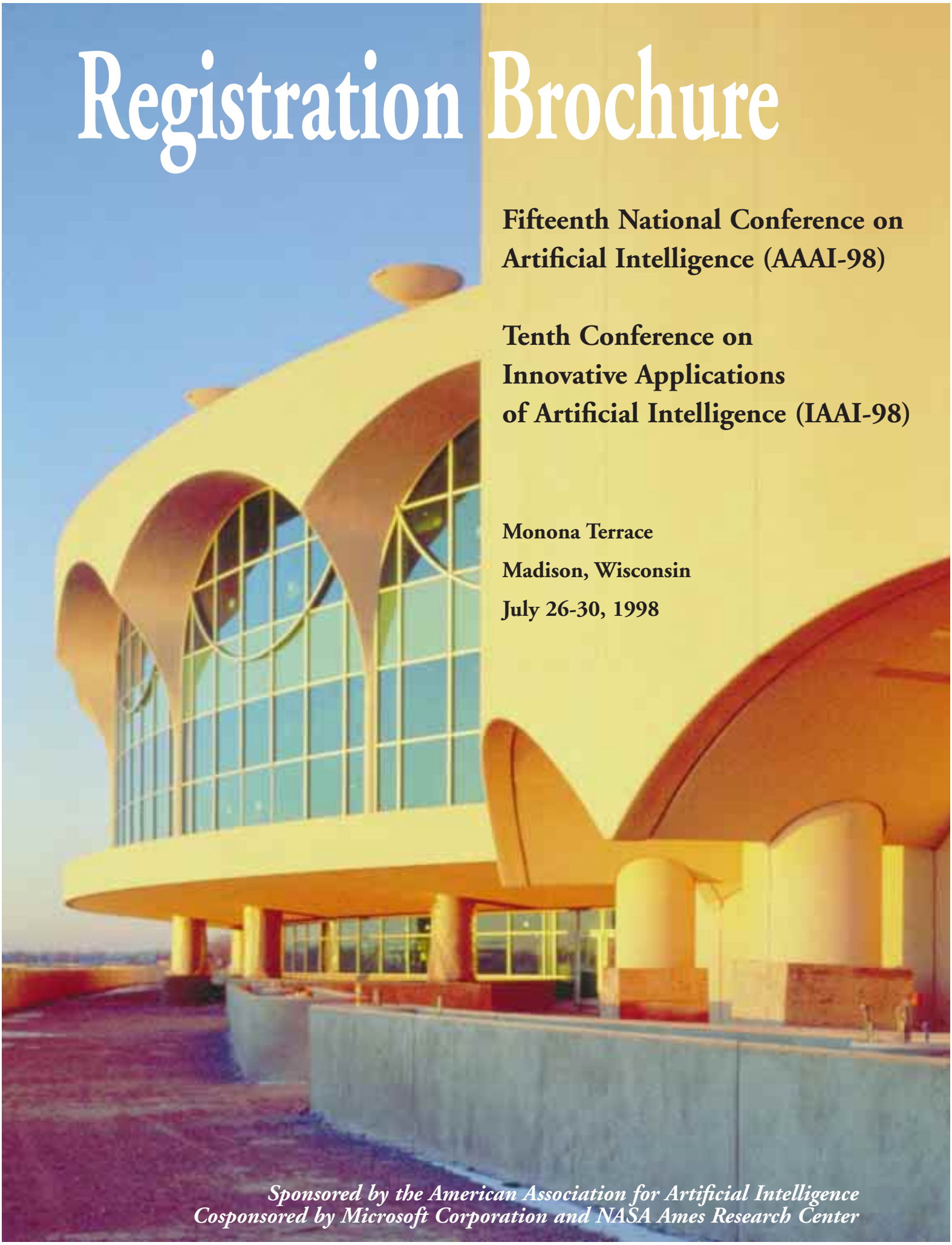
Registration Brochure



Fifteenth National Conference on Artificial Intelligence (AAAI-98)

Tenth Conference on Innovative Applications of Artificial Intelligence (IAAI-98)

Monona Terrace

Madison, Wisconsin

July 26-30, 1998

Sponsored by the American Association for Artificial Intelligence
Cosponsored by Microsoft Corporation and NASA Ames Research Center

Photo Courtesy Greater Madison Convention and Visitor's Bureau

It is our pleasure to invite you to the Fifteenth National Conference on Artificial Intelligence

Where you can

- Try your luck playing backgammon, Scrabble, poker, or bridge against some of the best AI programs in the world (Hall of Champions)
- Interact with live demonstrations of AI pets and other systems that respond to human speech and gestures, AI on the world wide web, and an intelligent classroom (Intelligent Systems Demonstrations Program)
- Dine and schmooze amidst the excitement of top robotics research teams from around the world competing head-to-head for fame and glory (AI Festival, Mobile Robot Competition and Exhibition)
- Join a team to design and build your own mobile robot and compete with it against other teams' robots (Robot Building Laboratory)

The backbone of the conference is, of course, the Technical Program, which this year comprises 144 papers, selected by a rigorous double-blind referee process out of 470 submissions. An advance listing of the Technical Program can be found at www.aaai.org/Conferences/National/1998/aaai98.html.

