Williams Simulating the Formation of Color Categories Tony Belpaeme</p>
3:10 PM – 4:10 PM	<p><i>Distinguished Presentation:</i>  <i>Identifying Semantic Roles in Text</i> Daniel Gildea and Daniel Jurafsky</p>	<p><b>FACTORED MARKOV DECISION PROCESSES</b> Solving Factored MDPs via Non-Homogeneous Partitioning Kee-Eung Kim and Thomas Dean Symbolic Dynamic Programming for First-Order MDPs Craig Boutilier, Ray Reiter, and Bob Price</p>	<p><b>DIAGNOSIS</b> Temporal Decision Trees or the lazy ECU vindicated Luca Console, Claudia Picardi, and Daniele Theseider Dupré Model-Based Diagnosability and Sensor Placement Application to a Frame 6 Gas Turbine Subsystem Louise Travé-Massuyès, Teresa Escobet, and Robert Milne</p>	<p><b>COGNITIVE MODELING — PERCEPTUAL GROUNDING</b> Grounded Models as a Basis for Intuitive Reasoning Josefina Sierra-Santibáñez Perceptual Anchoring of Symbols for Action Silvia Coradeschi and Alessandro Saffiotti</p>



ROOM 609	ROOM 611	ROOM 612	ROOM 613
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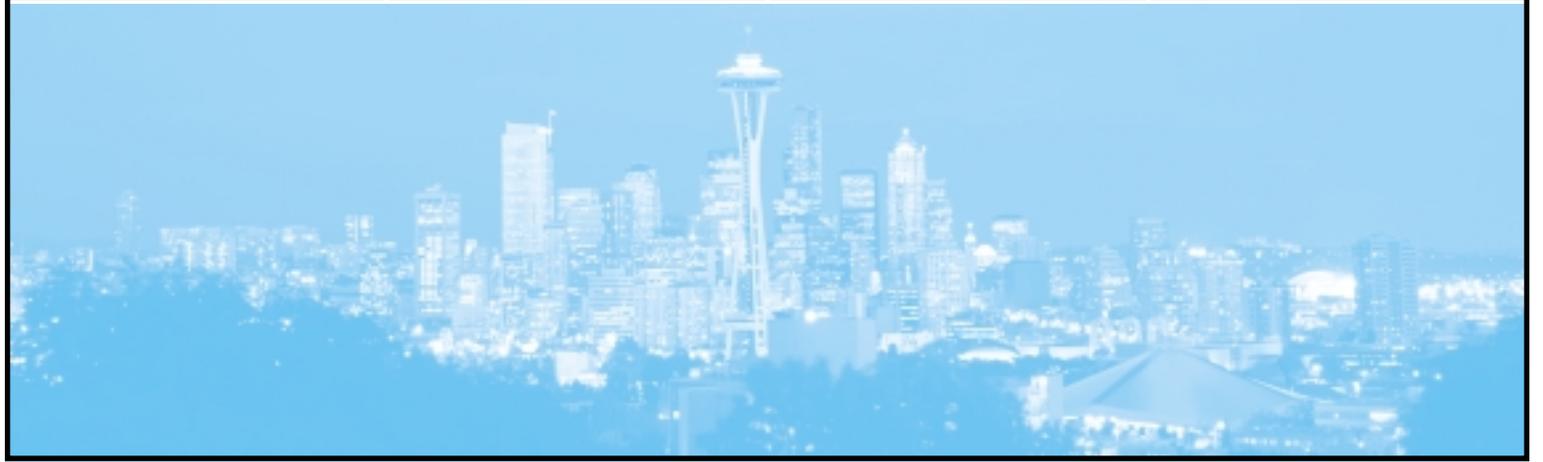
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**9:30 AM – 10:00 AM COFFEE BREAK**

<p><b>PLANNING WITH FORWARD SEARCH</b></p> <p><b>Planning with Resources and Concurrency: A Forward Chaining Approach</b> Fahiem Bacchus and Michael Ady</p> <p><b>Total-Order Planning with Partially Ordered Subtasks</b> Dana Nau, Héctor Muñoz-Avila, Yue Cao, Amnon Lotem, and Steven Mitchell</p> <p><b>Conditional progressive planning under uncertainty</b> Lars Karlsson</p>	<p><b>DESCRIPTION LOGICS AND FORMAL CONCEPT ANALYSIS</b></p> <p><b>Matching under Side Conditions in Description Logics</b> Franz Baader, Sebastian Brandt, and Ralf Küsters</p> <p><b>Computing Least Common Subsumers in ALEN</b> Ralf Küsters and Ralf Molitor</p> <p><b>FCA-Merge: Bottom-Up Merging of Ontologies</b> Gerd Stumme and Alexander Maedche</p>	<p><b>REINFORCEMENT LEARNING</b></p> <p><b>R-MAX — A General Polynomial Time Algorithm for Near-Optimal Reinforcement Learning</b> Ronan Braffman and Moshe Tennenholtz</p> <p><b>From Q(<math>\lambda</math>) to Average Q-learning: Efficient Implementation of an Asymptotic Approximation</b> Frédéric Garcia and Florent Serre</p> <p><b>Exploiting Multiple Secondary Reinforcers in Policy Gradient Reinforcement Learning</b> Greg Grudic and Lyle Ungar</p>	<p><b>INFORMATION EXTRACTION AND RETRIEVAL</b></p> <p><b>Representing Sentence Structure in Hidden Markov Models for Information Extraction</b> Soumya Ray and Mark Craven</p> <p><b>Sequentially Finding the N-Best List in Hidden Markov Models</b> Dennis Nilsson and Jacob Goldberger</p> <p><b>NLP-driven IR: Evaluating Performances over a Text Classification task</b> Roberto Basili, Alessandro Moschitti and Maria Teresa Paziienza</p>
<p><b>HIERARCHICAL DIAGNOSIS AND MONITORING</b></p> <p><b>Hierarchical Diagnosis Guided by Observations</b> Luca Chittaro and Roberto Ranon</p> <p><b>Mode Estimation of Model-based Programs: Monitoring Systems with Complex Behavior</b> Brian C. Williams, Seung Chung, and Vineet Gupta</p>	<p><b>USER INTERFACES</b></p> <p><b>Usability Guidelines for Interactive Search in Direct Manipulation Systems</b> Robert St. Amant and Christopher G. Healey</p> <p><b>Leveraging Data About Users in General in the Learning of Individual User Models</b> Anthony Jameson and Frank Wittig</p>	<p><b>MACHINE LEARNING AND DATA MINING</b></p> <p><b>The Foundations of Cost-Sensitive Learning</b> Charles Elkan</p> <p><b>Mining Soft-Matching Rules from Textual Data</b> Un Yong Nahm and Raymond J. Mooney</p>	<p><b>PLANNING WITH TEMPORAL UNCERTAINTY</b></p> <p><b>Executing Reactive, Model-based Programs through Graph-based Temporal Planning</b> Phil Kim, Brian C. Williams and Mark Abramson</p> <p><b>Dynamic Control Of Plans With Temporal Uncertainty</b> Paul Morris, Nicola Muscettola, and Thierry Vidal</p>

**12:40 PM – 2:00 PM LUNCH**

<p><b>SEARCH HEURISTICS IN PLANNING</b></p> <p><b>Local Search Topology in Planning Benchmarks: An Empirical Analysis</b> Jörg Hoffmann</p> <p><b>Reviving Partial Order Planning</b> XuanLong Nguyen and Subbarao Kambhampati</p>	<p><b>KNOWLEDGE ACQUISITION</b></p> <p><b>Knowledge Analysis on Process Models</b> Jihie Kim and Yolanda Gil</p> <p><b>Integrating Expectations from Different Sources to Help End Users Acquire Procedural Knowledge</b> Jim Blythe</p>	<p><b>MULTI-AGENT GAMES</b></p> <p><b>Rational and Convergent Learning in Stochastic Games</b> Michael Bowling and Manuela Veloso</p> <p><b>Multi-Agent Influence Diagrams for Representing and Solving Games</b> Daphne Koller and Brian Milch</p>	
<p><b>MARKET MECHANISMS</b></p> <p><b>Market Clearability</b> Tuomas Sandholm and Subhash Suri</p> <p><b>On Market-Inspired Approaches to Propositional Satisfiability</b> William E. Walsh, Makoto Yokoo, Katsutoshi Hirayama, and Michael P. Wellman</p>	<p><b>MACHINE LEARNING AND DATA MINING</b></p> <p><b>Link Analysis, Eigenvectors and Stability</b> Andrew Y. Ng, Alice Zheng, and Michael Jordan</p> <p><b>Active Learning for Class Probability Estimation and Ranking</b> Maytal Saar-Tsechansky and Foster Provost</p>	<p><b>MULTI-AGENT SYSTEMS</b></p> <p><b>Bidding Languages for Combinatorial Auctions</b> Craig Boutilier and Holger H. Hoos</p> <p><b>Partitioning Activities for Agents</b> Fatma Özcan and V.S. Subrahmanian</p>	





## IJCAI-01 Exhibit Program

The exhibition will be held in Exhibit Hall 4B on the fourth level of the Washington State Convention & Trade Center, Tuesday, August 7 through Thursday, August 9. Admittance is restricted to badged conference attendees. Vendor-issued guest passes must be redeemed at the Exhibitor Registration Desk, in the registration area on the fourth level of the Washington State Convention & Trade Center. Further information regarding access to the Exhibition can be obtained from the Exhibitor Registration Desk.

