Welcome to ijcai99

IJCAI-99, the Sixteenth International Joint Conference on Artificial Intelligence, is sponsored by the International Joint Conferences on Artificial Intelligence, Inc. (IJCAII), and the Scandinavian AI societies: Danish AI Society (DAIS), Finnish AI Society (FAIS), Norwegian AI Society (NAIS), and the Swedish AI Society (SAIS). A Nordic Scientific Advisory Committee (NISAC) was established to organize IJCAI-99.

IJCAII sponsors biennial conferences on artificial intelligence, that 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)
Chambery, Savoie, France (1993)
Montreal, Quebec, Canada (1995)
Nagoya, Japan (1997)

The 2001 conference is scheduled for Seattle, Washington, USA, August 5–10.

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Workshop Chair

Sebastian Thrun, Carnegie Mellon University (USA)

Additional Volunteer help to Program Committee

Kee-Eung Kim, Brown University (USA)
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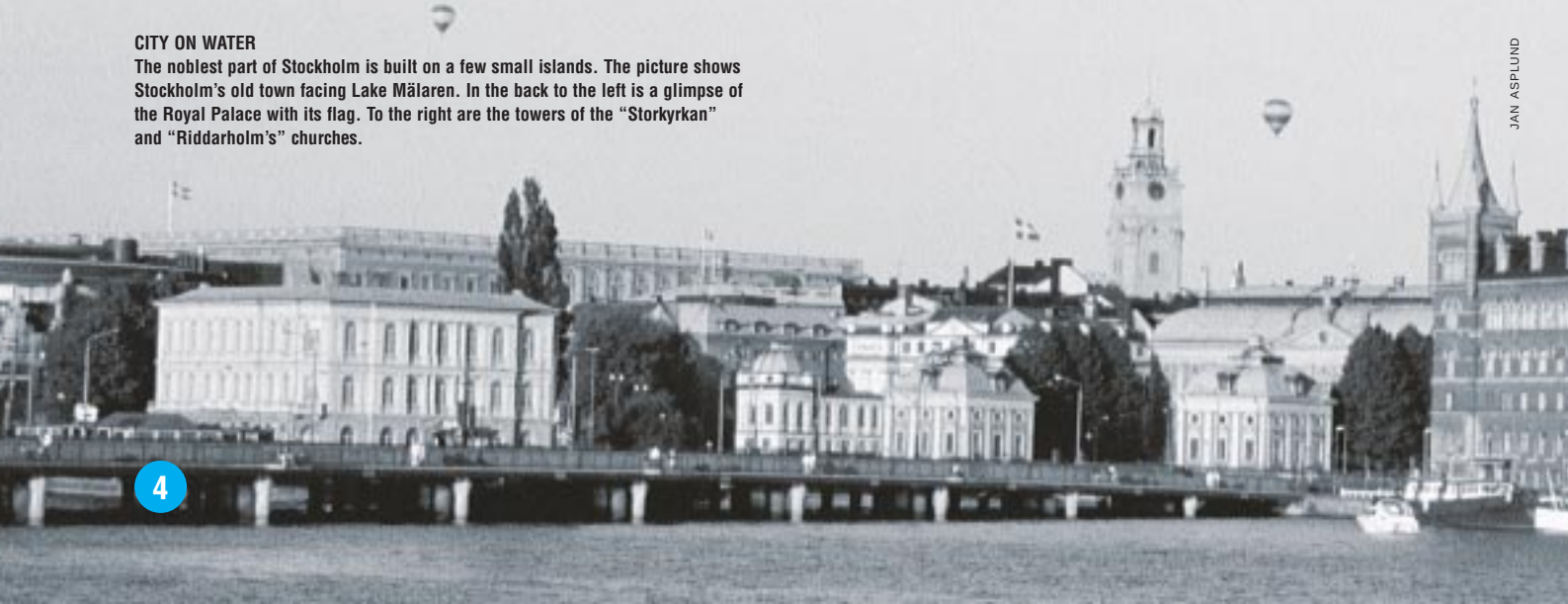
IJCAII Organization, Local Arrangements Committee, and NISAC (Nordic IJCAI Scientific Advisory Committee) are presented on page 24.



CITY ON WATER
The noblest part of Stockholm is built on a few small islands. The picture shows Stockholm's old town facing Lake Mälaren. In the back to the left is a glimpse of the Royal Palace with its flag. To the right are the towers of the "Storkyrkan" and "Riddarholm's" churches.

JAN ASPLUND

Conference at a glance

IJCAI-99 is composed of various complementary programs:

- the Technical Program, August 3 – August 6, including technical paper presentations by top scientists in the field, invited speakers and award winners
- the Tutorial Program, August 1 – August 2
- the Workshop Program, July 31 – August 2
- the Exhibition, August 3 – August 6
- RoboCup-99 to be held from July 29 to August 4 at the same venue as IJCAI-99.

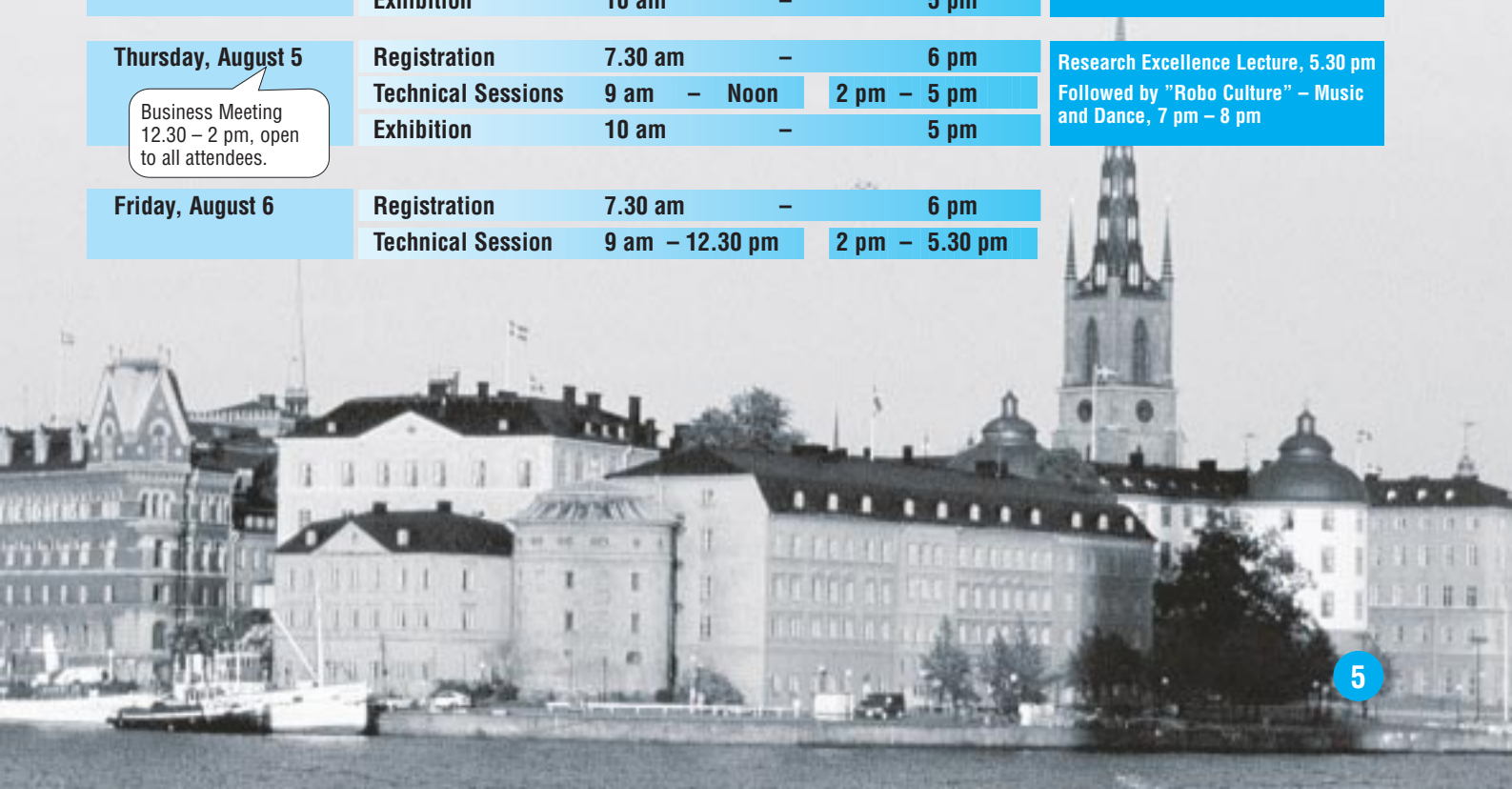
		MORNING	AFTERNOON	EVENING
Friday, July 30	Registration	7.30 am – 6 pm		
Saturday, July 31	Registration	7.30 am – 6 pm		
	Workshops	8.30 am – 5 pm		
Sunday, August 1	Registration	7.30 am – 6 pm		
	Workshops	8.30 am – 5 pm		
	Tutorials	9 am – 1 pm	2 pm – 6 pm	
Monday, August 2	Registration	7.30 am – 6 pm		Opening Ceremony: City Conference Centre, 5.30 pm Reception: City Hall of Stockholm
	Workshops	8.30 am – 5 pm		
	Tutorials	8 am – Noon	1 pm – 5 pm	
Tuesday, August 3	Registration	7.30 am – 6 pm		The Computers and Thought Lecture, 5.30 pm
	Technical Sessions	9 am – Noon	2 pm – 5 pm	
	RoboCup Semifinals	9 am – 6 pm		
	Exhibition	10 am – 5 pm		
Wednesday, August 4	Registration	7.30 am – 6 pm		Conference Dinner: Boat from the City at 6 pm followed by dinner at the Vaxholm Fortress
	Technical Sessions	9 am – 12.30 pm		
	RoboCup Finals		12.45 pm – 5.15 pm	
	Exhibition	10 am – 5 pm		
Thursday, August 5	Registration	7.30 am – 6 pm		Research Excellence Lecture, 5.30 pm Followed by "Robo Culture" – Music and Dance, 7 pm – 8 pm
	Technical Sessions	9 am – Noon	2 pm – 5 pm	
	Exhibition	10 am – 5 pm		
Friday, August 6	Registration	7.30 am – 6 pm		
	Technical Session	9 am – 12.30 pm	2 pm – 5.30 pm	

Business Meeting 12.30 – 2 pm, open to all attendees.

The Opening ceremony will be held at City Conference Centre followed by a Reception in the City Hall of Stockholm.

The Opening Ceremony will be chaired by Luigia Carlucci Aiello, the Conference Chair of IJCAI-99.

The Reception will be hosted by the City of Stockholm.



Workshop Program

(By invitation only)

The workshops will take place July 31–August 2. The program includes 29 workshops arranged in nine tracks centered around broad research topics and problem domains.

Participation is limited to those invited by the workshop organizers prior to the conference.

Workshop Chair: ***Sebastian Thrun***

Please note that the house name – Folkets Hus or Norra Latin – and the room number is required to identify a room.