Our invited speakers this year include, as usual, distinguished AI researchers speaking on technical topics of broad importance, as well as some special guests from outside our community whose work reflects and builds on ours:

- A panel of science-fiction authors (including Gregory Benford) reading from their work envisioning futures with AI
- A musical Turing test between the works of Bach and compositions by an AI program (David Cope)
- A psychologist with surprising evidence of how we treat computers like people—even when we know better (Cliff Nass)

Finally, we continue this year the popular Workshop Program, Tutorial Forum, SIGART/AAAI Doctoral Consortium, and Student Abstract and Poster Program.

After looking through this brochure for more details on these events, we hope you will decide to join us in Madison!

– *Jack Mostow and Charles Rich,* AAAI-98 Program Cochairs

Please join us for IAAI-98!

- Monday – Wednesday, July 27-29
- Emerging AI Applications and Technologies
- Fully Deployed Examples of AI's Successes
- Invited Talks on Emerging Areas for AI Applications

The Tenth Annual Conference on Innovative Applications of Artificial Intelligence (IAAI-98) continues the IAAI tradition of case studies of deployed applications with measurable benefits whose value depends on the use of AI technology. In addition, IAAI-98 augments these case studies with papers and invited talks that address emerging areas of AI technology or applications. IAAI is organized as an independent program within the National Conference, with schedules coordinated to allow attendees to move freely between IAAI and National Conference sessions. IAAI and the National Conference are jointly sponsoring several invited talks that fit the theme of both programs.

AI applications developers will benefit from learning about new AI techniques that will enable the next generation of applications. Basic AI research will benefit by learning about challenges of real-world domains and difficulties and successes in applying AI techniques to real business problems. IAAI-98 will address the full range of AI techniques including knowledge-based systems, natural language, and vision.

IAAI-98 showcases the deployed applications on the first day. The papers are case studies that provide a valuable guide to designing, building, managing, and deploying systems incorporating AI technologies. These applications provide clear evidence of the impact and value that AI technology has in today's world.

Papers in the Emerging Applications and Technologies track describe efforts whose goal is the engineering of AI applications. They inform AI researchers about the utility of specific AI techniques for applications domains and also inform applications developers about tools and techniques that will enable the next generation of new and more powerful applications.

This year's papers address applications in education, the military, networking, spacecraft, medicine, games, the stock market, and more. AI techniques include, among others, planning, natural language processing, diagnostic reasoning, and cognitive simulation.

We invite you to contribute to the dialog between basic and applied AI by joining us for IAAI-98.

– *Bruce G. Buchanan,* Program Chair & *Ramasamy Uthurusamy,* Program Cochair

AAAI-98 / IAAI-98 Conference Committee

AAAI-98 Program Cochairs
Jack Mostow, *Carnegie Mellon University*
Charles Rich, *MERL—A Mitsubishi Electric Research Laboratory*

IAAI-98 Conference Chair
Bruce G. Buchanan, *University of Pittsburgh*

IAAI-98 Conference Cochair
Ramasamy Uthurusamy, *General Motors Research*

Hall of Champions Chair and Cochair
Jonathan Schaeffer, *University of Alberta*
Dana Nau, *University of Maryland*

Intelligent Systems Demonstrations Cochairs
George Ferguson, *University of Rochester*
Randolph M. Jones, *University of Michigan*

Mobile Robot Competition Cochairs
Gregory Dudek, *McGill University*
Robin Murphy, *Colorado School of Mines*
David Kortenkamp, *NASA Johnson Space Center*

Mobile Robot Exhibition Cochairs
Tucker Balch, *Georgia Institute of Technology*
Karen Haigh, *Carnegie Mellon University*

Robot Building Laboratory Chair
David Miller, *KISS Institute for Practical Robotics*

SIGART/AAAI-98 Doctoral Consortium Chair
Janyce Wiebe, *New Mexico State University*

Student Abstract and Poster Chair
Michael Littman, *Duke University*

Tutorial Cochairs
Padhraic Smyth, *University of California, Irvine*
Bart Selman, *Cornell University*

Workshop Chair and Cochair
David Leake, *Indiana University*
Raymond C. Mooney, *University of Texas at Austin*

For information about collocated conferences in Madison, please see pages 6 and 18–23 or visit our web site at www.aaai.org/Conferences/National/1998/aaai98.html.

AAAI–98 Special Events

AAAI Presidential Address

The Importance of Importance

David L. Waltz, NEC Research Institute
9:00 am, Tuesday, July 28

Human intelligence is shaped by what we care most about—the things that cause ecstacy, despair, pleasure, pain, terror, security, satisfaction, and other intense emotions. Any system we would consider truly intelligent will depend critically on the ability to separate the important from among the unimportant. This ability underlies such faculties as attention, focusing, situation and outcome assessment, priority setting, judgment, taste, goal selection, credit assignment, the selection of relevant memories and precedents, assessment of meaning and significance; all of these are important in learning from experience. AI has for the most part focused on logic and reasoning in artificial situations where only relevant variables and operators are specified, and has paid insufficient attention to processes of reducing the richness and disorganization of the real world to a form where logical reasoning can be applied. This talk will discuss the role of importance in intelligence, provide some examples of research that makes use of importance judgments, and offer suggestions for new mechanisms, architectures, applications, and research directions for AI.