### EXHIBIT HOURS

Tuesday, August 7	10:00 AM – 6:00 PM
Wednesday, August 8	10:00 AM – 6:00 PM
Thursday, August 9	10:00 AM – 4:30 PM

**RoboCup 2001 and RoboCup Junior will be held in Exhibit Hall 4A, adjacent to the main IJCAI-01 Exhibit Hall, August 1-10. For more information on RoboCup, please see page 24.**

### EXHIBITORS

- ◆ AAAI Press
- ◆ Acroname Inc.
- ◆ ActivMedia Robotics, LLC
- ◆ AI Topics – The AAAI Pathfinder
- ◆ Carnegie Mellon University
- ◆ ECCAI – European Co-ordinating Committee for AI
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- ◆ Morgan Kaufmann Publishers
- ◆ NASA Ames Research Center
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- ◆ PC AI Magazine
- ◆ ScienceDirect
- ◆ SGI
- ◆ Sony America ERA
- ◆ Springer Verlag New York, Inc.
- ◆ TRAC Labs, A Division of Metrica, Inc.
- ◆ University of Alberta AI Lab
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### BOOTH #313

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ROBOTS GET A GRIP ON IT! In past years, we've focused on our intelligent laser navigation and vision systems. This year, see all the new options ActivMedia Robotics offers for manipulation: from little AmigoFingers to the new Pioneer 2 classroom arm to mammoth new MonsterBot carrying a 6 dof industrial arm. Also showing: new ARBS plug-n-play software for quick demos, online robot operation and classroom instruction; new ARIA C/C++ transparent robot operating environment; Saphira Laser Navigation system, PTZ Vision, and our Pioneer 2-DX, P2-AT, AmigoBot, PeopleBot & MonsterBot robots.

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### BOOTH #308

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Jon Glick, Webmaster

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AI Topics is a dynamic online library sponsored by the American Association for Artificial Intelligence for students, teachers, journalists, and everyone who would like to learn more about what artificial intelligence is, and what AI scientists do. This free web site offers a limited number of exemplary, non-technical resources that have been organized and annotated to provide meaningful access to basic information about the AI universe.

Although you can always find AI Topics online at [www.aaai.org/aitopics](http://www.aaai.org/aitopics), this conference offers you the exciting opportunity to visit AI Topics in person at Booth #308. Since you are either a potential user of the web site or a potential contributor to it, we'd really like to meet you and introduce you to the site. And because AI Topics is dedicated to serving you, we're very interested in hearing your questions, ideas, concerns, suggestions, and criticism.

Please stop by and let's get acquainted!

### BOOTH #210

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ECCAI is the European Co-ordinating Committee on Artificial Intelligence. This umbrella organisation brings together the more than 25 National AI societies

in Europe. Its primary focus is to share information on AI activities and events across Europe, and to help the national societies to work together. They also provide a program of travel grants and ECCAI Fellows. ECCAI is responsible for the bi-annual European-wide AI conference. Information on ECAI-2002 to be held in July in Lyon, France, including the call for papers for the technical conference and PAIS-2002, the Prestigious Applications of AI conference. In addition, information on proceedings of past ECAI conferences, published by IOS Press, will be available.

### BOOTH #329

#### Franz Incorporated

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Franz Inc. produces Allegro CL® 6.0, a complete, cross-platform development environment powered by Common Lisp/CLOS. Allegro CL's dynamic object-oriented technology allows developers to create leading edge, mission-critical applications that are robust, scaleable, and easy to evolve and deploy. With Allegro CL, developers can create powerful applications that get to market quickly, can change frequently, and grow with their end users. Allegro CL is ideal for Dynamic Servers, Manufacturing scheduling and control, IC design & synthesis, Knowledge Management and Data Mining. Other Franz Inc. products include AllegroServe™, a dynamic web-enabling Lisp Web Server, Allegro ORBLink™, a CORBA-compliant ORB, and AllegroStore®, a persistent object database.

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#### Inspire. Encourage. Enable.

iRobot's team of dedicated engineers, software developers and production specialists embrace creativity, innovative thinking and cutting-edge technology to design and build a growing family of versatile, rugged, fully integrated mobile robot systems. The revolutionary Mobility Robot Integration Software and rFLEX Robot Control Architecture drive the entire family of research robot platforms, providing seamless, top-to-bottom integration along with clear, intuitive migration paths among platforms. iRobot's mission is to provide robot development tools that inspire, encourage and enable advances in robotics. Stop by to see these great red machines in action.



## BOOTH #107

### The MIT Press

5 Cambridge Center • Cambridge, MA 02142  
<http://mitpress.mit.edu>

The MIT Press is an academic publisher specializing in books at the cutting edge of the sciences, including computer science and cognitive science. Please visit our booth for a 20% conference discount on all MIT Press titles! New books available at IJCAI 2001 include *Mechanics of Robotic Manipulation* in our *Intelligent Robots and Autonomous Agents* series, by Matthew T. Mason; *Qualitative Methods for Reasoning Under Uncertainty*, by Simon Parsons; and *Knowledge in Action: Logical Foundations for Specifying and Implementing Dynamical Systems*, by Ray Reiter. We also distribute books from AAAI Press.

## BOOTH #434

### MindBox, Inc.

300 Drake's Landing, Suite 155 • Greenbrae, CA 94904  
877-650-MIND

MindBox is focused on helping financial services organizations gain a competitive edge by automating their complex, knowledge-intensive business processes. We deliver customized systems that meet the specific business needs of clients. By automating these clients' complex decision processes, we help improve the efficiency and effectiveness of their business operations by making every contact with their customers count.

MindBox software is based around a sophisticated artificial intelligence application development platform, ARTEnterprise. The product family includes components that automate critical processes within a lending process. The combination of decisioning technology and modular architecture of the components enables us to rapidly deploy the solution in order for client's to realize a return on their investment.

## BOOTH #211

### Morgan Kaufmann Publishers

340 Pine Street 6th Floor • San Francisco, CA 94104  
415-392-2665

Morgan Kaufmann is dedicated to publishing distinguished books for artificial intelligence researchers and students, including graduate and undergraduate level texts, monographs, collected volumes, and conference proceedings. Since its founding in 1984, Morgan Kaufmann has published high-quality books for the artificial intelligence field that are substantially unique, are written by authoritative authors, and reflect our overall commitment to fine book making. We have

continued this publishing philosophy with more than 150 books in the AI field, most of which are today considered the definitive works in their fields.

## BOOTH #307

### NASA Ames Research Center

The Computational Sciences Division at NASA Ames Research Center conducts research in artificial intelligence and computer science that will enable the critical technologies necessary for NASA's missions of exploration in the 21st Century. The Ames exhibit will feature current work on autonomous spacecraft control, preparations for the 2003 rover mission to Mars, and a demonstration of a neural network based adaptive flight controller.

## BOOTH #214

### Naval Research Laboratory

Navy Center for Applied Research in  
Artificial Intelligence, Code 5515  
4555 Overlook Ave., S.W.  
Washington, DC 20375-5337

NRL's Navy Center for Applied Research in Artificial Intelligence (NCARAI) presents work in several areas of AI including computer vision, human computer interaction, intelligent multi-modal multimedia communication, natural language understanding, case-based reasoning, and machine learning, particularly the evolution of cooperative control for multi-robot systems. Results from these research areas are being integrated with the mobile robotics effort to develop intelligent robots which use adjustable autonomy and adaptation to perform a variety of tasks including military operations support and urban search and rescue. Several robots can be easily directed using a multimodal interface combining speech, natural gesture, and PDA input.