Track	Saturday, July 31 8.30 am – 5 pm	Sunday, August 1 8.30 am – 5 pm	Monday, August 2 8.30 am – 5 pm
Track "KRR" **Knowledge Representation and Reasoning**	**KRR-1: Practical Reasoning and Rationality** John Bell, jb@dcs.qmw.ac.uk Norra Latin, room 451	**KRR-2: Nonmonotonic Reasoning, Action and Change** Michael Thielscher, mit@pikas.inf.tu-dresden.de Norra Latin, room 451 **KRR-4: Qualitative and Model Based Reasoning for Complex Systems and Their Control** Robert Milne, rmilne@bcs.org.uk Norra Latin, room 454	**KRR-3: Hot Topics in Spatial and Temporal Reasoning** Hans W. Guesgen, hans@cs.auckland.ac.nz Norra Latin, room 451 **KRR-5: Ontologies and Problem-Solving Methods: Lessons Learned and Future Trends** Richard Benjamins, richard@swi.psy.uva.nl Norra Latin, room 454
Track "ML" **Machine Learning**	**ML-1: Statistical Machine Learning for Large-Scale Optimization** Justin Boyan, jboyan@mail.arc.nasa.gov Norra Latin, room 360 **ML-4: Learning About Users** Åsa Rudström, asa@sics.se Norra Latin, room 358	**ML-2: Neural, Symbolic, and Reinforcement Methods for Sequence Learning** C. Lee Giles, giles@research.nj.nec.com Ron Sun, rsun@cs.ua.edu Norra Latin, room 360	**ML-3: Support Vector Machines** Craig Saunders, C.Saunders@dcs.rhbnc.ac.uk Norra Latin, room 360 **ML-5: Automating the Construction of Case Based Reasoners** Sarabjot Singh Anand, ss.anand@ulst.ac.uk Agnar Aamodt, agnar.aamodt@idi.ntnu.no David W. Aha, aha@aic.nrl.navy.mil Norra Latin, room 358
Track "IRF" **Information Retrieval and Filtering**	**IRF-1: Intelligent Information Integration** Dieter Fensel, dieter.fensel@aifb.uni-karlsruhe.de Norra Latin, room 361	**IRF-2: Machine Learning for Information Filtering** Thorsten Joachims, thorsten@ls8.cs.uni-dortmund.de Norra Latin, room 361	**IRF-3: Text Mining: Foundations, Techniques and Applications** Ronen Feldman, feldman@cs.biu.ac.il Norra Latin, room 361

Track	Saturday, July 31 8.30 am – 5 pm	Sunday, August 1 8.30 am – 5 pm	Monday, August 2 8.30 am – 5 pm
Track "ABS" **Agent-Based Systems**	**ABS-1: Agent Mediated Electronic Commerce** Alexandros Moukas moux@media.mit.edu Carles Sierra, sierra@iiia.csic.es Fredrik Ygge fredrik.ygge@enersearch.se Folkets Hus, room 203	**ABS-2: Agent Communication Languages** Frank Dignum, dignum@win.tue.nl B. Chaib-draa, chaib@ift.ulaval.ca Folkets Hus, room 203	**ABS-3: Learning About, From and With Other Agents** Jose M. Vidal, vidal@sc.edu Folkets Hus, room 203
	ABS-4: The Third International Workshop on RoboCup Manuela M. Veloso, veloso@cs.cmu.edu Folkets Hus, room 204		**ABS-5: Team Behavior and Plan Recognition** Simon Goss, simon.goss@dsto.defence.gov.au Folkets Hus, room 204
Track "PLAN" **Planning, Scheduling, and Control**		**PLAN-1: Adjustable Autonomy Systems** David Kortenkamp, kortenkamp@jsc.nasa.gov Norra Latin, room 455	**PLAN-2: Scheduling and Planning Meet Real-time Monitoring in a Dynamic and Uncertain World** Abdel-Illah Mouaddib, mouaddib@cril.univ-artois.fr Thierry Vidal, thierry@enit.fr Norra Latin, room 455
Track "ROB" **Robotics**	**ROB-1: Robot Action Planning** Michael Beetz, beetz@cs.uni-bonn.de Joachim Hertzberg, joachim.hertzberg@gmd.de Norra Latin, room 355	**ROB-2: Adaptive Spatial Representations of Dynamic Environments** Gerhard Kraetzschmar, gkk@acm.org Norra Latin, room 355	**ROB-3: Reasoning with Uncertainty in Robot Navigation** Alessandro Saffiotti, alessandro.saffiotti@ton.oru.se Norra Latin, room 355
Track "BUS" **AI and Business**	**BUS-1: Knowledge Management and Organizational Memory** Rose Dieng, Rose.Dieng@sophia.inria.fr Nada Matta, Nada.Matta@sophia.inria.fr Norra Latin, room 352	**BUS-2: Intelligent Workflow and Process Management: The New Frontier for AI in Business** Mamdouh Ibrahim, mamdouh.ibrahim@eds.com Brian Drabble, drabble@cirl.uoregon.edu Norra Latin, room 352	
Track "NLP" **Natural Language Processing**			**NLP-2: Knowledge and Reasoning in Practical Dialogue Systems** Jan Alexandersson, janal@dfki.de Norra Latin, room 461
Other Topics	**EMP: Empirical AI** Achim Hoffmann, achim@cse.unsw.edu.au Norra Latin, room 462	**CASA: Computational Auditory Scene Analysis** Frank Klassner, klassner@monet.csc.vill.edu Norra Latin, room 462	**SATIS: Non Binary Constraints** Jean-Charles Regin, regin@ilog.fr Wim Nuijten, nuijten@ilog.fr Norra Latin, room 462

Tutorial Program

The IJCAI-99 Tutorial Program features 20 four-hour tutorials that explore evolving techniques. Each tutorial is taught by experienced scientists and practitioners in AI. The tutorials are organized in five main themes A–E with four tutorials in each theme. The themes are:

A) Multiagent Systems,
B) Situated Artificial Intelligence,
C) Planning and Scheduling,
D) Basic Technologies, and
E) Knowledge Extraction and Discovery.

Tutorial Chair: *Boi Faltings*

Please note that the house name – Folkets Hus or Norra Latin – and the room number is required to identify a room.

Sunday, August 1

9.00 am – 1.00 pm

A1 Agents and Multiagents in the Internet and Intranets
Michael N. Huhns, Munindar P. Singh
Norra Latin, room 456

B1 Robotic Soccer: The Research Challenges and the Concrete Simulation and Real Robot Platforms
Peter Stone, Manuela Veloso
Norra Latin, room 453

C1 Practical Planning Systems
Steve Chien, Brian Drabble
Norra Latin, room 357

D1 Neural Networks for Data Structures: Principles and Applications
Paolo Frasconi, Alessandro Sperduti
Norra Latin, room 463

E1 Evaluating Machine Learning and Knowledge Discovery
Foster Provost, David Jensen
Folkets Hus, room 307

2.00 pm – 6.00 pm

A2 Ontological Engineering
Asunción Gómez-Pérez
Norra Latin, room 456

B2 Intelligent Multimedia Interface Agents
Wolfgang Wahlster, Elisabeth André
Norra Latin, room 453

C2 Knowledge-based Scheduling
Steve Chien, Stephen Smith
Norra Latin, room 357

D2 Probabilistic Argumentation Systems
Jurg Kohlas, Rolf Haenni
Norra Latin, room 463

E2 Practical Text Mining
Ronen Feldman
Folkets Hus, room 307

Monday, August 2

8.00 am – Noon

A3 Collaborative Multiagent Systems
Barbara Grosz, Charlie Ortiz
Norra Latin, room 456

B3 Behavior-based Robotics
Maja Matarić, Ronald Arkin
Norra Latin, room 453

C3 Recent Advances in AI Planning: A Unified View
Subbarao Kambhampati
Norra Latin, room 357

D3 Learning Bayesian Networks from Data
Nir Friedman, Moises Goldszmidt
Norra Latin, room 463

E3 Automatic Text Summarization: Methods, Systems and Evaluation
Udo Hahn, Inderjeet Mani
Folkets Hus, room 307

1.00 pm – 5.00 pm

A4 Principles of Agents and Multiagent Systems: Social, Ethical, and Legal Abstractions and Reasoning
Michael N. Huhns, Munindar P. Singh
Norra Latin, room 456

B4 User-Adaptive Systems: An Integrative Overview
Anthony Jameson
Norra Latin, room 453

C4 Economically Founded Multiagent Systems
Tuomas W. Sandholm
Norra Latin, room 357

D4 Solving AI Problems with Satisfiability
Ian Gent, Toby Walsh
Norra Latin, room 463

E4 Introduction to Information Extraction Technology
Douglas E. Appelt, David J. Israel
Folkets Hus, room 307

IJCAI-99 Opening Ceremony

The Opening Ceremony will start at 5.30 pm August 2 in Room ABC – Folkets Hus followed, by a Reception in the City Hall of Stockholm.

The Opening Ceremony will be chaired by Luigia Carlucci Aiello, the Conference Chair of IJCAI-99. The Reception will be hosted by the City of Stockholm.

LARS HANSSON

The Conference Installation Norra Latin was earlier a high school. This elegantly renovated school house is now one of Sweden's top conference installations.

JAN ASPLUND

The IJCAI-99 reception will be held in "Blå Hallen" (The Blue Lounge) of Stockholm's City Hall on the shore of Lake Mälaren.
City Hall is where Stockholm's political leadership work. Here you can also find large, exclusive reception rooms.
The largest are "Blå Hallen" and "Gyllene Salen" (The Golden Room).
City Hall was built during 1911–1923.

Technical Program

The IJCAI-99 Technical Program includes talks by two IJCAI-99 award winners and 12 invited speakers and presentations of 195 papers, including two distinguished papers that are receiving publishers' prizes. Paper sessions are organized in 17 themes. A thematic overview of the schedule appears on pages 14–15, including the awards lectures and invited talks. The detailed program follows on pages 16–23.
Program Chair: *Thomas Dean.*

IJCAI-99 Awards

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

C. Raymond Perrault (Menlo Park, USA)
Ross Quinlan (Sydney, Australia)
Erik Sandewall (Linköping, Sweden)
Wolfgang Wahlster (Saarbrücken, Germany, Chair)

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 IJCAII, the IJCAI-99 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), and Aravind Joshi (1997).

The winner of the 1999 IJCAI Award for Research Excellence is Judea Pearl, Professor of Computer Science at the University of California Los Angeles, USA. Professor Pearl is recognized for his fundamental work on heuristic search, reasoning under uncertainty, and causality. He will deliver a lecture entitled *Reasoning with Cause and Effect* on the evening of August 5, 1999.

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 IJCAII 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), and Leslie Kaelbling (1997).

The winner of the 1999 IJCAI Computers and Thought Award is Nicholas R. Jennings, Professor at the Department of Electronic Engineering of the Queen Mary & Westfield College, University of London, UK.

Professor Jennings is recognized for his contributions to practical agent architectures and his applied work in the field of multi-agent systems. He will deliver a lecture entitled *Agent-Based Computing: Promise and Perils* on the evening of August 3, 1999.

THE DONALD E. WALKER DISTINGUISHED SERVICE AWARD

The IJCAI Distinguished Service Award was established in 1979 by the IJCAII 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 Bledsow (1991) and Daniel G. Bobrow (1993).

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 IJCAII organization as a Secretary-Treasurer.

At IJCAI-99, the Donald E. Walker Distinguished Service Award will be given to Wolfgang Bibel, Professor of Intellectics at the Department of Computer Science of the Darmstadt Institute of Technology in Germany.