David Waltz has been Vice President of the Computer Science Research Division of NEC Research Institute in Princeton, New Jersey, and an adjunct professor of computer science at Brandeis University for the last five years. Prior to this Waltz directed the data mining and text retrieval effort at Thinking Machines Corp. for nine years, and was on the faculty at the University of Illinois for eleven years. Waltz received all his degrees from the Massachusetts Institute of Technology. He is currently President of the American Association of Artificial Intelligence (AAAI) and is a Fellow of the AAAI and a senior member of IEEE. His research interests have included constraint propagation, computer vision, massively parallel systems for both relational and text databases, memory-based and case-based reasoning systems and their applications, protein structure prediction using hybrid neural net and memory-based methods, and connectionist models for natural language processing.

Special AAAI-98 Outstanding Paper Session

4:30 – 6:00 pm, Tuesday, July 28

The presentation of the three papers that have been recognized as the AAAI-98 Outstanding Papers will be combined into one special session in the invited talk track of the conference. For complete abstracts of these three talks, please consult the AAAI web site. The papers, listed alphabetically by first author, are:

- *Learning Evaluation Functions for Global Optimization and Boolean Satisfiability*, by Justin A. Boyan and Andrew W. Moore, Carnegie Mellon University
- *The Interactive Museum Tour-Guide Robot,* by Wolfram Burgard, Armin B. Cremers, Dieter Fox, and Dirk Haehnel, University of Bonn; Gerhard Lakemeyer, University of Aachen; Dirk Schulz and Walter Steiner, University of Bonn; and Sebastian Thrun, Carnegie Mellon University
- *Acceleration Methods for Numeric CSPs* by Yahia Lebbah and Olivier Lhomme, Ecole des Mines de Nantes (France)

The AAAI-98 Program Committee wishes to congratulate all the authors on their accomplishments!

AAAI-98 Rendezvous, Opening Reception and AI Festival

As you arrive in Madison (or even if you are already there!), hook up with your colleagues at the informal rendezvous in the lobby of the Monona Terrace Convention Center from 5:30 – 7:00 pm on July 27, 1998. Light snacks will be available.

AAAI-98 Opening Reception

The AAAI-98 opening reception will be held Tuesday, July 28 from 6:00 – 7:00 pm in the Grand Terrace of the Monona Terrace Convention Center. This event will provide the traditional opportunity for attendees to socialize at the end of the first day of technical sessions. A variety of hors d'oeuvres and a no-host bar will be available. Admittance to the reception is free to AAAI-98 registrants. A $15.00 per person fee ($5.00 for children) will be charged for spouses and other nontechnical conference registrants.

AI Festival

AAAI is pleased to introduce an extended AI Festival, which will be held Wednesday, July 29 from 6:00 – 10:00 pm in the Exhibition Hall of the Monona Terrace Convention Center. Having the Festival in the evening, when no technical paper sessions are scheduled, will allow you to stroll among numerous exciting events—the Mobile Robot Competition and Exhibition, the Hall of Champions, the Intelligent Systems Demos, and the Student Posters—enlivened by informal supper and conversation. Several special events are being planned for the evening, which should make for quite a full evening! Admittance to the reception is free to AAAI-98 registrants. A $20.00 per person fee ($5.00 for children) will be charged for spouses and other nontechnical conference registrants.

Invited Presentations

AAAI–98 IAAI–98 invited presentations will be held Tuesday-Thursday, July 28-30. The following is a partial list in alphabetical order. Schedules are subject to change.

AI in Medicine: The Spectrum of Challenges from Managed Care to Molecular Medicine

Russ B. Altman, Stanford University
2:00 – 3:00 pm, Wednesday, July 29

AI has embraced medical applications from its inception, and some of the earliest work in successful application of AI technology occurred in medical contexts. Medicine in the twenty first century will be very different than medicine in the late twentieth century. Fortunately, the technical challenges to AI that emerge are very similar, and the prospects for success are high.

When and Where Will AI Meet Robotics? Issues in Representation

Ruzena Bajcsy, University of Pennsylvania
9:00 – 10:00 am, Thursday, July 30

In the early days of AI, robotics was an integral part of our research effort. In the early 1970s, all major AI laboratories had research programs in robotics. However, by the late 1970s, robotics took its own course separate from the core activities of AI. In this presentation, Bajcsy explores the *common* issue that is pertinent to both AI and robotics, the issue of representation.

Experiments in Musical Intelligence

David Cope, University of California, Santa Cruz
10:30 – 11:30 am, Thursday, July 30

Musical works contain code about the processes and influences that created them. The computer program EXPERIMENTS IN MUSICAL INTELLIGENCE attempts to decipher this code and create new but stylistically-faithful music. Examples of output will be performed, followed by a discussion of how these principles can transfer to other media.