## BOOTH #311

### Springer Verlag New York, Inc.

175 Fifth Avenue • New York, NY 10010  
Phone: (212) 460-1533 • Fax: (212) 533-5587

Save 20% on artificial intelligence titles from Springer-Verlag! From the acclaimed *How To Solve It: Modern Heuristics* and the new *Coordination of Internet Agents*, to journals such as *Pattern Analysis and Applications* and *AI & Society*, Springer has established a reputation for publishing essential books and journals in all areas of artificial intelligence.

## BOOTH #414

### TRACLabs, a division of Metrica, Inc.

8620 N. New Braunfels, Suite 603  
San Antonio, TX 78217-6363  
Contact: Bob Hattier at 210-822-2310

**Biclops:** our pan, tilt, verge head for monocular or stereo vision applications. It is compact, lightweight, low power, and accurate. Key features include:

- Rugged and finely adjustable camera mounts
- Novel verge mechanism provides zero backlash and high precision
- Pan and tilt mechanisms have separate drive and feedback trains for precise observability
- Wide pan axis bearing allows for orderly camera cable routing through base
- All control electronics are housed in the base
- Industry-standard, serial interface provides several position and velocity PWM servo control modes.

Biclops is also available with fixed-vergence and in custom configurations.

## BOOTH #310

### University of Alberta AI Lab

Web-Based Interactive AI Resources

The web is fundamentally changing the field of artificial intelligence (AI); it can also improve the way we \*teach\* the ideas underlying our field. The rich assortment of media available — including applets, sound, video, down-loads, and text — can be exploited to make AI come alive. This booth will present a variety of web-based systems, each designed to help teach some aspect of AI. These resources are from the IJCAI workshop on "Effective Interactive Artificial Intelligence Resources"

<http://mainline.brynmawr.edu/EIAIR/IJCAI01.html>

Our eventual goal is a collection of tools for teaching AI, which is informative, useful, up-to-date, and, most important, fun.

We will include demos from:

- University of Alberta  
(<http://www.cs.ualberta.ca/~aixplore/>)
- University of British Columbia  
(<http://www.cs.ubc.ca/labs/lci/CIspace/>)
- University of Calgary  
(<http://tiger.cpsc.ucalgary.ca/WebGrid/WebGrid.html>)
- University of Saskatchewan  
(<http://www.cs.usask.ca/projects/aries/>)

See <http://mainline.brynmawr.edu/EIAIR/> for an overview of some of the available resources.



## The AAI Mobile Robot Competition and Exhibition

This year's IJCAI will include several events showing off the communities' work in intelligent robotics. Events will cover both research and applied robot systems. The Robot Competition and Exhibition will be held in Exhibit Hall 4B on the fourth level of the Washington State Convention & Trade Center, and will be open to registered conference attendees during exhibit hours.

The mission of the Mobile Robot Competition and Exhibition is to serve AAI, AI-robotics researchers, and the larger AI community by promoting innovative research through events which appeal to media and sponsors, while conducting these events in a format that facilitates comparison of approaches, but at low risk to individual or institutional reputations. Its goals are to:

- ◆ Foster the sharing of research and technology
- ◆ Allow research groups to showcase their achievements
- ◆ Encourage students to enter robotics and artificial intelligence fields at both the undergraduate and graduate level
- ◆ Increase awareness of the field

In previous years, the event has attracted both local and national news media — the 1996 contest resulted in a segment in Alan Alda's "Scientific American Frontiers" program on the Discovery Channel.

## Events

*The Competition and Exhibition comprises three separate events.*

### Robot Rescue

This year this event is being held jointly with RoboCup. The objective of this contest is to give participants the opportunity to work in a domain of critical practical importance. Robots must enter a fallen structure, find human victims, and direct human rescuers to the victims.

### Hors d'oeuvres anyone?

The objective of this contest is to create service robots that can offer hors d'oeuvres to attendees at the receptions. Each contestant is required to explicitly and unambiguously demonstrate interaction with the spectators. This event is designed to support research in human-robot interaction.

### Exhibition

The exhibition gives researchers an opportunity to demonstrate state-of-the-art research in a less structured environment. Exhibits are scheduled through several days of the conference, and in addition to live exhibits, a video proceedings is produced.

## TEAM PARTICIPANTS

### Robot Rescue

#### Spud and Friends

Fayette Shaw, Rachel Gockley, Arthur Butz, Jiin Joo Ong, Dan Vogel, Carnegie Mellon University Robotics Club

#### Rescue Robot

Cynthia Forgie, David Gustafson, Kansas State University

#### Mario & Company

Gil Jones and Bruce Maxwell, Swarthmore College

#### Rescue Robot

Daniel Farinha, Jesus Juarez-Guerrero, John Pissokas, University of Edinburgh

#### Lobotomous and Kirby

Christopher Smith, University of New Mexico

#### Rescue Robot

Robin Murphy, University of South Florida

#### Emdad1

Amir Hossein Jahangir, Sharif University of Technology

#### Blue Swarm I & II

Dan Stormont, Utah State University

### AAAI/RoboCup Mobile Robot Exhibition

#### Spud and Friends

Fayette Shaw, Rachel Gockley, Arthur Butz, Jiin Joo Ong, Dan Vogel, Carnegie Mellon University Robotics Club

#### Jim2, Flying Ginsu

Jonathan Hurst, Brian Kirby, Anthony Rowe, Carnegie Mellon University

#### Air Hockey Playing with the Humanoid Robot DB

Darrin Bentivegna, Georgia Institute of Technology

#### Tortoise

Ron A. Nucci

#### Sharif CE Rescue Robot Team

Amir Hossein Jahangir, Sharif University of Technology

#### Mario + company

Gil Jones, Bruce Maxwell, Swarthmore College

#### PINO

Hiroaki Kitano, Erato Kitano, Symbiotic Systems Project

#### Robot

Kimbugwe Tonny, Uganda East Africa

#### CARL project

Lus Seabra Lopes, Universidade de Aveiro -Portugal

#### Scout

Paul E. Rybski, Sascha A. Stoeter, University of Minnesota

#### Blue Swarm I & II

Dan Stormont, Utah State University

### AAAI Hors D'oeuvres Contest

#### Jim2, Flying Ginsu

Jonathan Hurst, Brian Kirby, Anthony Rowe, Carnegie Mellon University

#### KSU2

David Gustafson, Kansas State University

#### Mario

Bruce Maxwell, Swarthmore College

#### CARL project

Luís Seabra Lopes, Universidade de Aveiro - Portugal

#### Eric

Robot Partners group from the Laboratory for Computational Intelligence, University of British Columbia

# IJCAI-O 1 Exhibit: The AAAI Mobile Robot Competition & Exhibition and the National Botball 2001 Tournament



## Schedule *(Subject to Change)*

### Tuesday, August 7

10:00AM - 2:00PM

**Rescue Robot preliminary rounds**

12:30PM

**Botball Seeding Rounds**

3:00PM - 6:00PM

**Hors d'oeuvres preliminary rounds**

### Wednesday, August 8

10:00AM - 2:00PM

**Rescue Robot FINALS**

12:30 PM

**Botball Double Elimination Rounds**

5:00PM

**Botball Awards**

### Thursday, August 9

9:00AM - 11AM

**Exhibition**

12:00 - 1:00PM

**Hors d'oeuvres FINALS**

1:00PM - 2:00PM

**Awards and Photos**

2:00PM - 6:00PM

**AAAI Mobile Robot Workshop**

Location: Meeting Room 615, Sixth Level,  
Washington State Convention & Trade Center

## National Botball 2001 Tournament

No, the graduate students haven't gotten younger! IJCAI-01 and AAAI are pleased to host the National Botball Tournament, featuring top robots built by middle and high school students from across the country. Botball is a game in which robots attempt to achieve a specified goal, in an exciting head to head, double elimination tournament.

The goal of Botball is to get middle and high school students involved in the creative side of technology - to get our upcoming workforce excited about technology, robotics, and AI. Botball involves embodied agent computer programming (in C), mechanical design, science, math, and teamwork.