As a pioneering researcher in automated deduction, Professor Wolfgang Bibel is recognized for his outstanding contributions and service to the international AI community including his creation of ECCAI, which has operated since 1982 as an umbrella organization of 27 European societies for artificial intelligence.

The award will be given during the opening ceremony, Monday August 2, 5.30 pm.

IJCAI-99 AWARD FOR RESEARCH EXCELLENCE

Reasoning With Cause and Effect

Judea Pearl

Judea Pearl

The talk will summarize models, principles, and tools that were found useful in applications involving causal reasoning, including knowledge mining, policy prediction, explanation, and counterfactuals. The principles build on structural-model semantics in which actions are interpreted as surgeries on mechanisms and causes transmit the impact of such surgeries.

Thursday, August 5, 5.30 pm–6.30 pm

Folkets Hus, Room ABC

IJCAI-99 COMPUTERS AND THOUGHT AWARD

Agent-Based Computing: Promise and Perils

Nick Jennings

Nick Jennings

Agent-based computing represents an exciting new synthesis both for Artificial Intelligence and, more generally, Computer Science. It has the potential to significantly improve the theory and the practice of modeling, designing, and implementing complex systems. In this talk we explore what makes agents such an appealing and powerful conceptual model and argue that scaleable software systems require agents that can perform effectively in dynamic and uncertain environments interacting via flexible organizational structures.

Tuesday, August 3, 5.30 pm–6.30 pm

Folkets Hus, Room ABC

DISTINGUISHED PAPERS

Learning in Natural Language

Dan Roth

Dan Roth

The paper presents a learning theory account of the major statistical approaches to learning in natural language. A class of Linear Statistical Queries (LSQ) hypotheses is defined and many statistical learners used in natural language are shown to be in this class. The coherent view of learning approaches in this context may help to develop better learning methods and an understanding of the role of learning in natural language inferences.

Friday, August 6, 2 pm–3.30 pm

Norra Latin, Room Aulan

A Distributed Case-Based Reasoning Application for Engineering Sales Support

Ian Watson and Dan Gardingen

Ian Watson

This paper describes the implementation of a distributed case-based reasoning application that supports engineering sales staff. The application operates on the world wide web and uses the XML standard as a communications protocol between client and server side Java applets. The paper describes the distributed architecture of the application, the two case retrieval techniques used, its implementation, trial and roll-out, detailing the benefits it has provided to the company.

Friday, August 6, 11 am–12.30 pm

Folkets Hus, Room C

Invited Speakers

Minoru Asada, Osaka University and Henrik I. Christensen, The Royal Institute of Technology in Stockholm and Centre for Autonomous Systems

Robotics in the Home, Office, and Playing Field

Robots are moving into our everyday life for tasks like entertainment, cleaning, and delivery. To arrive at such systems, a number of key scientific questions must be answered and technological breakthroughs must be accomplished. The areas of service robotics and the RoboCup each define common tasks that allow evaluation of systems promoting integration of robotics and AI. In this talk the application domains are introduced, recent results are reviewed, and issues for future generations are outlined.

Wednesday, August 4, 11 am – Noon

Folkets Hus, Room C

Luca Console, Universitá di Torino and Oskar Dressler, OCC´M Software GmbH

Model-based Diagnosis in the Real World: Lessons Learned and Challenges Remaining

Model-based diagnosis techniques have started to enter industrial applications and commercial tools. We focus on pointing out the reasons behind these successes, in terms of both technical solutions and industrial needs. The lessons learned and open problems hampering wider application suggest future theoretical and practical research.

Friday, August 6, 9 am – 10 am

Folkets Hus, Rroom C

Neil Gershenfeld, Physics and Media Group at the MIT Media Lab

Natural Intelligence

While the study of machine intelligence has focused on the programming of general-purpose computers, digital logic represents a small subset of the latent capability of natural systems to manipulate information. I present some of the remarkable computational tasks that can be performed by the evolution of simple classical and quantum systems, and consider the implications for inference and interfaces of bringing rich sensory information into more conventional computing environments.

Friday, August 6, 9 am – 10 am

Folkets Hus, Room A

Stig B. Hagström, Stanford University

From Teaching to Learning: The Role of AI in an Educational Paradigm Shift

Simultaneously with the information "explosion" in the last few decades there has been a corresponding "explosion" in higher education in most countries. This growth in number of students has essentially followed an "extrapolation" of traditional teaching modes.

There have, however, been a number of attempts to apply modern electronic tools to promote a change described as "from teaching to learning".

In a joint effort Stanford University and selected Swedish universities are promoting a shift towards learning through Learning Laboratories. The talk will illustrate some basic ideas and concepts behind this collaboration and the Learning Laboratories.

Wednesday, August 4, 11 am – Noon

Folkets Hus, Room A

David Heckerman, Microsoft Research

Learning Bayesian Networks

For two decades, Bayesian networks constructed by experts have been used in intelligent systems with a fair amount of success. More recently, researchers have developed techniques for constructing Bayesian networks (both parameters and structure) from a combination of expert knowledge and data. These techniques can significantly reduce the cost of building an intelligent system and can be used to identify causal relationships from non-experimental data – an important breakthrough for science. I will describe some of these techniques, concentrating on methods borrowed from Bayesian statistics, and discuss real-world applications.

Tuesday, August 3, 4 pm – 5 pm

Folkets Hus, Room A

John Hooker, Carnegie Mellon University

Unifying Optimization and Constraint Satisfaction

The optimization methods of operations research and the constraint satisfaction methods of artificial intelligence have a unifying theme: both fields exploit the fundamental and related dualities of search vs. inference and strengthening vs. relaxation. This allows the two fields to be seen as special cases of a more general approach and suggests new methods that fit into neither OR nor AI.

Thursday, August 5, 4 pm – 5 pm

Folkets Hus, Room A

Radu Horaud, CNRS and INRIA Rhone-Alpes

Non-Metric Dynamic Vision: A Paradigm for Representing Motion in Perception Space

The representation of motion is of central importance in many artificial intelligence-related fields such as robotics, computer graphics, virtual reality, neurophysiology, and so forth. A crucial and not yet completely understood issue is, however, the measurement of motion. Computer vision has proposed a paradigm called "dynamic vision". Within this paradigm, the vast majority of solutions consider a single camera. In this talk we advocate that a pair of uncalibrated cameras should be preferred.

The motion measurement and representation issued from such a camera pair are more tractable from a mathematical point of view and can be used in a wider range of applications, such as visual guidance of robots and vehicles, visual surveillance, and virtualized reality.

Thursday, August 5, 4 pm – 5 pm

Folkets Hus, Room C

Lydia Kavraki, Rice University

Computational Approaches to Drug Design

The rational approach to pharmaceutical drug design begins with an investigation of the relationship between chemical structure and biological activity. Information gained from this analysis is used to aid the design of new or improved drugs. Computational chemists involved in rational drug design routinely use an array of programs to compute geometric and chemical characteristics of molecules. In this talk I describe areas of computer-aided drug design that are important to computational chemists but are also rich in algorithmic problems and have attracted the attention of computer scientists.

Tuesday, August 3, 4 pm – 5 pm

Folkets Hus, Room C

Robert Schapire, AT&T Labs – Research

Theory and Practice of Boosting

Boosting is a general method for producing a very accurate classification rule by combining rough and moderately inaccurate "rules of thumb." While rooted in a theoretical framework of machine learning, boosting has been found empirically to perform rather well. In this talk, I will introduce the boosting algorithm AdaBoost and explain the underlying theory of boosting, including an explanation of why boosting often does not suffer from overfitting. I also will describe some recent applications of boosting.

Tuesday, August 3, 9 am – 10 am

Folkets Hus, Room C

Donia Scott, University of Brighton

The Multilingual Generation Game: Authoring Fluent Texts in Unfamiliar Languages

This talk presents Multilingual Natural Language Generation (M-NLG), which is proving successful in its attempts to achieve the same goals as machine translation (the more familiar alternative technology for automating multilingual document production) while avoiding many of its pitfalls.

Thursday, August 5, 9 am – 10 am

Folkets Hus, Room C

Oliviero Stock, IRST, Instituto per la Ricerca Scientifica e Tecnologica

Was the Title of This Talk Generated Automatically? Prospects for Intelligent Interfaces and Language

Language processing has a large practical potential when we realize that, for instance, it can be integrated with other modalities made available by a computer. Intelligent interfaces are artifacts that (often) practically embody these concepts. Some prototypes are presented and challenges for the future are discussed.

Tuesday, August 3, 9 am – 10 am

Folkets Hus, Room A

Moshe Tennenholtz, the Technion Israel Institute of Technology

Realizing Electronic Commerce: From Economic and Game-Theoretic Models to Working Protocols

Mechanism design is the branch of economics and game theory that deals with the design of economic settings and protocols. In this talk we review some of the mechanism design literature and discuss some essential steps in the adaptation of economic mechanisms to non-cooperative computational environments, such as the Internet.

Thursday, August 5, 9 am – 10 am

Folkets Hus, Room A

Technical Program Overview

Theme ►	IJCAI-99 Awards and Distinguished Papers	Invited Talks	Automated Reasoning Room 456	Case-Based Reasoning Room C
Tuesday August 3	17.30 - 18.30, **Room ABC** Computers and Thought Award, *Nicholas R. Jennings*	9.00 - 10.00 *Oliviero Stock*, **Room A** *Robert Schapire*, **Room C** 16.00 - 17.00 *David Heckerman*, **Room A** *Lydia Kavraki*, **Room C**	10.30 - 12.00 Theorem Proving 14.00 - 15.30 Non-Monotonic Reasoning 1	10.30 - 12.00 Case-Based Reasoning 1 14.00 - 15.30 Case-Based Reasoning 2
Wednesday August 4		11.00 - 12.00 *Stig Hagström*, **Room A** *Minoru Asada* and *Henrik Christiansen* (joint talk), **Room C**	9.00 - 10.30 Non-Monotonic Reasoning 2 11-12.30 Non-Monotonic Reasoning 3: Model Checking Methods	
Thursday August 5	17.30 - 18.30, **Room ABC** Award for Research Exellence, *Judea Pearl*	9.00 - 10.00 *Moshe Tennenholz*, **Room A** *Donia Scott*, **Room C** 16.00 - 17.00 *John Hooker*, **Room A** *Radu Horaud*, **Room C**	9.00 - 10.00 Description Logics 2 10.30 - 12.00 Description Logics 1 14.00 - 15.30 Semantics and Models	
Friday August 6	11-12.30, **Room C** Distinguished Paper, *Ian Watson and Dan Gardingen,* in session Knowledge-based Applications, Application 1 14.00 - 15.30, **Room Aulan** Distinguished Paper, *Dan Roth,* in session Natural Language Processing 3, Learning	9.00 - 10.00 *Neil Gershenfeld*, **Room A** *Luca Console* and *Oskar Dressler* (joint talk), **Room C**	9.00 - 10.30 Reasoning About Action 1 11.00 - 12.30 Reasoning About Action 2 14.00 - 15.30 Belief Revision 16.00 - 17.30 Resource-Bounded Reasoning	