Modeling Satisfaction and Satisfactory Modeling: Modeling Problems So Constraint Engines Can Solve Them

Eugene C. Freuder, University of New Hampshire
3:10 – 4:10 pm, Tuesday, July 28

A wide variety of problems can be modeled as constraint satisfaction (or optimization) problems. Once they are so modeled, powerful search and inference methods can be brought to bear. Modeling itself, however, presents a series of challenges. The ultimate challenge is to automate the modeling process.

"Every Time I Fire a Linguist, My Performance Goes Up," and Other Myths of the Statistical Natural Language Processing Revolution

Julia Hirschberg, AT&T Labs—Research
3:10 – 4:10 pm, Wednesday, July 29

In the past two decades, natural language processing has experienced a revolution, from rule-based symbolic approaches to statistical, corpus-based techniques—with remarkable success in applications such as machine translation, automatic speech recognition, and text-to-speech. But there are signs that this revolution may be finding its limits, signs this talk will explore.

Structured Probabilistic Models: Bayesian Networks and Beyond

Daphne Koller, Stanford University
11:40 am – 12:40 pm, Wednesday, July 29

In recent years, Bayesian networks have had significant impact on many areas in AI, including diagnosis, planning, and learning. Koller describes this technology, and analyzes the reasons behind its success, suggesting that the use of structured model-based representations is one crucial component. These insights lead to richer probabilistic representations that can model significantly more complex domains, involving many components that interact and evolve over time. Koller argues that these representations can help us build agents that reason and act in complex uncertain environments.

Panel

Evaluating Representations of Common Sense

Organizer: Douglas B. Lenat, CYCORP
11:40 am – 12:40 pm, Thursday, July 30

Everyone knows that horses have heads, babies want milk, unsupported objects fall, falling eggs break, and so forth. To use such knowledge, our programs manipulate representations of them. But by what criteria should we evaluate various representations of commonsense knowledge? How should we evaluate the different contradictory criteria for evaluating representations?

Panel

Science Fiction Writers Read the Futures of AI

Organizer: David Miller, KISS Institute for Practical Robotics
4:30 – 6:00 pm, Wednesday, July 29

Visionary science fiction authors are the prophets of AI. Unencumbered by the burden of having to implement anything, they construct vivid images of where our work might lead—the good, bad, and ugly. They inspire and warn, challenge and scold, excite and lampoon, tickle and scare. They ask questions we need to think about.

In this panel, some science fiction authors will articulate their best hopes, worst fears, and most interesting predictions about AI and its role in (future?) society. The ensuing discussion will attempt to raise our consciousness by discussing future issues the field of AI will need to consider as AI advances in its capabilities and pervasiveness.

How People Treat Computers Like Real People: Experimental Evidence of a New Paradigm

Clifford Nass, Stanford University
9:00 – 10:00 am, Wednesday, July 29

This talk will describe a series of experimental studies that demonstrate that people apply the same social rules and expectations to computers that they apply to people. Areas to be discussed include politeness, personality, reciprocity, adaptation, gender, voice input and output, humor, and computer-mediated communication versus human-computer interaction.

Learning Sparse Representations: Machine Learning, Machine Vision and the Brain

Tomaso Poggio, Massachusetts Institute of Technology
11:40 am – 12:40 pm, Tuesday, July 28

Learning is becoming the central problem in trying to understand intelligence and in trying to develop intelligent machines. Poggio will outline some of the recent efforts in the domain of vision to develop machines that learn and to understand the brain mechanisms of learning.

Special Panel

Eight Cool Things from the Collocated Conferences

Organizer: Charles Rich (AAAI-98 Program Cochair), MERL—A Mitsubishi Electric Research Laboratory
10:30 – 11:30 am, Tuesday, July 28

Please see the box at right for a description of this special panel.

Real-World Scheduling Applications A Valuable Mine Field Where Search Algorithm Is Less Important Than Representation and Usability

Monte Zweben, Entrepreneur-in-Residence, Institutional Venture Partners & Matrix Partners
10:30 – 11:30 am, Wednesday, July 29

After six years of commercially developing, marketing, selling, and deploying manufacturing scheduling systems, we learned that scheduling was nearly impossible to do generically. Yet companies that attempted to model in excessive detail generally failed, and those that planned more abstractly succeeded. A project was only successful if the key decision criteria was captured in the representation—an obvious point that was extraordinarily hard to execute.