In this year's tournament, teams either play the black ball or white ball side. The challenge is to score points by moving your colored ping pong balls from inside tubes onto the top of pylons.

We will start out with a seeding round, at which time robots run unopposed - a prime opportunity to show off their best moves. During the regular one-on-one matches, teams are notified three minutes before the round as to which side they will play. Robots are required to start by themselves and shut down after 90 seconds.

Last year's tournament featured a final match between the undefeated homeschool team from Norman, Oklahoma and the seeding round winner from Paxon School for Advanced Studies in Jacksonville, Florida. The stunning finals match had the crowds cheering, and we expect even more excitement this year.

These robots were completely designed, built, and programmed by students from a kit of over 2000 parts. The Botball contest will be open to IJCAI-01 attendees during regular exhibit hours.

## Botball Participants

Andrew P. Hill High School  
 Andrew P. Hill High School Team 2  
 Broad Run High School  
 Capitol Hill High School  
 Cary Middle School Team 1  
 Cary Middle School Team 2  
 Episcopal High School of Houston  
 Episcopal High School of Jacksonville  
 F.H. Peterson Academies of Technology  
 Fletcher High School Team 1  
 Gabrielino High School Team 1  
 Glen Burnie High School  
 Gunderson High School  
 Hampton High School  
 Hillsdale High School  
 Holy Trinity Episcopal Middle School 1  
 Holy Trinity Episcopal Middle School 2  
 Independence High School Team 1  
 Jordan High School Team 1  
 MAST Academy Team 1  
 Middlesex School  
 Norman High School Team 1  
 Norman Homeschool  
 Oliver Springs High School Team 1  
 Oliver Springs High School Team 2  
 Rockville  
 Rose-Hulman Explore Engineering  
 Sallisaw High School Team 1  
 Sallisaw High School Team 2  
 Schiller Classical Academy  
 South Vermillion Middle School  
 Thomas Edison High School Team 1  
 Thomas Edison High School Team 2  
 Thomas Edison High School Team 3  
 Thomas Jefferson High School Team 1  
 Thomas Jefferson High School Team 2  
 Thomas Jefferson High School Team 3  
 Tilden Middle School Team 1  
 Tilden Middle School Team 3  
 U.S. Grant High School  
 W.C. Overfelt High School Team 1  
 W.C. Overfelt High School Team 2  
 W.T. White High School  
 Wakefield High School  
 Wellesley High School Team 1  
 Wellesley High School Team 2  
 Woodrow Wilson Middle School

## ORGANIZERS

### GENERAL CHAIRS

#### ROBOT COMPETITION & EXHIBITION

Tucker Balch, Carnegie Mellon University  
 Holly Yanco, University of Massachusetts Lowell

#### ROBOT RESCUE

Holly Yanco, University of Massachusetts Lowell

#### HORS D'OEUVRES ANYONE?

Francois Michaud, University of Sherbrooke  
 David A. Gustafson, Kansas State University

### AAAI ROBOT EXHIBITION

Vandi Verma, Carnegie Mellon University  
 Brian Adams, Massachusetts Institute of Technology

### AAAI ROBOT WORKSHOP

Brian Scassellati, Carnegie Mellon University

### NATIONAL BOTBALL TOURNAMENT

Cathryne Stein, Kiss Institute for Practical Robotics  
 David Miller, Kiss Institute for Practical Robotics  
 Darcy Hartz Schein, Kiss Institute for Practical Robotics



## RoboCup 2001

A discounted registration fee to the RoboCup 2001 Symposium will be offered to all IJCAI-01 registrants. However, attendance at the RoboCup 2001 Competition is free to all IJCAI-01 registrants.

RoboCup is a yearly event featuring an International Symposium, Competitions, and Exhibits that has gathered many researchers interested in multiagent and multirobot systems. In 2001, RoboCup will be held for the first time in the United States, being collocated with IJCAI-01. RoboCup will be held in Exhibit Hall 4A on the fourth level of the Washington State Convention & Trade Center.

## RoboCup 2001 will include:

- ◆ An International Research Symposium for the wide research community interested in the concrete challenges of multirobot and multiagent systems and their applications.
- ◆ Several competitions that offer different leagues in two tasks: (i) soccer, as traditionally pursued in RoboCup since 1996, and (ii) search and rescue. This year will include the first RoboCup rescue simulation competition, and, jointly with AAAI, the RoboCup/AAAI rescue robot competition. Attendance at the RoboCup 2001 competition is free to all IJCAI-01 registrants.
- ◆ RoboCup Junior that aims at middle and high school students with competitions of two on two soccer robots, robot dancing, and robot rescue.
- ◆ Exhibits, jointly with AAAI, of new robots and tasks, including demonstrations of humanoid robots.

The RoboCup 2001 competitions provide several technical platforms, including soccer and rescue simulations for teams of fully distributed software agents; small robots with offboard vision and computer control allowed; and fully autonomous middle-size robots and Sony legged robots. In addition to advances in perception, reasoning, and multiagent approaches, participants in the robot leagues also contribute new mechanical designs of robots. RoboCup 2001 welcomes attendance and participation by IJCAI-01 research colleagues.

### GENERAL CHAIR:

Manuela Veloso, Carnegie Mellon University

### ASSOCIATE CHAIR FOR ROBOTICS EVENTS:

Tucker Balch, Carnegie Mellon University

### ASSOCIATE CHAIR FOR SIMULATION EVENTS:

Peter Stone, AT&T Labs — Research

### ASSISTANT:

Debbie Cavlovich, Carnegie Mellon University

## ROBOCUP 2001 SCHEDULE

### Thursday, August 2

#### RoboCup Welcome Reception

Metropolitan Ballroom, Sheraton Seattle Hotel

### Saturday, August 4

#### Round Robin Competition

### Sunday, August 5

#### Round Robin Competition

### Monday, August 6

#### Round Robin Competition

### Tuesday, August 7

#### RoboCup Junior Competition

#### RoboCup International Symposium

Ballroom 6A

#### Symposium Cocktail Reception / Poster Session

Ballroom 6A

### Wednesday, August 8

#### RoboCup Junior Finals

#### RoboCup International Symposium

Ballroom 6A

#### RoboCup/AAAI Robot Rescue Finals

Exhibit Hall 4B

### Thursday, August 9

#### Quarter-Final, Semi-Finals

#### RoboCup Junior Workshop

Ballroom 6A

#### RoboCup Banquet

Elliott Grand Hyatt Seattle

### Friday, August 10

#### Semi-Finals, Finals

#### Awards Ceremony & Farewell

# IJCAI - O 1 Registration & General Information



Conference registration will take place in the Exhibition Hall Lobby on the fourth level of the Washington State Convention & Trade Center, beginning Friday, August 3. Registration hours are:

Friday, August 3	1:00 PM – 6:00 PM
Saturday, August 4	7:30 AM – 6:00 PM
Sunday, August 5	7:30 AM – 6:00 PM
Monday, August 6	7:30 AM – 6:00 PM
Tuesday, August 7	8:00 AM – 6:00 PM
Wednesday, August 8	8:00 AM – 6:00 PM
Thursday, August 9	8:00 AM – 6:00 PM
Friday, August 10	8:00 AM – 12:00 PM

Only checks drawn on US banks, VISA, MasterCard, American Express, government purchase orders, traveler's checks, and US currency will be accepted. We cannot accept foreign currency or checks drawn on foreign banks.

## Registration Fees

Your IJCAI-01 program registration includes admission to all technical paper sessions, invited talks and panels, the IJCAI-01 Exhibition, including the RoboCup-2001 Competition, the IJCAI-01 opening ceremony and reception, IAAI-01, the IJCAI-01 conference proceedings, and the IAAI-01 conference proceedings. Students must present proof of full-time student status to qualify for student rate. Onsite technical program fees are:

Onsite Regular	\$725
Onsite Student	\$225

## Tutorial Program

### AUGUST 5 – 6

Registrants for the IJCAI-01 technical program are encouraged to participate in the tutorial program at the fees listed below. Prices quoted are per tutorial. Your tutorial program registration includes admittance to one tutorial, the IJCAI-01 Exhibition, and one tutorial syllabus. Prices quoted are per tutorial. A maximum of four may be taken due to parallel schedules. Onsite tutorial fees are:

Onsite Regular	\$220
Onsite Student	\$100

It is also possible to attend tutorials without registering for the IJCAI technical program at the following fees:

Tutorial Only Regular	\$475
Tutorial Only Student	\$200

## Workshop Program

### AUGUST 4 – 6

Workshop registration is limited to those active participants determined by the organizer prior to the conference. All IJCAI-01 workshop participants must be registered for the IJCAI-01 technical program. An additional workshop fee is required for each workshop attended. Registration onsite for a workshop is possible with the prior permission of the corresponding workshop organizer.