Theme ►	Machine Learning Room A/Room Aulan	Natural Language Processing, Room Aulan	Planning and Scheduling Room 307	Qualitative Reasoning and Diagnosis, Room B
Tuesday August 3	10.30 - 12.00, **Room A** Learning for Information Retrieval 1 14.00 - 15.30, **Room A** Learning for Information Retrieval 2		9.00 - 10.00 Planning 1 10.30 - 12.00 Planning 2: Exploiting Domain Structure 14.00 - 15.30 Planning 3: Disjunctive Planning 16.00 - 17.00 Scheduling	
Wednesday August 4	9.00 - 10.30, **Room A** Classification Learning 1	9.00 - 10.30 Natural Language Processing 1	9.00 - 10.30 Planning 4: Uncertainty and Time Constraint	
Thursday August 5	10.30 12.00, **Room A** Classification Learning 2: Support Vector Machines 10.30 - 12.00, **Room Aulan** Neural Networks 1 14.00 - 15.30, **Room A** Reinforcement Learning 1 14.00 - 15.30, **Room Aulan** Hybrid Systems: Neural and Symbolic Processing 16.00 - 17.00, **Room Aulan** Neural Networks 2			14.00 - 15.30 Qualitative Reasoning 1
Friday August 6	11.00 - 12.30, **Room A** Reinforcement Learning 2: Applications 14.00 - 15.30, **Room A** Automated Discovery 16.00 - 17.30, **Room A** Data Mining	11.00 - 12.30 Natural Language Processing 2 14.00 - 15.30 Natural Language Processing 3: Learning 16.00 - 17.30 Natural Language Processing 4: Information Retrieval		11.00 - 12.30 Qualitative Reasoning 2: Spatial Reasoning 14.00 - 15.30 Diagnosis 1 16.00 - 17.30 Diagnosis 2

Challenge Papers Room B	Cognitive Modelling Room 307	Constraint Satisfaction Room Aulan/Room B	Distributed AI Room 307	Computer Game Playing Room 307	Knowledge-based Applications, Room C
10.30 - 12.00 Challenge Papers 1 14.00 - 15.30 Challenge Papers 2: Propositional Reasoning and Search 16.00 - 17.00 Challenge Papers 3: Propositional Reasoning and Search/Planning		10.30 - 12.00, **Room Aulan** Constraint Satisfaction 1 14.00 - 15.30 **Room Aulan** Constraint Satisfaction 2			
		9.00 - 10.30, **Room B** Constraint Satisfaction 3 11.00 - 12.30, **Room B** Constraint Satisfaction 4	11.00 - 12.30 Multi-Agent Systems 1		
10.30 - 12.00 Challenge Papers 4: Bridging Plan Synthesis Paradigms			10.30 - 12.00 Multi-Agent Systems 2 14.00 - 15.30 Economic Models 1	9.00 - 10.00 Game Playing 1 16.00 - 17.00 Game Playing 2	
	11.00 - 12.30 Cognitive Modeling 1 14.00 - 15.30 Cognitive Modeling 2 16.00 - 17.00 Cognitive Modeling 3: Spatial Reasoning		9.00 - 10.30 Economic Models 2: Auctions		11.00 - 12.30 Applications 1 14.00 - 15.30 Applications 2 16.00 - 17.30 Applications 3

Robotics and Perception Room C	Search Room 203/204	Software Agents Room 203/204	Temporal Reasoning Room 203/204	Uncertainty and Probabilistic Reasoning, Room 203/204
				10.30 - 12.00 Decision-Theoretic Applications to Controlling Computation 14.00 - 15.30 Probabilistic Reasoning and Learning
9.00 - 10.30 Robotics and Perception 1				9.00 - 10.30 Markov Decision Processes 1 11.00 - 12.30 Markov Decision Processes 2
10.30 - 12.00 Robotics and Perception 3 14.00 - 15.30 Robotics and Perception 2			14.00 - 15.30 Temporal Reasoning	9.00 - 10.00 Alternative Uncertainty Formalisms 10.30 - 12.00 Solving Control Problems
	9.00 - 10.30 Search 1 11.00 - 12.30 Search 2 14.00 - 15.30 Genetic Algorithms	16.00 - 17.30 Software Agents		

Technical Program: Tuesday, August 3

Time	Room: A Folkets Hus	B Folkets Hus	C Folkets Hus
9 am – 10 am	**INVITED TALK** • Was the Title of This Talk Generated Automatically? Prospects for Intelligent Interfaces and Language. *Oliviero Stock, IRST, Instituto per la Ricerca Scientifica e Tecnologica*		**INVITED TALK** • Theory and Practice of Boosting *Robert Schapire, AT&T Labs – Research*
10.30 am – Noon	**MACHINE LEARNING** ***Learning for Information Retrieval 1*** • A Machine Learning Approach to Building Domain-Specific Search Engines *Andrew McCallum, Kamal Nigam, Jason Rennie and Kristie Seymore* • Domain-Specific Keyphrase Extraction *Eibe Frank, Gordon W. Paynter, Ian H.Witten, Carl Gutwin and Craig G.Nevill-Manning* • Learning Rules for Large Vocabulary Word Sense Disambiguation *Georgios Paliouras, Vangelis Karkaletsis and Constantine D. Spyropoulos*	**CHALLENGE PAPERS** ***Challenge Papers 1*** • Adaptive Web Sites: Conceptual Cluster Mining *Mike Perkowitz and Oren Etzioni* • An Assessment of Submissions Made to the Predictive Toxicology Evaluation Challenge *Ashwin Srinivasan, Ross D. King and Douglas W. Bristol* • Two Fielded Teams and Two Experts: A Robo-Cup Challenge Response from the Trenches *Milind Tambe, Gal Kaminka, Stacy Marsella, Ion Muslea and Taylor Raines*	**CASE-BASED REASONING** ***Case-Based Reasoning 1*** • Demand-Driven Discovery of Adaptation Knowledge *David McSherry* • Dynamic Refinement of Feature Weights Using Quantitative Introspective Learning *Zhong Zhang and Qiang Yang* • Remembering to Add: Competence-preserving Case-Addition Policies for Case Base Maintenance *Jun Zhu and Qiang Yang*
2 pm – 3.30 pm	**MACHINE LEARNING** ***Learning for Information Retrieval 2*** • The Cluster-Abstraction Model: Unsupervised Learning of Topic Hierarchies from Text Data *Thomas Hofmann* • Latent Class Models for Collaborative Filtering *Thomas Hofmann and Jan Puzicha* • Conceptual Grouping in Word Co-occurrence Networks *Anne Veling and Peter van der Weerd*	**CHALLENGE PAPERS** ***Challenge Papers 2: Propositional Reasoning and Search*** • Compiling Knowledge into Decomposable Negation Normal Form *Adnan Y. Darwiche* • Using Walk-SAT and Loop-Back CSP for Cryptographic Key Search *Fabio Massacci* • SAT-Encodings, Search Space Structure, and Local Search Performance *Holger H. Hoos*	**CASE-BASED REASONING** ***Case-Based Reasoning 2*** • PEBM: A Probabilistic Exemplar Based Model *Andres F. Rodriguez and Sunil Vadera* • Toward a Probabilistic Formalization of Case-Based Inference *Eyke Hüllermeier* • A Lattice Machine Approach to Automated Casebase Design: Marrying Lazy and Eager Learning *Hui Wang, Werner Dubitzky, Ivo Dntsch and David A. Bell*
4 pm – 5 pm	**INVITED TALK** • Learning Bayesian Networks *David Heckerman, Microsoft Research*	**CHALLENGE PAPERS** ***Challenge Papers 3: Propositional Reasoning and Search / Planning*** • On the Use of Integer Programming Models in AI Planning *Thomas Vossen, Michael Ball, Amnon Lotem and Dana Nau* • The LPSAT Engine & its Application to Resource Planning *Steven A. Wolfman and Daniel S. Weld*	**INVITED TALK** • Computational Approaches to Drug Design *Lydia Kavraki, Rice University*
5.30 pm – 6.30 pm	**COMPUTER AND THOUGHT LECTURE** • Agent-Based Computing: Promise and Perils *Nicholas R. Jennings, Professor at the Department of Electronic Engineering of the Queen Mary & Westfield College, University of London, UK.*		

Please note that the house name – Folkets Hus or Norra Latin – and the room number is required to identify a room.

Room:

Aulan Norra Latin	**456** Norra Latin	**203 / 204** Folkets Hus	**307** Folkets Hus
			PLANNING AND SCHEDULING ***Planning 1*** • Dealing with Geometric Constraints in Game-Theoretic Planning *Patrick Fabiani and Jean-Claude Latombe* • Computational Complexity of Planning and Approximate Planning in Presence of Incompleteness *Chitta R. Baral, Vladik Kreinovich and Raul Trejo*
CONSTRAINT SATISFACTION ***Constraint Satisfaction 1*** • A Comparison of Structural CSP Decomposition Methods *Georg Gottlob, Nicola Leone and Francesco Scarcello* • Solving Strategies for Highly Symmetric CSPs *Pedro Meseguer and Carme Torras* • Extending Consistent Domains of Numeric CSP *Helene Collavizza, Franois Delobel and Michel Rueher*	**AUTOMATED REASONING** ***Theorem Proving*** • Lemma Generation for Model Elimination by Combining Top-Down and Bottom-Up Inference *Marc Fuchs* • Cooperation of Heterogeneous Provers *Joerg Denzinger and Dirk Fuchs* • UPML: A Framework for Knowledge System Reuse *Dieter Fensel, Richard Benjamins, Enrico Motta and Bob Wielinga*	**UNCERTAINTY AND PROBABILISTIC REASONING** ***Decision-Theoretic Applications to Controlling Computation*** • Reactive Control of Dynamic Progressive Processing *Shlomo Zilberstein and Abdel-Illah Mouaddib* • Pre-sending Documents on the WWW: A Comparative Study *David W. Albrecht, Ingrid Zukerman and Ann E. Nicholson* • Continual Computation Policies for Allocating Offline and Real-Time Resources *Eric Horvitz*	**PLANNING AND SCHEDULING** ***Planning 2: Exploiting Domain Structure*** • The Detection and Exploitation of Symmetry in Planning Problems *Maria Fox and Derek Long* • From Interaction Data to Plan Libraries: A Clustering Approach *Mathias Bauer* • SHOP: Simple Hierarchical Ordered Planner *Dana S. Nau, Yue Cao, Amnon Lotem, and Hector Munoz-Avila*
CONSTRAINT SATISFACTION ***Constraint Satisfaction 2*** • The Difference All-Difference Makes *Kostas Stergiou and Toby Walsh* • The Symmetric Alldiff Constraint *Jean-Charles Regin* • Branch and Bound with Mini-Bucket Heuristics *Kalev Kask and Rina Dechter*	**AUTOMATED REASONING** ***Nonmonotonic Reasoning 1*** • Complexity Results for Propositional Closed World Reasoning and Circumscription from Tractable Knowledge Bases *Sylvie Coste-Marquis and Pierre Marquis* • Credulous Nonmonotonic Inference *Alexander Bochman* • Preferred Arguments are Harder to Compute than Stable Extension *Yannis Dimopoulos, Bernhard Nebel and Francesca Toni*	**UNCERTAINTY AND PROBABILISTIC REASONING** ***Probabilistic Reasoning and Learning*** • On the Role of Context-Specific Independence in Probabilistic Inference *Nevin L. Zhang and David Poole* • Exploratory Interaction with a Bayesian Argumentation System *Ingrid Zukerman, Richard McConachy, Kevin B. Korb and Deborah Pickett* • Learning Probabilistic Relational Models *Nir Friedman, Lise Getoor, Daphne Koller and Avi Pfeffer*	**PLANNING AND SCHEDULING** ***Planning 3: Disjunctive Planning*** • Reachability, Relevance, Resolution and the Planning as Satisfiability Approach *Ronen Brafman* • Improving Graphplan's Search with EBL & DDB Techniques *Subbarao Kambhampati* • To Encode or Not to Encode – Linear Planning *Ronen Brafman and Holger H. Hoos*
			PLANNING AND SCHEDULING ***Scheduling*** • Cyclic Scheduling *Denise L. Draper, Ari K. Jonsson, David P. Clements and David E. Joslin* • An Iterative Sampling Procedure for Resource Constrained Project Scheduling with Time Windows *Amedeo Cesta, Angelo Oddi and Stephen F. Smith*