Collocated Conferences in Madison

- **Eighth International Conference on Inductive Logic Programming** (ILP '98), July 22-24, 1998 (www.cs.louisville.edu/faculty/page/ilp98)
- **Third Annual Genetic Programming Conference** (GP-98), July 22-25, 1998 (www.genetic-programming.org)
- **Symposium on Genetic Algorithms** (SGA-98), July 22-25, 1998 (www.genetic-algorithm.org)
- **Eleventh Annual Conference on Computational Learning Theory** (COLT '98), July 24-26, 1998 (theory.lcs.mit.edu/COLT-98)
- **Fifteenth International Conference on Machine Learning** (ICML '98), July 24-26, 1998 (www.cs.wisc.edu/icml98)
- **Fourteenth Annual Conference on Uncertainty in Artificial Intelligence** (UAI-98), July 24-26, 1998 (www.uai98.cbmi.upmc.edu)
- **Eighth Annual Meeting of the Society for Text and Discourse** (ST&D98), July 29-31, 1998 (text2.psych.umn.edu/ST&DHomePage.htmld/)
- **Twentieth Annual Meeting of the Cognitive Science Society,** August 1-4, 1998 (psych.wisc.edu/CogSci98/conf.html)

The eight organizations above have chosen to hold their meetings in Madison contiguous with AAAI-98 this year. In honor of this special occasion, we have invited a chairperson from each of these conferences to join a panel on the opening morning of AAAI-98 to answer the following question: What is the most important recent result/experiment/discovery in the area of your conference that the general AI audience doesn't know or understand or appreciate, but should (and why)?

For registration information for ILP '98, COLT '98, or ICML '98, please see the registration section elsewhere in this brochure. For the other conferences listed above, please visit their web sites.

AAAI-98 Exhibition

The AAAI-98 Exhibition will span three days (Tuesday – Thursday, July 28-30) and will comprise a host of events, designed to showcase current products, research and applications in AI. Admittance is open to all AAAI-98 registrants. For more information about the exhibition, please visit the AAAI web site or write to ncai@aaai.org.

AAAI-98 Exhibitors

Exhibitors will be leading suppliers of AI software as well as AI consultants and publishers displaying the latest in AI books and periodicals. Past AAAI Exhibitors have included:

- AAAI Press
- AK Peters, Ltd.
- Academic Press
- Applied Science Laboratories
- Brightware, Inc.
- Franz, Inc.
- Harlequin Ltd
- Kluwer Academic Publishers
- The MIT Press
- Morgan Kaufmann Publishers, Inc.
- NASA Ames Research Center
- *PC AI Magazine*
- Prentice Hall
- Real World Interface, Inc.
- Springer Verlag
- US Department of Energy, Office of Science and Technology

AAAI-98 Hall of Champions

The 1998 Hall of Champions will feature competitions between the best humans and best computers in several games. In backgammon and Scrabble, it is an open question as to whether machine is better than man. We will be featuring two events: a three-day backgammon match between Gerry Tesauro's TD GAMMON and the world champion Malcolm Davis, and a three-day Scrabble match between Brian Shepphard's MAVEN and Adam Logan, the best human player in the world. Hopefully these events will be long enough to tell us whether computers have now exceeded the abilities of the best human players.

In addition, there will be short exhibitions in bridge, go and poker. Conference attendees will have the opportunity to try their luck playing any of the Hall of Champions programs.

AAAI-98 Intelligent Systems Demonstrations

AAAI-98 introduces a new program of Intelligent Systems Demonstrations to showcase state of the art AI implementations. System builders will be on hand to present their work, and audience interaction will be encouraged where possible. The program includes a wide variety of intelligent systems representing the diversity of research in the field. Examples include systems that respond to human speech and gestures, software simulations that incorporate intelligent components, systems using AI on the world wide web, an intelligent classroom, and even some "artificially intelligent pets."

AAAI-98 Mobile Robot Competition

The Seventh Annual AAAI Mobile Robot Competition will host more challenging versions of two popular events from 1997: Hors d'Oeuvres Anyone? and Find Life on Mars. The finals for the Hors d'Oeuvres Anyone? competition will be held during the AI Festival, where the robots will replace the waiters. The purpose of the event is to demonstrate innovation in human-robot interaction. Be on the look out for robots in the lobby handing out flyers and making announcements during the conference as part of the ongoing technical challenge round. The Find Life on Mars event will demonstrate advances in more traditional navigation, task planning, and mapping activities. The finals for Find Life on Mars will be held on Thursday.

All teams will have posters set up in the robotics arena area to encourage a better understanding of the AI employed by the entrants. In addition, a number of Technical Innovation awards will be given to teams which show significant advances in some area of AI, independently of their place in the finals of the events.

For more information, please visit the AAAI web site or www.cc.gatech.edu/aimosaic/robot-lab/aaai98/.

AAAI-98 Mobile Robot Exhibition

The mission of the AAAI-98 Robot Exhibition is to showcase current research in robotics that does not fit into the competition tasks. This may include robots of different shapes, robots with emotion, robots over the Web, videos and more. We're aiming for as much variety as possible! Exhibitors are still welcome. For details and points-of-contact, visit www.cc.gatech.edu/~aaai98/

Special Programs

AAAI-98 Robot Building Laboratory

Sunday – Monday, July 26-27, 1998
Preregistration is required.

AAAI-98 Robot Building Laboratory participants will spend the day seeing how easy or difficult it is to implement their favorite AI techniques on an actual robot. Participants will be grouped into small teams, each of which will build their own mobile robot. The RBL will start with a quick tutorial on robot basics covering sensors, effectors and real-time programming techniques. Participants will spend most of their time designing, building, and programming their mobile robot. Throughout the laboratory there will be individual team tutorials covering specific aspects of robot design and programming. Demonstrations of other robot systems and technologies will also take place, and an extensive library of robot functions will be available. Some portions of the mobility system will be provided prebuilt, thereby assuring that all groups get a good start on a fully functional robot. There will be ample opportunity for individual design, creativity, testing and redesign. At the end of the session all the robots will participate in a double-elimination tournament. Then we will see which robot has the right stuff to best accomplish the task (which will be specified at the beginning of the robot lab)!