Your workshop registration includes admittance to one workshop and the working notes for that workshop (if available).

Workshop Fee	\$70
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## IJCAI-01 Banquet

### AUGUST 8

The fee for the banquet at Tillicum Village is \$75. For more information, see page 14.

## Accompanying Persons

Accompanying persons are entitled to attend the Official Opening Ceremony, the Opening Reception, and visit the IJCAI-01 Exhibition.

Accompanying Person Fee	\$75
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## Exhibition

Admission to the exhibition hall programs is included in all other types of registration. For individuals interested in admittance to the exhibit hall only, an exhibit only registration is available in onsite registration. Exhibit hall programs include vendor exhibits, the AAI Mobile Robot Competition and Exhibition, RoboCup 2001, and the High School National Botball Tournament.

### ONE DAY:

\$10/adult	\$5/child	\$25/family
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### TWO OR MORE DAYS:

\$20/adult	\$10/child	\$40/family
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## Seattle: The Emerald City

Built on seven hills, with unmatched mountain and water views, the wealth of natural beauty in and around Seattle astonishes first-time visitors. Bounded on the west by Puget Sound, an inland arm of the Pacific Ocean, and on the east by Lake Washington, the city occupies a north-south corridor, slender at the waist, with hundreds of miles of salt and freshwater shoreline literally touch the city's boundaries. The Cascade mountain range is east of the city, and the Olympic Mountains are to the west. Thousands of square miles of evergreen forest extend out from the city, and, on a clear day, the views of mountains and water are spectacular.

Seattle is a major port, transportation hub, and manufacturing center and the principal city of Washington State and of the Pacific Northwest. Some of Seattle's best-known attractions are the Space Needle, Pike Place Market, Pioneer Square, Woodland Park Zoo, Waterfront, Ballard Locks, and the new Experience Music Project. These urban landmarks are clustered in pedestrian-scale sections, best savored on foot. Central business district buses are free, and the Monorail speeds quickly between downtown and the Seattle Center (site of both the Space Needle and the Experience Music Project).

## Excursions

Optional tours are available, based on availability. You may purchase tickets on-site at the Seattle V.I.P. Services Tour Registration Desk. There will be an additional \$3.00 fee for on-site ticket sales. All tours depart promptly from the Convention Center.

## Tours

Friday, August 3, 7:00 AM – 9:45 PM  
Independent Victoria Day Trip  
(No onsite reservations)

Tuesday, August 7, 6:00 PM – 9:00 PM  
Seattle City Highlights by Night

Saturday, August 11, 8:00 AM – 6:00 PM  
Mt. Rainier Tour



## General Information

### Admission

Each conference attendee will receive a name badge upon registration. This badge is required for admittance to the technical, tutorial, exhibit, IAAI, RoboCup, or workshop programs. Smoking, drinking, and eating are not allowed in any of the technical, tutorial, workshop, IAAI, RoboCup, or exhibit sessions.

### Administrative Offices

The IJCAI offices will be in room 504 on the fifth level of the Washington State Convention and Trade Center. The IJCAI-01 administrative office will be in room 505.

### Banking

Banks in downtown Seattle are usually open Monday–Friday from 9:00 AM – 5:00 PM. Some banks are open Saturdays from 9:00 AM - 4:00 PM. Automatic teller machines are available throughout town.

### Currency

The American Dollar, with one dollar equaling 100 cents. Approximate rates of exchange in the beginning of July were:

US\$1.00 =	.71	British Pounds
US\$1.00 =	1.51	Canadian Dollars
US\$1.00 =	7.73	French Francs
US\$1.00 =	2.30	German Marks
US\$1.00 =	1.24	Japanese Yen
US\$1.00 =	1.17	Euros

### Career Information

A bulletin board for job opportunities in the artificial intelligence industry will be made available in the registration area on the fourth level of the Washington State Convention & Trade Center. Attendees are welcome to post job descriptions of openings at their company or institution.

### Child Care

Babysitting and childcare services are available from Best Sitters Incorporated. Rates (at press time) are \$54.00 for the first four hours (four-hour minimum), and \$10 for each additional hour. Parking is \$6.00 and any meals must be paid by the individual. Best Sitters Inc. can be reached directly at (425) 455-5533 or through the Sheraton Seattle Concierge at (206) 621-9000. This information is for your convenience, and does not represent an endorsement of Best Sitters Incorporated by IJCAI-01 sponsors.

### Copy Services

Copy service is available at Kinko's on the first level of the Washington State Convention & Trade Center. Kinko's is open 24 hours a day.

### Handicapped Facilities

The Washington State Convention & Trade Center and the Sheraton Seattle Hotel are equipped with handicapped facilities.

### Housing

For information regarding hotel reservations, please contact the hotels directly. For student housing, please contact the University of Washington Conference Services at 206-543-7634.

### Information Desk

An information desk and message board will be staffed during registration hours, Saturday – Friday, August 4 – 10. It is located near the registration area on the fourth level of the Washington State Convention & Trade Center.

### Internet Room

Internet access will be provided in room 614 on the sixth level of the convention center. The room will be open from 8:00 AM - 6:00 PM, August 4-9 and 8:00 AM - 12:00 PM, August 10. As a courtesy, please limit your access time to 5-10 minutes if others are waiting to use the service.

### List of Attendees

A list of preregistered attendees of the conference will be available for review at the IJCAI-01 registration area on the fourth level of the Washington State Convention & Trade Center. Attendee lists will not be distributed.

### Message Center

See Information Desk.

### Parking

Parking is available at the Washington State Convention & Trade Center. The rates are \$4.00 for the first hour and \$1.50 for each additional hour. The cost is \$10.00 for 8 hours and \$11.00 for 8-12 hours.

### Post Office

Shipping services are available in Kinko's on the first level of the Washington State Convention & Trade Center. Kinko's is open 24 hours a day.

### Printed Materials

Display tables for the distribution of promotional and informational materials of interest to conference attendees will be located in the registration area on the fourth level of the Washington State Convention & Trade Center.

### Press

All members of the media are requested to register in the Press Room, on the third level of the Washington State Convention & Trade Center in Meeting Room 309. Press badges will only be issued to individuals with approved credentials. The Press Room will be open during the following hours.

Friday, August 3 – Thursday, August 9  
8:00 AM – 5:00 PM

Friday, August 10  
8:00 AM – 12:00 PM

An IJCAI-01 volunteer will be on duty during press room hours to assist the members of the press and media.

### Proceedings

Each registrant for the IJCAI-01 technical program and for IAAI-01 will receive a ticket redeemable for one copy of each of the conference proceedings. During registration hours on Saturday, August 4-Monday, August 6, and on Tuesday, August 7 until 10:00 AM, proceedings tickets can be redeemed at the Proceedings counter, located in the registration area. After 10:00 AM on Tuesday, the IJCAI-01 Proceedings ticket may be redeemed at the Morgan Kaufmann Publishers booth #213, located in Exhibit Hall 4B, during exhibit hours. The IAAI-01 proceedings tickets can be redeemed at onsite registration.

The IJCAI-01 *Proceedings* can also be redeemed by mailing the ticket with your name, shipping address, e-mail, and postage payment to:

Morgan Kaufmann Publishers  
340 Pine Street, Sixth Floor  
San Francisco, CA 94104, USA

The IAAI-01 *Proceedings* may also be redeemed by mailing the ticket with your name, shipping address, and postage payment to:

AAAI Press  
445 Burgess Drive  
Menlo Park, CA 94025 USA

Extra proceedings may be purchased at the conference site at the above locations. Thursday, August 9 will be the last day to redeem your tickets and purchase extra copies of the IJCAI-01 Proceedings. For shipping services, see Post Office.