Technical Program: Wednesday, August 4

Time	Room: A Folkets Hus	Room: B Folkets Hus	Room: C Folkets Hus
9 am – 10.30 am	**MACHINE LEARNING** ***Classification Learning 1*** • Decision Tree Grafting From the All Tests But One Partition *Geoffrey Webb* • Constructive Induction: A Version Space-based Approach *Michele Sebag* • Process-Oriented Estimation of Generalization Error *Pedro M. Domingos*	**CONSTRAINT SATISFACTION** ***Constraint Satisfaction 3*** • Improving Search Using Indexing: A Study with Temporal CSPs *Nikos Mamoulis and Dimitris Papadias* • A New Tractable Subclass of the Rectangle Algebra *Philippe Balbiani, Jean-Francois Condotta and Luis Farinas del Cerro* • Maximal Tractable Fragments of the Region Connection Calculus: A Complete Analysis *Jochen Renz*	**ROBOTICS AND PERCEPTION** ***Robotics and Perception 1*** • Multiple Path Coordination for Mobile Robots: A Geometric Algorithm *Stephane Leroy, Jean-Paul Laumond and Thierry Simeon* • Physical Constraints on Human Robot Interaction *Michita Imai, Kazuo Hiraki and Tsutomu Miyasato* • State Space Construction by Attention Control *Hiroshi Ishiguro, Masatoshi Kamiharako and Toru Ishida*
11 am – 12.30 pm	**INVITED TALK** • From Teaching to Learning: The Role of AI in an Educational Paradigm Shift *Stig B. Hagström, Stanford University*	**CONSTRAINT SATISFACTION** ***Constraint Satisfaction 4*** • Path Consistency on Triangulated Constraint Graphs *Christian Bliek and Djamila Sam-Haroud* • A New Method to Index and Query Sets *Jürg Hoffmann and Jana Koehler* • Constraint Propagation and Value Acquisition: Why We Should Do it Interactively *Rita Cucchiara, Marco Gavanelli, Evelina Lamma, Paola Mello, Michela Milano and Massimo Piccardi*	**INVITED TALK** • Robotics in the Home, Office, and Playing Field *Minoru Asada, Osaka University and Henrik I. Christensen, The Royal Institute of Technology in Stockholm and Centre for Autonomous Systems*

Room:	Aulan Norra Latin	456 Norra Latin	203 / 204 Folkets Hus	307 Folkets Hus
	NATURAL LANGUAGE PROCESSING ***Natural Language Processing 1*** • Situated Grounded Word Semantics *Luc Steels and Frederic Kaplan* • Lean Semantic Interpretation *Udo Hahn, Martin Romacker and Katja Markert* • The Role of Saliency in Generating Natural Language Arguments *Chris Reed*	**AUTOMATED REASONING** ***Nonmonotonic Reasoning 2*** • Abducing Priorities to Derive Intended Conclusions *Katsumi Inoue and Chiaki Sakama* • Maximum Entropy and Variable Strength Defaults *Rachel A. Bourne and Simon Parsons* • On the Relations Between Probabilistic Logic and p-CMS *Pierre Hansen, Brigitte Jaumard and A.D Parreira*	**UNCERTAINTY AND PROBABILISTIC REASONING** ***Markov Decision Processes 1*** • Computing Near Optimal Strategies for Stochastic Investment Planning Problems *Milos Hauskrecht, Gopal Pandurangan and Eli Upfal* • Multi-Value-Functions: Efficient Automatic Action Hierarchies for Multiple Goal MDPs *Andrew W. Moore, Leemon Baird and Leslie P. Kaelbling*	**PLANNING AND SCHEDULING** ***Planning 4: Uncertainty and Time Constraints*** • A Possibilistic Planner that Deals with Non-Determinism and Contingency *Emmanuel Guere and Rachid Alami* • Highly Reactive Decision Making: A Game with Time *Thierry Vidal and Silvia Coradeschi* • Real-Time Problem-Solving with Contract Algorithms *Shlomo Zilberstein, Francois Charpillet and Philippe Chassaing*
		AUTOMATED REASONING ***Nonmonotonic Reasoning 3: Model Checking Methods*** • On the Complexity of Model Checking for Propositional Default Logics: New Results and Tractable Cases *Robert Baumgartner and Georg Gottlob* • Stable Model Checking Made Easy *Christoph E. Koch and Nicola Leone* • Model Checking for Nonmonotonic Logics: Algorithms and Complexity *Riccardo Rosati*	**UNCERTAINTY AND PROBABILISTIC REASONING** ***Markov Decision Processes 2*** • A Sparse Sampling Algorithm for Near-Optimal Planning in Large Markov Decision Processes *Michael Kearns, Yishay Mansour and Andrew Ng* • Computing Factored Value Functions for Policies in Structured MDPs *Daphne Koller and Ronald Parr* • Bounding the Suboptimality of Reusing Subproblem *Michael H. Bowling and Manuela M. Veloso*	**DISTRIBUTED AI** ***Multi-Agent Systems 1*** • Sequential Optimality and Coordination in Multiagent Systems *Craig Boutilier* • A Protocol-Based Semantics for an Agent Communication Language *Jeremy Pitt and Abe Mamdani* • Towards Flexible Multi-Agent Decision-Making Under Time Pressure *Sanguk Noh and Piotr J. Gmytrasiewicz*

A view of the Vaxholm Fortress and the island Vaxholmen in the inner part of the Stockholm Archipelago.

Conference Dinner

The Conference Dinner will be at Vaxholm Fortress on August 4 to a cost of 600 SEK, including VAT. Access to the Fortress will be by boat, leaving from Nybrokajen in the City's center at 6 pm for a one-hour cruise through the Stockholm Archipelago.

A traditional Nordic Dinner will be served in ancient, historic surroundings. Return to Stockholm will again be by boat, departing between 10 pm and midnight.

Informal dress is recommended. Please register early, as space is limited.

Swedish king Gustav Vasa decided that the Fortress should be built and the work began on the original structure in 1548, but there were many alterations over the centuries. The present-day fortifications date back to 1863, and the mighty walls are built from 30,000 solid granite blocks. The fortress has been attacked twice, by the Danish navy in 1612 and by the Russian navy in 1719.

The courtyard, originally used for military drilling, is now a place for events, theatre and music. Today the Fortress is an exciting and popular tourist attraction.

Technical Program: Thursday, August 5

Time	Room: A Folkets Hus	B Folkets Hus	C Folkets Hus
9 am – 10 am	**INVITED TALK** • Realizing Electronic Commerce: From Economic and Game-Theoretic Models to Working Protocols *Moshe Tennenholtz, the Technion Israel Institute of Technology*		**INVITED TALK** • The Multilingual Generation Game: Authoring Fluent Texts in Unfamiliar Languages *Donia Scott, University of Brighton*
10.30 am – Noon	**MACHINE LEARNING** ***Classification Learning 2: Support Vector Machines*** • Transduction with Confidence and Credibility *Craig Saunders, Alex Gammerman and Volodya Vovk* • Leave-One-Out Support Vector Machines *Jason Weston*	**CHALLENGE PAPERS** ***Challenge Papers 4: Bridging Plan Synthesis Paradigms*** • Unifying SAT-based and Graph-based Planning *Henry Kautz and Bart Selman* • Temporal Planning with Mutual Exclusion Reasoning *David E. Smith and Daniel S. Weld*	**ROBOTICS AND PERCEPTION** ***Robotics and Perception 3*** • Markov Localization Using Correlation *Kurt Konolige and Ken Chou* • Tracking Many Objects with Many Sensors *Hanna Pasula, Stuart J. Russell, Michael Ostland and Ya'acov Ritov*
2 pm – 3.30 pm	**MACHINE LEARNING** ***Reinforcement Learning 1*** • A Near-Optimal Poly-Time Algorithm for Learning in Stochastic Games *Ronen Brafman and Moshe Tennenholtz* • Efficient Reinforcement Learning in Factored MDPs *Michael Kearns and Daphne Koller* • Convergence of Reinforcement Learning with General Function Approximators *Vassilis A. Papavassiliou and Stuart J. Russell*	**QUALITATIVE REASONING AND DIAGNOSIS** ***Qualitative Reasoning 1*** • Semi-Quantitative Comparative Analysis *Ivayla Vatcheva and Hidde de Jong* • A Qualitative-Fuzzy Framework for Nonlinear Black-box System Identification *Riccardo Bellazzi, Raffaella Guglielmann and Liliana Ironi* • Generalized Physical Networks for Automated Model Building *Matthew Easley and Elizabeth Bradley*	**ROBOTICS AND PERCEPTION** ***Robotics and Perception 2*** • A Spatiotemporal/Spatiotemporal-Frequency Interpretation of Apparent Motion Reversal *Todd R. Reed* • A Context-dependent Attention System for a Social Robot *Cynthia Breazeal and Brian Scassellati*
4 pm – 5 pm	**INVITED TALK** • Unifying Optimization and Constraint Satisfaction *John Hooker, Carnegie Mellon University*		**INVITED TALK** • Non-Metric Dynamic Vision: A Paradigm for Representing Motion in Perception Space *Radu Horaud, CNRS and INRIA Rhone-Alpes*
5.30 pm – 6.30 pm	**RESEARCH EXCELLENCE LECTURE** • Reasoning with Cause and Effect *Judea Pearl, Professor at the Computer Science Department of the University of California Los Angeles, USA.*		