This tournament will be open to all the attendees of AAAI. The lab is being organized and taught by the KISS Institute for Practical Robotics for AAAI. For updated information about this event, please write to rbl98@kipr.org. For information about how to register for RBL-98, please see the registration fee schedule in this brochure.

Special Tutorial (MP5)

Getting that First Grant: A Young Scientist's Guide to (AI) Funding in America

Presented by Jim Hendler
Monday, July 27, 7:00 – 8:30 pm
This tutorial is open to all AAAI-98 registrants at no additional charge.

Funding for AI in our country derives from three main sources: the Department of Defense, the National Science Foundation, and from corporate contributions to research. For a young scientist—and even for some who have been at it a long time—finding one's way through the morass of rules and regulations, not to mention learning the tricks of the trade, can be a daunting task. Yet, with more and more schools increasing the pressure on younger scientists to bring in their own money, failing to master the arcane art of fund raising can be a serious career breaker. In this short seminar, we review some of the rules and practices in the funding world, and discuss many practical hints for getting grants.

Jim Hendler is currently a professor at the University of Maryland and is serving as the Air Force Office of Scientific Research's program manager for software and systems. As a university professor he has received funding from many different sources. In his role as a program manager, he funds approximately $10 million per year in AI and other software areas.

Student Programs

AAAI-98 Student Abstract Poster Program

The Student Abstract Program is designed to provide a forum in which students can present and discuss their work while still in its early stages, meet peers who have related interests, and introduce themselves to more senior members of the field. The twenty-five students whose abstracts were chosen for inclusion in the AAAI-98 conference *Proceedings* will display their work at the Student Abstract Poster Session during the AI Festival on Wednesday, July 29, 6:00 – 10:00 pm in the Monona Terrace Exhibition Hall. All AAAI-98 registrants are encouraged to visit these presentations.

AAAI/SIGART Doctoral Consortium

The Third AAAI/SIGART Doctoral Consortium will be held Monday and Tuesday, July 26-27, 1998 from 8:30 – 6:00 pm. The Doctoral Consortium provides an opportunity for a group of Ph.D students to discuss and explore their research interests and career objectives in an interdisciplinary workshop together with a panel of established researchers. The sixteen students accepted to participate in this program will also participate in the Student Poster program on Wednesday, July 29, from 6:00 – 10:00 pm during the AI Festival. All interested AAAI-98 student registrants are invited to observe the presentations and participate in discussions at the workshop. AAAI and ACM/SIGART gratefully acknowledge a grant from the Office of Naval Research, which partially supports student travel to this event.

Tutorial Forum

The 1998 AAAI Tutorial Forum features sixteen four-hour tutorials that provide an opportunity for researchers to spend two days freely exploring exciting advances in disciplines outside their normal focus. All AAAI attendees are encouraged to participate in this continuing education program. Each tutorial is taught by experienced scientists and practitioners in AI. One low fee entitles tutorial forum registrants to attend up to four consecutive tutorials, and to receive the corresponding four tutorial syllabi. The Special Tutorial (MP5) is open to all AAAI-98 registrants for no additional fee.

Session 1: Sunday, July 26, 9:00 AM – 1:00 PM

SA1: Computational Molecular Biology and Artificial Intelligence: An Introduction *(Rick Lathrop)*

SA2: Economically Founded Multiagent Systems *(Tuomas Sandholm)*

SA3: Recent Advances in AI Planning *(Craig Knoblock and Qiang Chung Yang)*

SA4: Advanced Techniques for Information Access *(Marti A. Hearst and Michael J. Pazzani)*

Session II: Sunday, July 26, 2:00 – 6:00 PM

SP1: Automatic Text Summarization *(Udo Hahn and Inderjeet Mani)*

SP2: Model-Based Autonomous Systems *(Pandu Nayak and Brian Williams)*

SP3: Principles and Strategies of Automated Inference: A Unifying View *(Rina Dechter and Irina Rish)*

SP4: Integration of Artificial Intelligence and Operations Research Techniques *(Carla P. Gomes, Ken McAloon and Carol Tretkoff)*

Session III: Monday, July 27, 9:00 AM – 1:00 PM

MA1: Graphical Models and Variational Approximation *(Michael I. Jordan)*

MA2: Genetic Algorithms, Operations Research and AI *(Darrell Whitley)*

MA3: From Action Theories to Agent-Planning Control Strategies for Reactive Agents *(Chitta Baral and Froduald Kabanza)*

MA4: Statistical Methods in Natural Language Processing *(John Lafferty and Lillian Lee)*