### Quiet Room

A “quiet room” has been designated in meeting room 204 on the second level of the Washington State Convention & Trade Center for quiet contemplation, meditation or private prayer. The hours are 9:00 AM – 6:00 PM Saturday, August 4 – Wednesday, August 8.



## Recording

No audio or video recording is allowed in the tutorial rooms. Audiotapes of the plenary sessions, invited talks and panels, and the IAAI sessions will be for sale on the sixth level of the Washington State Convention & Trade Center. A representative from Audio Archives will be available to take your order during registration hours, beginning on Tuesday, August 7. Order forms are included with registration materials. Tapes may also be ordered by mail or phone from:

Audio Archives International, Inc.  
3043 Foothill Blvd., Suite #2  
La Crescenta, CA 91214  
Ph: (818) 957-0874  
Fx (818) 957-0876  
email audioarc@flash.net  
800-747-8069

## Restaurants

Lunches are not included in the registration fee. Coffee and tea will be served mornings and afternoons at several stations near the conference rooms. There are many restaurants (fast food, economy and luxury class) near the Washington State Convention and Trade Center, including several outlets in the building.

### RESTAURANT CATEGORY

Category	Breakfast	Lunch	Dinner
Fast Food	\$3-4	\$5-7	\$8-10
Economy	\$5	\$8-12	\$10-20
Deluxe	\$15-25	\$15-35	\$25-50

(hotels only for breakfast)

## Speaker Ready Room

The Speaker Ready Room will be located in Meeting Room 605 on the sixth level of the Washington State Convention & Trade Center. This room has audiovisual equipment to assist speakers with their presentations. It is important that speakers visit this room to organize their materials. The room will be open 8:00 AM – 5:00 PM, Saturday, August 4 – Thursday, August 9, and 8:00 AM – 12:00 PM, Friday, August 10.

Invited Speakers are asked to come to Meeting Room 605 one-day prior to their speech. Representatives from Audio Visual Headquarters will be available from 9:00 AM – 5:00 PM, Saturday, August 4 – Thursday, August 9 and 9:00 AM – 12:00 PM, Friday, August 10 to confirm your audiovisual needs, and assist with the preparation of your materials, if necessary.

## Taxes

The current sales tax in Seattle, Washington is 8.6%.

## Telephones

Public telephones for domestic and international calls are located throughout the Washington State Convention & Trade Center on all levels except the second.

## Tipping

In general, a tip of 15-20 percent is given to waiters, waitresses, hairdressers, taxi drivers, etc. Bellhops, doormen, porters, etc., at hotels, airports and railway stations are generally paid \$1.00 per item of luggage.

## Shirts

IJCAI-01 shirts will be for sale during registration hours at the registration desk, on the fourth level of the Washington State Convention & Trade Center. Supplies are limited.

## Transportation

The following information is the best available at press time. Please confirm fares when making reservations. The Washington State Convention & Trade Center is located on Interstate 5 and exit 165.

### Airport Connections

The primary methods of transportation from the Seattle-Tacoma airport are taxi and shuttle. Typical fares are listed below. For additional information about shuttles, please contact your hotel directly.

### Taxi

Taxis are available at Seattle-Tacoma International Airport. The fare from the airport to downtown Seattle is approximately \$30.00 each way.

### Shuttle

Gray Line of Seattle  
206-624-5077

Seattle-Tacoma Airport to downtown Seattle  
Fare: \$8.00; \$13.00 round trip

### Rail

The Amtrak Station is located at Third and Jackson Streets, approximately twelve blocks from the Washington State Convention & Trade Center. For Amtrak reservations or information, call 1-800-USA RAIL or 510-238-4369

### Metro Transit

Metro operates bus service throughout Seattle and King County. Schedules and routes are listed at each bus stop and can also be found at the Visitor Center in the Washington State Convention & Trade Center. Metro Transit is free within the downtown Seattle area. For information call (206) 553-3000

## Tutorial Syllabi

Extra copies of the IJCAI-01 tutorial syllabi will be available for purchase in the IJCAI-01 onsite registration area on the fourth level of the Washington State Convention & Trade Center, beginning Monday, August 6. Supplies are limited. Preregistration tutorial syllabi tickets must be redeemed in the tutorial rooms.

## Visitor Information

Visitor information is available in the Washington State Convention & Trade Center. This one-stop center provides visitors with tourist information and services such as travel planning, information on activities, and attractions.

800 Convention Place  
Washington State Convention & Trade Center  
Center-Lobby Level  
(206) 461-5840

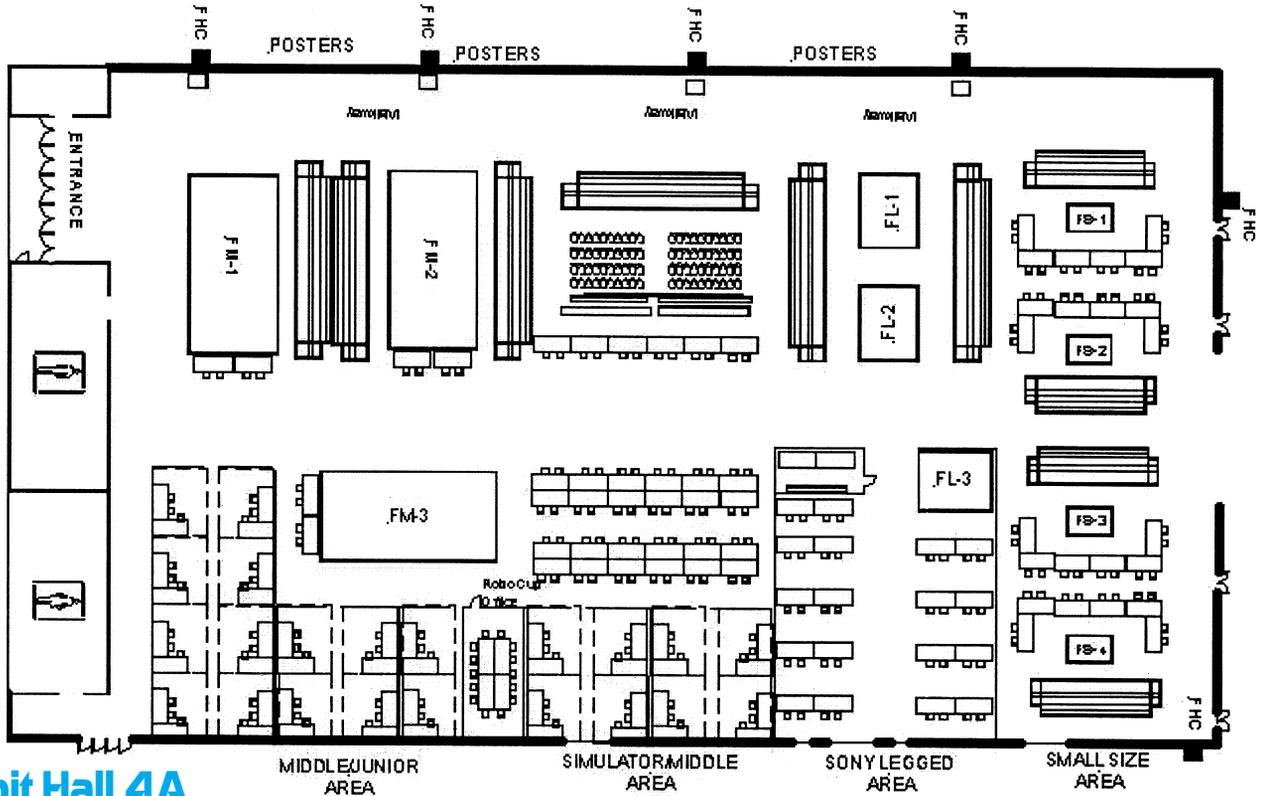
## Volunteer Room

The volunteer room is located in meeting room 302 on the third level of the Washington State Convention & Trade Center. Hours are 8:00 AM – 5:00 PM, Saturday, August 4 – Thursday, August 9 and 8:00 AM – 12:00 PM, Friday, August 10. Extra volunteer instructions and schedules will be available. All volunteers should check in with Colleen Boyce, AAAI Volunteer Coordinator, in the registration area prior to their shifts. The volunteer meeting will be held Thursday, August 2 at 4:00 PM in Meeting Room 307.