Room:	**Aulan** Norra Latin	**456** Norra Latin	**203 / 204** Folkets Hus	**307** Folkets Hus
		AUTOMATED REASONING ***Description Logics 2*** • Multi-Dimensional Description Logics *Frank Wolter and Michael Zakharyaschev* • On the Relation of Resolution and Tableaux Proof Systems for Description Logics *Ullrich Hustadt and Renate A. Schmidt*	**UNCERTAINTY AND PROBABILISTIC REASONING** ***Alternative Uncertainty Formalisms*** • Towards a Possibilistic Logic Handling of Preferences *Salem Benferhat, Didier Dubois and Henri Prade* • Incremental Learning in a Fuzzy Intelligent System *Yi L. Murphey and TieQi Chen*	**COMPUTER GAME PLAYING** ***Game Playing 1*** • Temporal Coherence and Prediction Decay in TD Learning *Donald F. Beal and Martin C. Smith* • Domain-Dependent Single-Agent Search Enhancements *Andreas Junghanns and Jonathan Schaeffer*
	MACHINE LEARNING ***Neural Networks 1*** • A Potts Spin MFT Network Solving Multiple Causal Interactions *Lotfi Ben Romdhane* • SARDSRN: A Neural Network Shift-Reduce Parser *Marshall R. Mayberry and Risto Miikkulainen*	**AUTOMATED REASONING** ***Description Logics 1*** • Reasoning in Expressive Description Logics with Fixpoints Based on Automata on Infinite Trees *Diego Calvanese, Giuseppe De Giacomo, and Maurizio Lenzerini* • Reasoning with Concrete Domains *Carsten Lutz* • Computing Least Common Subsumers in Description Logics with Existential Restrictions *Franz Baader, Ralf Kuesters and Ralf Molitor*	**UNCERTAINTY AND PROBABILISTIC REASONING** ***Solving Control Problems*** • Combining Variable Resolution Discretization for High-Accuracy Solutions of Continuous Time and Space MDPs *Remi Munos and Andrew W. Moore* Solving Non-Markovian Control Tasks with Neuro-Evolution *Faustino J. Gomez and Risto Miikkulainen* • Reinforcement Algorithms Using Functional Approximation for Generalization and their Application to Cart Centering and Fractal Compression *Clifford Claussen, Srinivas Gutta and Harry Wechsler*	**DISTRIBUTED AI** ***Multi-Agent Systems 2*** • Risk Control in Multi-Agent Coordination by Negotiation with a Trusted Third Party *Shih-Hung Wu and Von-Wun Soo* • Shopbots and Pricebots *Amy R. Greenwald and Jeffrey O. Kephart* • Be Patient and Tolerate Imprecision: How Autonomous Agents Can Coordinate Effectively *Sudhir K. Rustogi and Munindar P. Singh*
	MACHINE LEARNING ***Hybrid Systems: Neural and Symbolic Processing*** • Preference Moore Machines for Neural Fuzzy Integration *Stefan Wermter* • Processing Symbols at Variable Speed in DUAL: Connectionist Activation as Power Supply *Alexander A. Petrov and Boicho N. Kokinov* • Hybrid Thematic Role Processor: Symbolic Linguistic Relations Revised by Connectionist Learning *Jaao Luis G. Rosa and Edson Franozo*	**AUTOMATED REASONING** ***Semantics and Models*** • Preferential Semantics for Causal Systems *Maurice Pagnucco, Pavlos Peppas, Mikhail Prokopenko, Norman Y. Foo and Abhaya C. Nayak* • Query Evaluation and Progression in AOL Knowledge Bases *Gerhard Lakemeyer and Hector J. Levesque* • Axiomatic Foundations for Qualitative/Ordinal Decisions with Partial Preferences *Adriana M. Zapico*	**TEMPORAL REASONING** • Scalable Temporal Reasoning *Steffen Staab and Udo Hahn* • Managing Temporal Uncertainty Through Waypoint Controllability *Paul H. Morris and Nicola Muscettola* • A New Framework for Reasoning About Points, Intervals and Durations *Arun K.Pujari and Abdul Sattar*	**DISTRIBUTED AI** ***Economic Models 1*** • Efficiency and Equilibrium in Task Allocation Economies with Hierarchical Dependencies *William E. Walsh and Michael P. Wellman* • Sequential Auctions for the Allocation of Resources with Complementarities *Craig Boutilier, Moises Goldszmidt and Bikash Sabata* • Algorithms for Optimizing Leveled Commitment Contracts *Tuomas W. Sandholm, Sandeep Sikka and Samphel Norden*
	MACHINE LEARNING ***Neural Networks 2*** • Improved Classification for a Data Fusing Kohonen Self Organizing Map Using a Dynamic Thresholding Technique *Odin Taylor, John MacIntyre and John Tait* • Generalized Connectionist Associative Memory *Nigel P. Duffy and Arun K. Jagota*			**COMPUTER GAME PLAYING** ***Game Playing 2*** • Decomposition Search: A Combinatorial Games Approach to Game Tree Search, with Applications to Solving Go Endgames *Martin Mueller* • GIB: Steps Toward an Expert-Level Bridge-Playing Program *Matthew L. Ginsberg*

Technical Program: Friday, August 6

Time	Room: A Folkets Hus	B Folkets Hus	C Folkets Hus
9 am – 10.30 am	**INVITED TALK** • Natural Intelligence *Neil Gershenfeld, Physics and Media Group at the MIT Media Lab*		**INVITED TALK** • Model-based Diagnosis in the Real World: Lessons Learned and Challenges Remaining *Luca Console, Universitá di Torino and Oskar Dressler, Technical University of Munich*
11 am – 12.30 pm	**MACHINE LEARNING** ***Reinforcement Learning 2: Applications*** • Confidence Based Dual Reinforcement Q-Routing: An Adaptive Online Network Routing Algorithm *Shailesh Kumar and Risto Miikkulainen* • A Neural Reinforcement Learning Approach to Learn Local Dispatching Policies in Production Scheduling *Simone C. Riedmiller and Martin A. Riedmiller*	**QUALITATIVE REASONING AND DIAGNOSIS** ***Qualitative Reasoning 2: Spatial Reasoning*** • Acquisition of Qualitative Spatial Representation by Visual Observation *Takushi Sogo, Hiroshi Ishiguro and Toru Ishida* • Qualitative Outline Theory *Antony P. Galton and Richard C. Meathrel* • Qualitative and Quantitative Representations of Locomotion and their Application in Robot Navigation *Alexandra Musto, Klaus Stein, Andreas Eisenkolb and Thomas Roefer*	**KNOWLEDGE-BASED APPLICATIONS** ***Applications 1*** • An Effective Ship Berthing Algorithm *Andrew Lim* • A Distributed Case-Based Reasoning Application for Engineering Sales Support *Ian Watson and Dan Gardingen* • Knowledge Modeling and Reusability in ExClaim *Liviu Badea*
2 pm – 3.30 pm	**MACHINE LEARNING** ***Automated Discovery*** • Discovering Admissible Model Equations from Observed Data Based on Scale-Types and Identity Constrains *Takashi Washio, Hiroshi Motoda and Niwa Yuji* • Finding Relations in Polynomial Time *Gilles Caporossi and Pierre Hansen* • Automatic Concept Formation in Pure Mathematics *Simon G. Colton, Alan Bundy and Toby Walsh*	**QUALITATIVE REASONING AND DIAGNOSIS** ***Diagnosis 1*** • Debugging Functional Programs *Markus Stumptner and Franz R. Wotawa* • Monitoring Piecewise Continuous Behaviors by Refining Semi-Quantitative Trackers *Bernhard Rinner and Benjamin Kuipers* • Diagnosis as a Variable Assignment Problem: a Case Study in a Space Robot Fault Diagnosis *Luigi Portinale and Pietro Torasso*	**KNOWLEDGE-BASED APPLICATIONS** ***Applications 2*** • Verifying Integrity Constraints on Web Sites *Mary Fernandez, Dana Florescu, Alon Levy and Dan Suciu* • Discovering Chronicles with Numerical Time Constraints from Alarm Logs for Monitoring Dynamic Systems *Christophe Dousson and Thang Vu Duong* • Integrating Problem-Solving Methods into CYC *James S. Aitken and Dimitrios Sklavakis*
4 pm – 5.30 pm	**MACHINE LEARNING** ***Data Mining*** • Efficient Mining of Statistical Dependencies *Tim Oates, Matthew D. Schmill and Paul R. Cohen* • Towards Efficient Metaquerying *Rachel Ben-Eliyahu-Zohary and Ehud Gudes* • Efficient SQL-Querying Method for Data Mining in Large Data Bases *Son H. Nguyen*	**QUALITATIVE REASONING AND DIAGNOSIS** ***Diagnosis 2*** • Utilizing Device Function in Structure-Based Diagnosis *Adnan Y. Darwiche* • Automatic Diagnosis of Student Programs in Programming Learning Environments *Songwen Xu and Yam San Chee* • Structured Modeling Language for Automated Modeling in Causal Networks *Yousri El Fattah*	**KNOWLEDGE-BASED APPLICATIONS** ***Applications 3*** • Visual Planning: A Practical Approach to Automated Presentation Design *Michelle X. Zhou* • A Case Based Approach to the Generation of Musical Expression *Taizan Suzuki, Takenobu Tokunaga and Hozumi Tanaka* • Using Focus Rules in Requirements Elicitation Dialogues *Renaud Lecoeuche, Catherine Barry and Dave Robertson*

Room:			
Aulan Norra Latin	**456** Norra Latin	**203 / 204** Folkets Hus	**307** Folkets Hus
	AUTOMATED REASONING ***Reasoning About Action 1*** • The Ramification Problem in the Event Calculus *Murray Shanahan* • Logic-Based Subsumption Architecture *Eyal Amir and Pedrito U. Maynard-Reid II* • Automata Theory for Reasoning About Actions *Eugenia Ternovskaia*	**SEARCH** ***Search 1*** • A Search in a Small World *Toby Walsh* • A Switching from Bidirectional to Unidirectional Search *Hermann Kaindl, Gerhard Kainz, Roland Steiner, Andreas Auer and Klaus Radda* • A Divide and Conquer Bidirectional Search: First Results *Richard E. Korf*	**DISTRIBUTED AI** ***Economic Models 2: Auctions*** • An Algorithm for Optimal Winner Determination in Combinatorial Auctions *Tuomas W. Sandholm* • Taming the Computational Complexity of Combinatorial Auctions: Optimal and Approximate Approaches *Yuzo Fujishima, Kevin Leyton-Brown and Yoav Shoham* • Speeding Up Ascending-Bid Auctions *Yuzo Fujishima, David McAdams and Yoav Shoham*
NATURAL LANGUAGE PROCESSING ***Natural Language Processing 2*** • Combining Weak Knowledge Sources for Sense Disambiguation *Mark Stevenson and Yorick Wilks* • Classifying Texts Integrating Pattern Matching and Information Extraction *Fabio Ciravegna, Alberto Lavelli, Luca Gilardoni, Johannes Matiasek, Nadia Mana, Silvia Mazza, Massimo Ferraro, William J Black, Fabio Rinaldi and David Mowatt*	**AUTOMATED REASONING** ***Reasoning About Action 2*** • Projection Using Regression and Sensors *Giuseppe De Giacomo and Hector J. Levesque* • Expressive Reasoning about Action in Nondeterministic Polynomial Time *Thomas Drakengren and Marcus Bjareland* • A Logic of Intention *Xiaoping Chen and Guiquan Liu*	**SEARCH** ***Search 2*** • Improvements to the Evaluation of Quantified Boolean Formulae *Jussi T. Rintanen* • An Experimental Study of Phase Transitions in Matching *Attilio Giordana, Marco Botta and Lorenza Saitta* • Optimizing Recursive Information-Gathering Plans *Eric Lambrecht, Subbarao Kambhampati and Senthil Gnanaprakasam*	**COGNITIVE MODELING** ***Cognitive Modeling 1*** • An Anthropocentric Tool for Decision Making Support *Elisabeth Le Saux, Philippe Lenca, Philippe Picouet and Jean-Pierre Barthelemy* • Autonomous Concept Formation *Edwin D. de Jong* • Reasoning About Actions in Narrative Understanding *Srinivas Narayanan*
NATURAL LANGUAGE PROCESSING ***Natural Language Processing 3: Learning*** • Learning in Natural Language *Dan Roth* • An Evaluation of Criteria for Measuring the Quality of Clusters *Bhavani Raskutti and Christopher Leckie* • Relational Learning for NLP Using Linear Threshold Elements *Roni Khardon, Dan Roth and Leslie G. Valiant*	**AUTOMATED REASONING** ***Belief Revision*** • A Foundational Approach to Belief Change *James P. Delgrande* • Postulates for Conditional Belief Revision *Gabriele Kern-Isberner* • An Inconsistency Tolerant Model for Belief Representation and Belief Revision *Samir Chopra and Rohit J. Parikh*	**SEARCH** ***Genetic Algorithms*** • Coevolution, Memory and Balance *Jan Paredis* • Genetic Heuristic for Search Space Exploration *Manuel Clergue and Philippe Collard*	**COGNITIVE MODELING** ***Cognitive Modeling 2*** • Using a Cognitive Architecture to Plan Dialogs for the Adaptive Explanation of Proofs *Armin Fiedler* • Investigating the Emergence of Speech Sounds *Bart G. de Boer* • Computer Aided Tracing of Children's Physics Learning: a Teacher Oriented View *Filippo Neri*
NATURAL LANGUAGE PROCESSING ***Natural Language Processing 4: Information Retrieval*** • Combining General Hand-Made and Automatically Constructed Thesauri for Query Expansion in Information Retrieval *Rila Mandala, Takenobu Tokunaga and Hozumi Tanaka* • Towards Multi-paper Summarization Using Reference Information *Hidetsugu Nanba and Manabu Okumura* • How Latent is Latent Semantic Analysis? *Peter M. Wiemer-Hastings*	**AUTOMATED REASONING** ***Resource-Bounded Reasoning*** • Programming Resource-Bounded Deliberative Agents *Michael Fisher and Chiara Ghidini* • Exploiting a Common Property Resource Under a Fairness Constraint: A Case Study *Michel Lemaitre, Grard Verfaillie and Nicolas Bataille* • Maximization of the Average Quality of Anytime Contract Algorithms over a Time Interval *Arnaud Delhay, Max Dauchet, Patrick Taillibert and Philippe Vanheeghe*	**SOFTWARE AGENTS** • Designing Comprehensible Agents *Phoebe J. Sengers* • Behavior Networks for Continuous Domains Using Situation-Dependent Motivations *Klaus Dorer* • Rights, Duties and Commitments between Agents *Leendert WN van der Torre and Yao-Hua Tan*	**COGNITIVE MODELING** ***Cognitive Modeling 3: Spatial Reasoning*** • Diagrammatic Proofs *Norman Y. Foo, Maurice Pagnucco and Abhaya C. Nayak* • Modeling the Basic Meanings of Path Relations *Christian Kray and Anselm Blocher*