Session IV: Monday, July 27, 2:00 – 6:00 PM

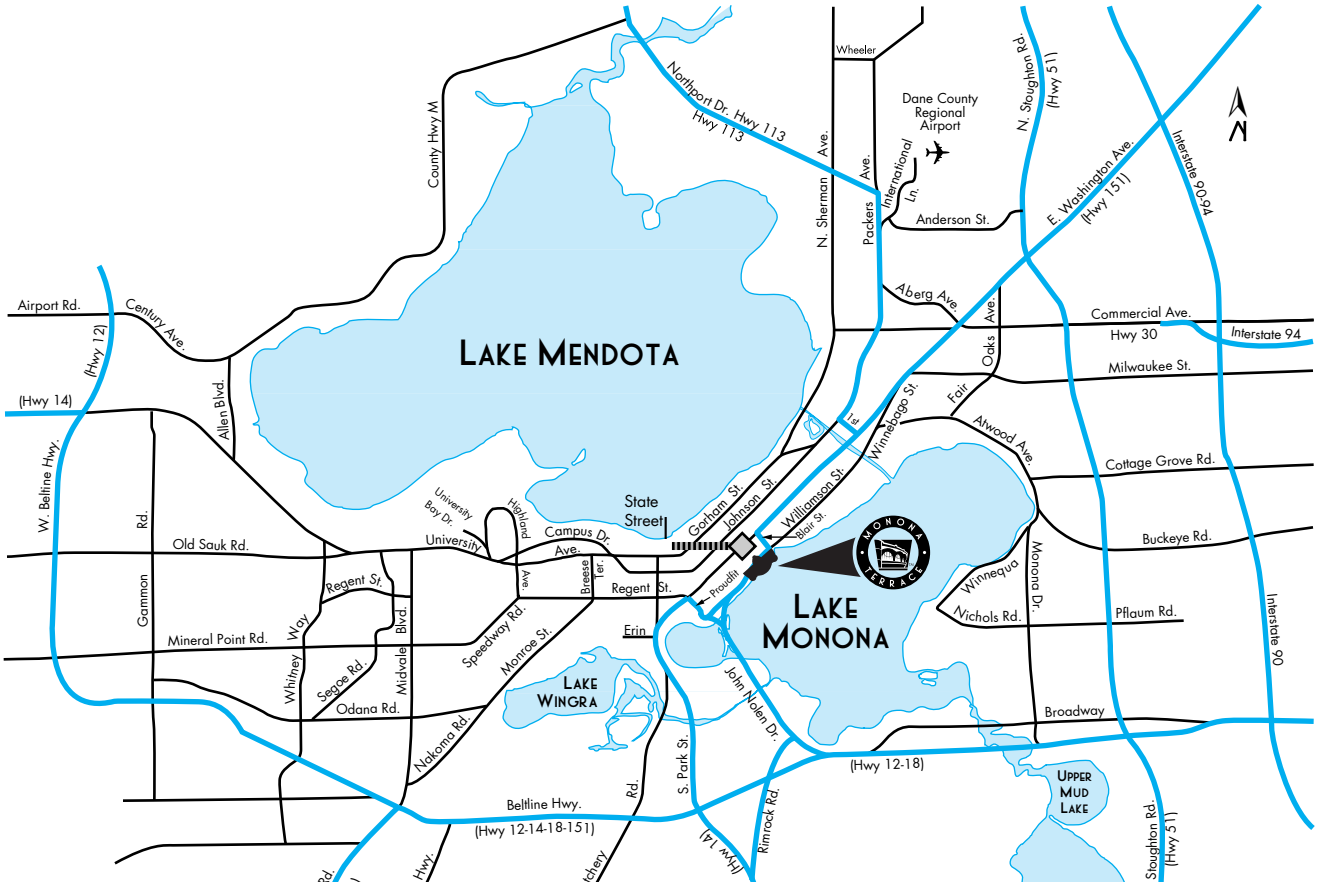
MP1: Learning Bayesian Networks from Data *(Nir Friedman and Moises Goldszmidt)*

MP2: Intelligent Simulation *(Feng Zhao and Chris Bailey-Kellog)*

MP3: Support Vector Learning *(Bernhard Schoelkopf)*

MP4: Computational Aspects of Knowledge Representations *(Marco Cadoli and Thomas Eiter)*

MP5: Special: Getting that First Grant: A Young Scientist's Guide to (AI) Funding in America *(Jim Hendler)* (Monday, July 27, 7:00 – 8:30



pm)

Advanced Techniques for Information Access (SA4)

Marti A. Hearst and Michael J. Pazzani
9:00 am – 1:00 pm, Sunday, July 26

The vast amount of information available on the Internet underscores the importance of techniques for locating relevant, useful, or interesting information. These techniques range from filtering news groups for articles of interest, to determining which web sites are good sources of information, to helping users understand their retrieval results and reformulate their queries.

This tutorial will review a variety of the findings from several decades of research on information retrieval focusing on approaches to information filtering, classification, and clustering. Next, machine learning approaches to text classification will be described and the relationship between machine learning and classic approaches from information retrieval will be discussed. Recent developments, such as collaborative filtering and information extracting, will be described. The tutorial will describe how the results of these kinds of content analysis should be used as part of an information access system, and then describe the state-of-the-art in user interfaces for information access.