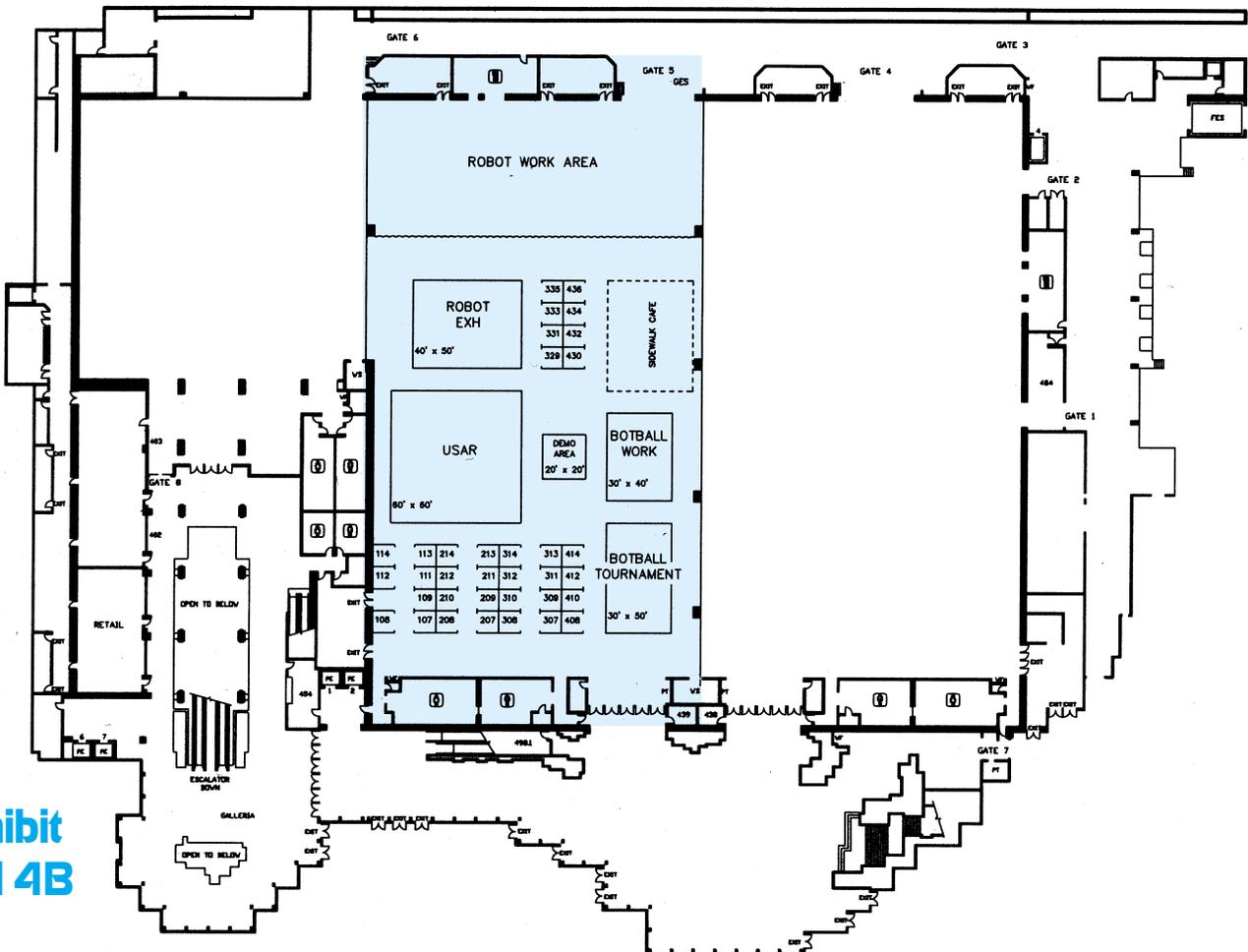
## Disclaimer

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# RoboCup / IJCAI - O1 Exhibit Hall Maps