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IJCAI-99 Conference Committee, see page 3.
IJCAI-99 Advisory Committee, see page 3.
IJCAI-99 Program Committee, see page 4.

Several bridges connect the islands and areas of land that comprise the city of Stockholm. One of the longest is "Västerbron" (West Bridge), which is an important link between the northern and southern central parts of town.

PHOTO: JAN ASPLUND

Information on Venue

STOCKHOLM – BEAUTY ON WATER

Stockholm – the Royal Capital of Sweden – is one of the most beautiful cities in the world. It is situated on 14 islands and laced by water so clean that you can fish and swim in it right in the middle of the city.

Stockholm became the capital of Sweden 700 years ago, and is today a modern city with more than 1 million inhabitants. In the picturesque winding alleyways of the city's medieval Old Town section, the very air is redolent with history. The Old Town is well known for its excellent restaurants and shopping facilities, and within a few minutes' walking distance is the throbbing pulse of a modern city. An optional guided tour will be held August 2.

Since 1901 the city has been the venue of the Nobel Prize Ceremony (see picture on brochure cover), the most prestigious of all meetings – and indeed the city makes a fitting venue. The reasons are basic, facilities and experience are excellent, the city's infrastructure is good and it is a safe place to be.

The city offers many attractive options for visitors. Perhaps the most breathtaking scenery of all awaits visitors to the archipelago, which with 24,000 islands is one of the largest archipelagos in the world. Why not take a steamship trip out there? You can be away all day or just a few hours. If you are interested in history you can visit the famous Open Air Museum or the Wasa Museum. An optional guided tour will be held at the Wasa Museum on August 3. There will be a one hour cruise through the archipelago ending with IJCAI-99 Dinner at Vaxholm Fortress on August 4.

Stockholm is also one of the communication hubs and economical and cultural centres of the Nordic area. Arlanda Airport handles some 200 flights daily to and from 40 countries on five continents. There are direct flights from most major cities in Europe and from the large cities in the U.S and easy connections from the rest of the world.

Stockholm is like a Swedish Smörgåsbord – it has everything.

CITY CONFERENCE CENTRE

The 16th International Joint Conference on Artificial Intelligence will be held at the City Conference Centre.

The City Conference Centre/Norra Latin, is one of Europe's largest and most beautiful congress and conference facilities. It is located in the center of Stockholm, at walking distance from the Central Railway Station and Air Bus Terminal (see map on brochure cover page).

Norra Latin, the magnificent old grammar school in Florentine Reinassance style from 1880, has recently been renovated. It now offers all conference amenities and provides an excellent setting for IJCAI-99.

PUBLIC TRANSPORTATION

Stockholm's public transportation system is safe, very efficient and convenient. It consists of buses, trains and underground. In the city, hotels, museums, shops and restaurants are generally within walking distance, which makes Stockholm an ideal city for strolls.

CURRENCY

The official currency is Swedish Krona (SEK). USD 1 = Approx. SEK 8. (June 1999).

TIPPING

When buying services in Sweden such as restaurants, hotels, sightseeing, etc., tipping is not required.

TAX-FREE

Non-European Union citizens have tax-free shopping privileges for goods that are packed and sealed in the shop, and are meant for use outside the border of Sweden. You receive a form when you make the purchase, and when you leave the country, most of the VAT is refunded.

TOURIST INFORMATION

The Conference Secretariat will be most happy to give you more information about Stockholm, book tour tickets, and make restaurant reservations or assist you in any other way during your stay in Stockholm.

You can also contact the Stockholm Information Service:

P.O. Box 7542, SE-103 93 Stockholm,
Phone: +46 8 789 24 00,
Fax: +46 8 789 24 50.
Visiting address in Stockholm:
Hamngatan 27, Sweden House.

BANKS

Most banks open at 9.30 am and close between 3pm and 4.30 pm. The banks closest to the venue are:

Nordbanken, Sveavägen 14,
open 10 am to 4 pm

Handelsbanken, Sveavägen 17
open 10 am to 3 pm

Föreningssparbanken, Vasagatan 27
(Norra Bantorget)
open 9:30 am to 3 pm

POST OFFICES

Post offices are generally open between 9 am and 6 pm.

There are two post offices close to City Conference Center. One is located at the Central Station, open Monday – Friday from 7 am to 10 pm, on Saturdays/Sundays from 10 am to 7 pm (no parcels). The other post office is located at Sveavägen 31, open Monday – Friday from 7 am to 7 pm, on Saturdays 10 am to 2 pm.

WHERE TO EAT

Lunches are not included in the registration fee. Coffee will be served mornings and afternoons at several stations near the conference rooms.

There are many restaurants, fast food, economic and luxury class, in the surroundings of City Conference Centre. Most of them are open both for lunch and dinners. The restaurant at City Conference Centre will be open for lunch, but not for dinner.

	Lunch	*Dinner*
Fast food	35-45	50-100
Economy	55-65	250 (3 dishes)
Deluxe	85-150	400-500 (3 dishes)

Restaurant costs in Sweden. Breakfast is normally included in hotel prices. Prices in SEK.

ADMINISTRATIVE OFFICES

The IJCAII office will be in room 510, Folkets Hus.

The IJCAI-99 administrative office will be in room 406 in Folkets Hus.

Volunteer headquarters at the IJCAI-99 Registration Desk in Marmorvalvet, Norra Latin, will be open from 8 am - 6 pm.

SPEAKER READY ROOM

Room 201, Folkets Hus. The room will be open from 8 am to 6 pm daily from July 31 to August 6.

On July 30 the room will be open from 2 pm to 5 pm. Assistance will be available.

MESSAGE BOARD

A message board for your convenience is located near the IJCAI-99 registration desk. Please check regularly for messages.

INTERNET

Internet access will be provided in room 300, Folkets Hus. The room will be open daily 8 am to 6 pm from July 29 to August 6.

TELEPHONES

Public telephones for domestic and international calls are located close to the reception desk at Norra Latin. At Folkets Hus you will find the telephones at the entrance and at the second floor. Telephones operate by telephone card, which may be purchased at the reception desks in Norra Latin and Folkets Hus.

CANCELLATIONS

Cancellations of registration

Cancellations of registrations will not be accepted after June 15th 1999. We regret that no refunds can be made for cancellations received after June 15th 1999.

Cancellation of hotel reservation

Cancellation of any hotel reservation will not be accepted after June 15th 1999. We regret that the hotel deposit cannot be refunded after June 15th 1999.

Cancellation of social events

Cancellation of social events will not be accepted after July 29th 1999. For cancellations received up to July 29th 1999, the payments will be refunded less 50%.

Disclaimer

The Organizing Committee and Congrex Sweden AB accept no liability for injuries/losses of any nature incurred by participants and/or accompanying persons, nor for loss or damage to their luggage and/or personal belongings.

VAT

All prices in Sweden include VAT, in most cases 25%.

Who gets the VAT refunded?

The first rule is that only enterprises/organizations can get the VAT repaid, not private persons. However, some enterprises are excluded: companies providing health care, banks, and insurance companies. Universities/schools get VAT repaid in most cases.

What is needed to get the VAT refunded?

- an application form must be filled in and sent to the Special Tax Office in Sweden
- the originals of invoices or comparable documents with specified VAT
- members in the European Union should add a VAT Registration Certificate
- members outside the European Union should add a Cooperation Certificate Registration that clearly shows business status.

The application form is included in your conference package.

All receipts, invoices or other documents should be in original, and explicitly specify the VAT. The sums should be in SEK; if presented in other currency, the rate of exchange should be stated. *Please note that sales slipes or receipts from credit cards are not accepted.*

Back home the application has to be filled in and signed by the applicant/person authorized to sign for the company/authorized agent.

In order to ensure an expeditious processing of a claim, please make sure that the documents listed above are enclosed. An application must be sent no later than six months after the end of the calendar year to which it refers.

The Special Tax Office will investigate your application. VAT will be refunded as soon as possible. Payment can be made to your bank account. It is very important to fill in the complete name, address and bank code including SWIFT code and account-holder.

Questions

Advice about how to fill in the application form can be obtained at the IJCAI-99 registration desk. Questions regarding VAT refund are being answered by the Special Tax Office, phone number (+46) 0240-870 00. Telephone hours: 9 am to 3 pm, Monday–Friday.

Exhibition Program

The Swedish Research Institute for Information Technology (SITI) has the pleasure to invite you to the IJCAI-99 Exhibition. The exhibition is open from August 3 to August 6, 10 am to 5 pm in Folkets Hus.

The goal is to illustrate AI techniques as ubiquitous elements of most technologies. Moreover it will serve as a meeting place and showroom for the conference.

The exhibition area is distributed on three floors as follows:

- **First floor:** companies, science projects and research groups
- **Second floor:** publishers, foundations and institutions
- **Third floor:** IJCAI-99 sponsors

SITI welcomes all participants to the IJCAI-99 Exhibition!