**Exhibit Hall 4A**



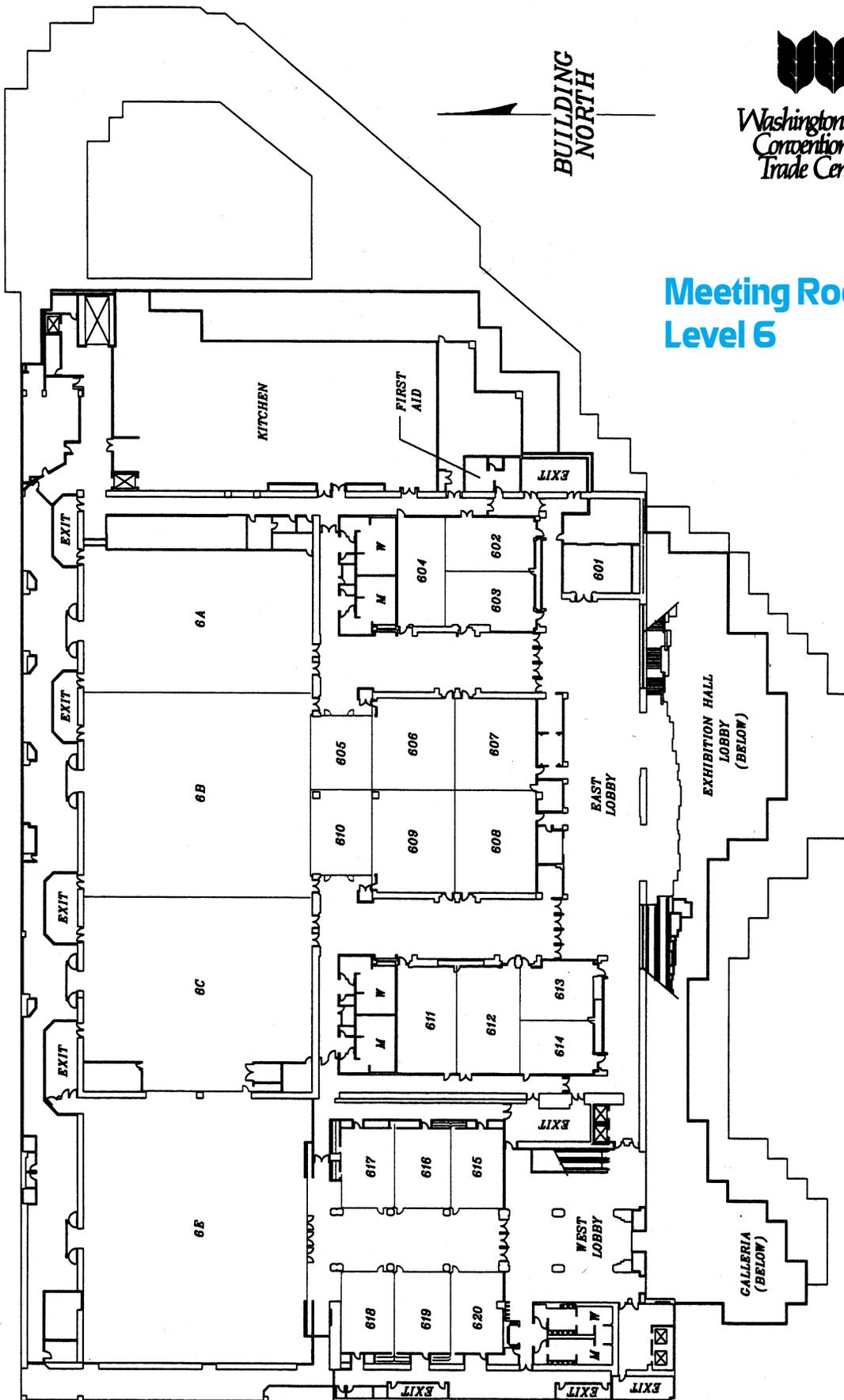
**Exhibit Hall 4B**

# Convention Center Meeting Rooms

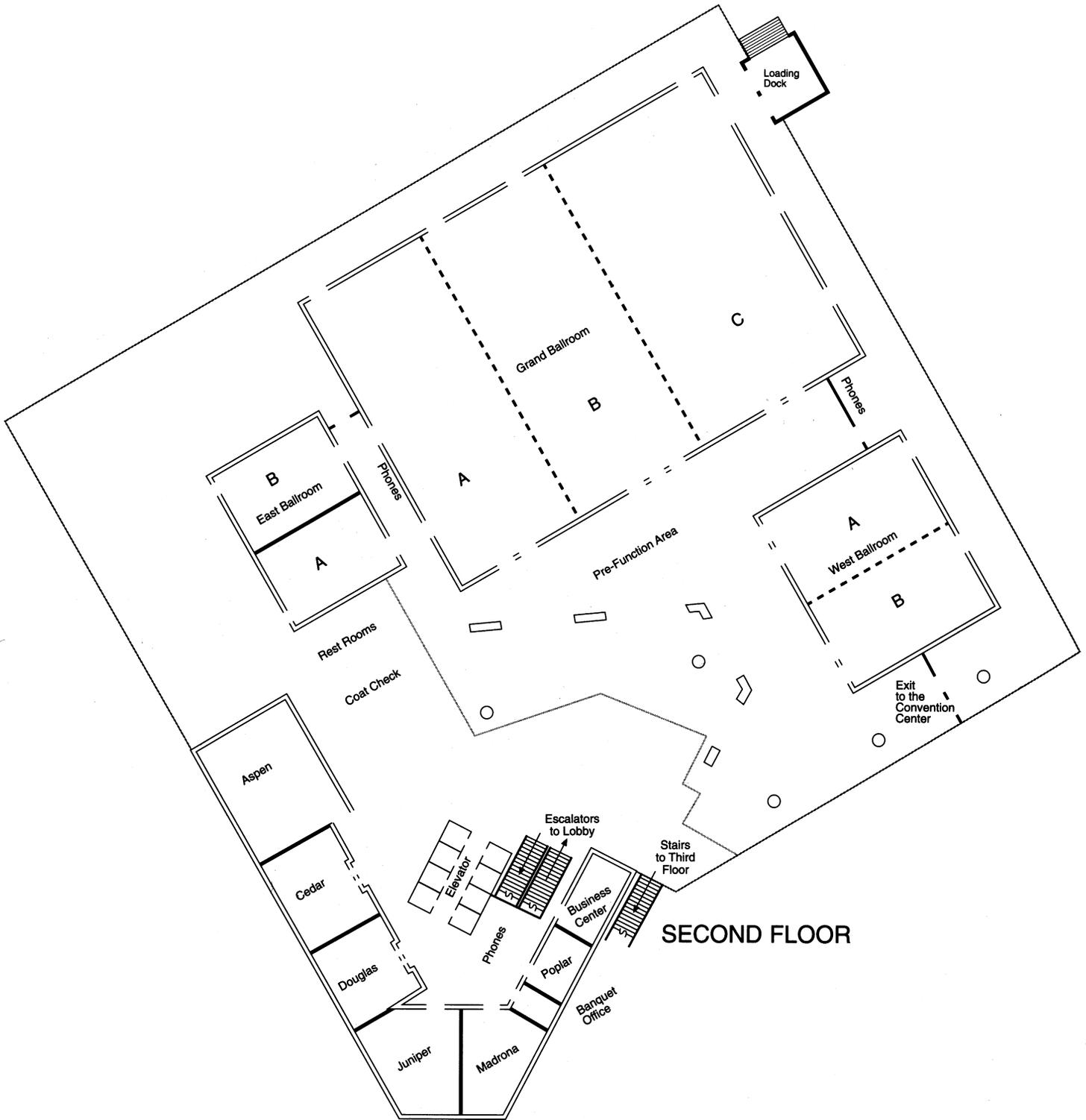


Washington State  
Convention &  
Trade Center

## Meeting Rooms Level 6



# Sheraton Meeting Rooms



## Sheraton Seattle Hotel & Towers 2nd Floor Ballrooms



## IJCAI-03 Acapulco, Mexico August 9 – 15, 2003

IJCAI-03, the Eighteenth International Joint Conference on Artificial Intelligence, will be held August 9-15, 2003 in Acapulco, Mexico. It is sponsored by the International Joint Conferences on Artificial Intelligence, Inc. (IJCAII), and cosponsored by the Mexican Society for Artificial Intelligence, and the American Association for Artificial Intelligence. Anthony Cohn of the University of Leeds will be the IJCAI-03 Conference Chair, Georg Gottlob of Vienna University of Technology will be the IJCAI-03 Program Chair, and Francisco Cantu of the Monterrey Institute of Technology will be the Local Arrangements Chair.

For further information, contact one of the following:

**Anthony G. Cohn**  
Conference Chair, IJCAI-03  
University of Leeds  
School of Computation Studies  
Leeds LS2-9JT  
United Kingdom  
44 113 235 482  
agc@scs.leeds.ac.uk

**Georg Gottlob**  
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Institute of Information Systems  
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**Francisco J. Cantu**  
Local Arrangements Chair, IJCAI-03  
Monterrey Institute of Technology  
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**Ronald J. Brachman**  
IJCAI Secretary-Treasurer  
AT&T Shannon Laboratory  
180 Park Avenue, Room A221  
Florham Park, NJ 07932-0971 USA  
E-mail: rjb@research.att.com

## IJCAI - 01 Special Meetings

### **IJCAII Annual Business Meeting**

Thursday, August 9 from 12:45 – 1:15 PM in Meeting Room 608 at the Washington State Convention & Trade Center. This meeting is open to all attendees.

### **IJCAI Executive Committee Meeting**

Wednesday, August 8 from 2:00 – 4:00 PM in the Aspen Room of the Sheraton Seattle Hotel.

### **IJCAI-01 Program Committee Meeting**

Wednesday, August 8 from 12:45 – 2:00 PM in the Cedar Room of the Sheraton Seattle Hotel. Lunch will be served.

### **IJCAII Trustees Meeting**

Sunday, August 5 from 9:00 AM – 5:00 PM in the Douglas Room of the Sheraton Seattle Hotel. A continuation will take place Thursday, August 8 from 8:30 AM – 12:00 PM in the same location.

### **AAAI Annual Business Meeting**

Wednesday, August 8 from 12:45 – 1:15 PM in Meeting Room 608 on the sixth level of the Washington State Convention & Trade Center.

### **AAAI Executive Council Meeting**

Sunday, August 5 from 9:00 AM – 5:00 PM in the Aspen Room of the Sheraton Seattle Hotel.

### **AAAI Fellows Dinner**

Tuesday, August 7 from 7:30 – 10:00 PM in the Cirrus Ballroom of the Sheraton Seattle Hotel.

### **AI Journal Editorial Board Meeting**

Tuesday, August 7 from 12:45 – 2:00 PM in the Cedar Room of the Sheraton Seattle Hotel. Lunch will be served.

### **AI Magazine Editorial Board Meeting**

Monday, August 6 from 12:45 – 2:00 PM in Suite 416 of the Sheraton Seattle Hotel.

### **CP-2001 Program Committee Meeting**

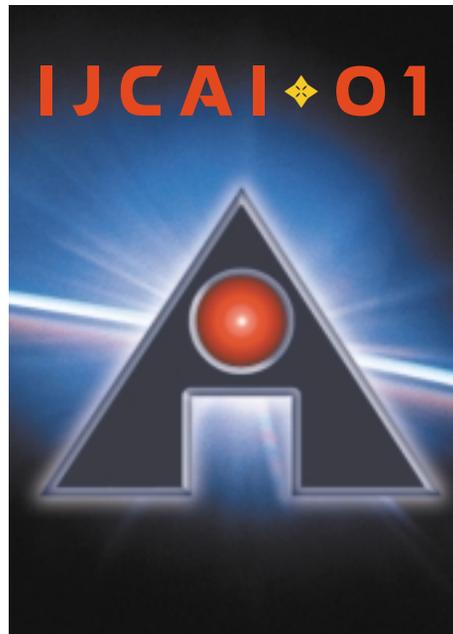
Wednesday, August 8 from 11:40 AM – 6:00 PM in Meeting Room 615 on the sixth level of the Washington State Convention & Trade Center.

### **ECCAI Board Meeting**

Wednesday, August 8 from 7:00 – 8:30 AM in the Madrona Room of the Sheraton Seattle Hotel.

### **IAAI-01 Program Committee Lunch**

Tuesday, August 7 from 12:45 – 2:00 PM in the Madrona Room of the Sheraton Seattle Hotel.



# Seventeenth International Joint Conference on Artificial Intelligence

Washington State Convention & Trade Center  
Seattle, Washington • USA  
August 4 - 10, 2001

I J C A I ♦ O 1

*Sponsored by*

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and American Association for  
Artificial Intelligence (AAAI)



*Program & Exhibit Guide*

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