Robot World Cup Soccer Games
and Conferences 29 July – 4 August, 1999

The Robot World Cup, RoboCup, is an international initiative to foster AI and intelligent robotics research by providing a standard problem, a soccer game, in which a wide range of technologies can be integrated and examined.

This is the third RoboCup event. The competitions take place in Stockholm, in conjunction with IJCAI-99.

The first Robot World Cup, RoboCup-97, was held in Nagoya, Japan, in August 1997, and included the participation of more than 40 teams. The second Robot World Cup, RoboCup-98, was held in Paris, in July 1998, and more than 50 teams participated.

In order for a team of robot agents to actually play a soccer game, different technologies need to be integrated, including design principles of autonomous agents, multi-agent collaboration, strategy acquisition, real-time reasoning, sensor-fusion, and learning. RoboCup is a task for a team of multiple fast-moving robot agents in a dynamic, nondeterministic and adversarial environment.

REAL ROBOT F180 LEAGUE

Teams of up to five real robots of small size (approximately 15 cm in diameter) compete in a field of a size of a table tennis table. This year 18 teams participate in the competition. The preliminaries (from the 29th till the 31st of July) take place in Electrum, Kista (blue underground with direction Akalla), while the quarter finals, semi finals and finals take place in Norra Latin (the same locality as the IJCAI conference).

REAL ROBOT F2000 LEAGUE

Teams of up to five real robots of medium size (approximately 50 cm in diameter) compete on a 9 by 5 meters field. This year 21 teams participate in the competition. The preliminaries (from the 29th to the 31st of July) will be played in Electrum, Kista, while the quarter finals, semi finals and finals take place in Norra Latin.

SIMULATION LEAGUE

Software agents play soccer using the RoboCup soccer server simulator, available from the RoboCup web page. The RoboCup Simulator League is a part of IJCAI's official Challenge Paper Program, where successful results will be reported at IJCAI-99. This year 35 teams participate in the competition. The competition will take place from the 29th of July to the 4th of August in Norra Latin.

SONY LEGGED ROBOT LEAGUE

The RoboCup-99 Sony legged robot league takes place in a carpeted field, with landmarks and goals. Each team consists of three legged robots. This year 9 teams will participate to the competition. The competition takes place from the 29th of July to the 4th of August in Norra Latin.

WORKSHOP

The workshop ABS-4, see page 7, presents and discusses technical details of the robots and software agents that participate in the competition, as well as other research and educational topics related to RoboCup. A post-workshop proceedings will be published by Springer-Verlag as part of Lecture Notes on Artificial Intelligence (LNAI).

FINALS

The Finals, on Wednesday the 4th of August will be held from 12.45 –17.15 in the following order:

- Simulation League
- Sony Legged Robot League
- Small Robot League
- Middle Size Robot League

For additional information please refer to

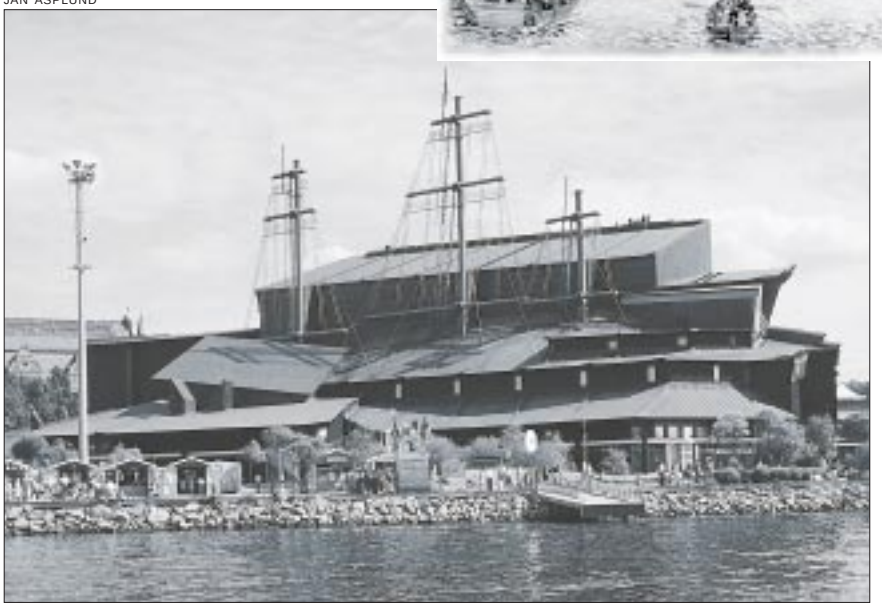
RoboCup web page: http://www.robocup.org/

RoboCup-99 web page: http://www.ida.liu.se/ext/RoboCup-99/

Social Program

(All prices include VAT)

JAN ASPLUND



This picture shows the exterior of the Vasa Museum which is, according to a survey made in 1996, rated the best museum in Stockholm. The warship Vasa capsized on her maiden voyage, August 10, 1628. On April 24, 1961, the ship broke the water surface again, after 333 years on the bottom of the sea. In the Vasa Museum's large shiphall stands the carefully restored ship. This is the only remaining ship of its kind in the world still intact from the 17th century .

FOR PARTICIPANTS AND ACCOMPANYING PERSONS

MONDAY 2 AUGUST, 5.30 PM

Opening Ceremony and Welcome Reception

Opening Ceremony in City Conference Centre followed by Welcome Reception at the Stockholm City Hall hosted by the City of Stockholm. The Ceremony and reception are included in the technical program fee and fee for accompanying persons.

WEDNESDAY 4 AUGUST

Dinner at Vaxholm Fortress

Price per person SEK 600.

Boats will take you from the city's center at 6 pm for a one-hour cruise through the Stockholm Archipelago ending at Vaxholm Fortress. Upon arrival you will be served a traditional Swedish dinner in ancient historic surroundings.

The number of tickets for the Dinner are limited and will be distributed on a first-come-first-served basis.

OPTIONAL TOURS

SUNDAY 1 AUGUST

Introduction to Stockholm – A Sightseeing Tour

Price per person SEK 135.

The best way of getting to know a city quickly is to go on a sightseeing tour by bus. This tour gives you an overall view of Stockholm. While passing well-known buildings, museums, and parks, your guide will tell you about shopping facilities, good restaurants and entertainment.

The tour starts at 2 pm and lasts for 1 1/2 to 2 hours. Departure and return are outside the City Conference Centre.

MONDAY 2 AUGUST

A Walk in Gamla Stan (the Old Town)

Price per person SEK 140.

A guided walk through Gamla Stan, Stockholm's heart. This is the island on which Stockholm was originally built at the beginning of the 13th century. Stroll down the narrow streets and discover breathtaking sights and fascinating buildings. The two most dominant buildings on Gamla Stan are Stockholm Cathedral, built in 1267 and therefore the oldest church in Stockholm, and the Royal Palace, where the King and Queen still hold their official receptions and banquets. The tour starts at 2 pm in Gamla Stan at Slottsbacken, by the Obelisk, and lasts for 2 hours.

TUESDAY 3 AUGUST

The Vasa Museum

Price per person SEK 155.

Enjoy a piece of Swedish history at the spectacular Vasa Museum, one of Stockholm's main attractions. The royal warship Vasa sank on her maiden voyage inside Stockholm Harbor, in 1628. After 333 years underwater, she was raised from her watery grave in 1961, and after several years of restoration she has now been moved to her final resting place in the spectacular museum. A guide will give a fascinating account of the Vasa and of what life was like onboard a warship in the 17th century. The tour starts at 10 am and lasts for 2 hours. Departure and return are outside the City Conference Centre.

WEDNESDAY 4 AUGUST

Art Tour

Price per person SEK 275.

This tour will take you to two beautiful art museums in Stockholm.

First, Millesgården, with its fountains, terraces and magnificent view of Stockholm, which was the home of the great Swedish sculptor Carl Milles (1875-1955). He is famous for his dramatic and technically daring work. A number of Milles' works are displayed in the beautiful garden overlooking the sea.

Second, Waldermarsudde, which was once the home of Prince Eugen, the "Painter Prince". His house, which contains his art collection, is now a museum offering the informal charm of a private home. The tour starts at 9.30 am and lasts for 3 hours. Departure and return are outside the City Conference Centre.

THURSDAY 5 AUGUST

Drottningholm Palace

Price per person SEK 310.

Drottningholm Palace, just outside Stockholm, dates from the 17th century and is modelled on Versailles. Today, the palace with its magnificent park is the Royal Family's residence. The Court Theatre is one of the oldest in the world still in use. It is the only theatre that uses the original stage scenery from the 18th century. The tour starts at 1 pm and lasts for 3 1/2 hours. Departure and return are outside the City Conference Centre.

Tickets for the social program can be purchased at registration desk. Tickets will be distributed on a first-come-first-served basis.

Congrex reserves the right to cancel any of the tours if the number of participants should be too small.

PHOTO: R.RYAN

Meetings

IJCAII TRUSTEES MEETING

Monday, August 2, 8 am – 5 pm in Sheraton Hotel. A continuation will take place Thursday August 5, 8.30 pm – Noon in room 405, Folkets Hus.

IJCAII EXECUTIVE MEETING

Wednesday, August 4, 2 pm – 4 pm in room 405, Folkets Hus.

IJCAII BUSINESS MEETING

Thursday, August 5, 12.30 pm – 2 pm in room A, Folkets Hus. This meeting is open to all attendees.

IJCAI-99 PROGRAM COMMITTEE MEETING

Wednesday, August 4, 12.30 pm – 2.30 pm, in Bruce's Dining Rooms, Norra Latin. Lunch will be served.

ECCAI – GENERAL ASSEMBLY

Wednesday, August 4, 11.30 pm – 2.30 pm, in room 357, Norra Latin.

ECCAI – BOARD MEETING

Monday August 2, 4 pm to 5.30 pm, in room 405, Folkets Hus.

ECCAI – FELLOWS BREAKFAST

Wednesday August 4, 7.30 am – 8.30 am, in Sheraton Hotel.

ECCAI – DISSERATION AWARDS PRESENTATION

Tuesday August 3, 12.05 pm – 1 pm, room A, Folkets Hus.

IFIP TC-12 MEETING

Monday August 2, 10 am to 2 pm, in room 405, Folkets Hus.

AIJ EDITORIAL BOARD MEETING

Tuesday August 3, Noon to 2 pm, in room 461, Norra Latin.

Next IJCAI Conference

IJCAI-2001, SEATTLE, USA
AUGUST 5–10, 2001

IJCAI-2001, the Seventeenth International Joint Conference on Artificial Intelligence, will be held August 5 through August 10 in Seattle, Washington, USA.

It is sponsored by the International Joint Conferences on Artificial Intelligence, Inc. (IJCAII) and co-sponsored by AAAI (American Association for Artificial Intelligence). The meetings will take place at the Washington State Convention and Trade Center. Their web site is at http://wsctc.com/.

For further information contact one of the following:

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Next IJCAI Conference will be held in Seattle, USA, August 5 – August 10, 2001.

IMPORTANT ADDRESSES AND TELEPHONE NUMBERS

Registration, hotel booking, social events and general information

All matters regarding registration, hotel booking, social events and general information are handled by Congrex Sweden AB.

During the Conference all inquiries to:

City Conference Centre
Attn. IJCAI 99
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World Wide Web

For the latest information about the Conference, please visit the Conference homepage at: http://www.ijcai.org/ijcai-99

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