The intended audience of this tutorial is practitioners and researchers interested in issues involved with applying machine learning and information retrieval algorithms to classification and ranking of information on the Internet. There are no special prerequisites, although a familiarity with introductory AI concepts such as classification and search, and basic knowledge of mathematics and probability will be assumed. Prior exposure to basic machine learning algorithms will be beneficial since these topics will be covered briefly.

Michael Pazzani is a professor and department chair in Information and computer science at the University of California, Irvine. He has been active in machine learning and information access research for the past decade with numerous publications in IJCAI, AAAI, and the International Machine Learning Conference.

Marti Hearst is an assistant professor at the University of California at Berkeley in the School of Information Management and Systems (SIMS). She received her B.S., M.S., and Ph.D degrees in computer science from the University of California at Berkeley. Her research focuses on user interfaces and robust language analysis for information access systems.

Automatic Text Summarization (SP1)

Udo Hahn and Inderjeet Mani
2:00 – 6:00 pm, Sunday, July 26

Research and development in automatic text summarization has become increasingly important as the rapid growth of the world wide web and on-line information services have made available vast amounts of textual data. This tutorial will provide an overview of the main challenges and methodologies in text summarization.

The tutorial will begin with a discussion of the varieties of summarization, and will offer a brief history of automatic text summarization. Naturally occurring human summarization activities will be discussed, and questions as to the appropriate ecological niches for automatic summarization will be posed. Summarization methods and tasks are differentiated from the closely related ones found in other disciplines involving text analysis. Both shallow approaches, incorporating statistical and linguistic techniques, as well as deeper approaches, where summarization is characterized as an AI reasoning task, will be discussed. Evaluation metrics and current evaluation efforts will be discussed in detail. New research areas such as multi-document and multi-media summarization will also be treated. We will conclude by identifying outstanding problems which remain challenges for the future.

Some familiarity with questions relating to natural language processing and information retrieval techniques is considered helpful, but will not be a prerequisite for attending the tutorial.

Udo Hahn is an associate professor of computational linguistics at Albert-Ludwigs-Universitat Freiburg, Germany. His research covers the intersection of text understanding and information systems and includes areas such as text summarization, intelligent text retrieval, acquisition of knowledge from texts, and text mining.

Inderjeet Mani is a principal scientist at the MITRE Corporation in Reston, Virginia. Mani was cochair of the ACL/EACL'97 Workshop on Intelligent Scalable Text Summarization, is assisting the U.S. Government with the TIPSTER First Automatic Text Summarization Conference, and is coediting a book on text summarization.

Computational Aspects of Knowledge Representation (MP4)

Marco Cadoli and Thomas Eiter
2:00 – 6:00 pm, Monday, July 27

Knowledge representation (KR) deals with descriptions—in some language—that correspond in some way to the world. In this discipline we study theory and practice of representation and computational manipulation of the knowledge that a robot should have to perform some useful task.

In this tutorial we address computational aspects of KR, starting with the simplest language for KR: first-order logic (and its fragment of propositional logic). Limitations of the language will be addressed, and new paradigms for representation introduced, such as logics for nonmonotonic reasoning, belief revision, and planning. For each logical language we will try to answer two kinds of questions:

- What does it do for me? What kind of deductions can I obtain?
- What is the computational cost of reasoning in it? Are there efficient algorithms for reasoning?

Relevant notions of computational complexity will be reminded.

Marco Cadoli received a Laurea degree in electrical engineering (1989) and a Ph.D in computer science (1993) from Universita "La Sapienza" in Rome, Italy. Since 1994 he has been an assistant professor of computer engineering at the same university. His primary research interests are computational aspects of knowledge and data representation, in particular nonmonotonic reasoning, concept description languages, planning, and query languages. He is coauthor of *Fundamentals of Software Design, with Applications in C++,* and has served on the program committees of several conferences on AI and databases, including AAAI-96, AAAI-97, AAAI-98, ICDT-97, ICDT-99, and KR-98.

Thomas Eiter received the Dipl.-Ing. degree, in 1989, the doctoral degree, in 1991, and the Dozent degree, in 1995, from the Technical University of Vienna. He has been associated with the Christian Doppler Laboratory for Expert Systems, the Institute for Information Systems at the Technical University of Vienna and the CD Lab for Expert Systems. Since 1996 he has been an associate professor of computer science at the University of Giessen, Germany. His current research interests are foundations of knowledge representation and reasoning, logic in computer science and AI, and foundations of databases.

Computational Molecular Biology and Artificial Intelligence: An Introduction (SA1)

Rick Lathrop
9:00 am – 1:00 pm, Sunday, July 26

From the standpoint of world scientific history, the fields of advanced computation and molecular biology have dominated the latter half of the twentieth century much as quantum and relativistic physics dominated the first half. Work at their multi-disciplinary interface continues to effect profound societal and technological changes; for example, computational analysis of data from the Human Genome Project will drive medicine for at least the first half of the next century. Difficult and complex biomedical problems often spur the development of novel computational approaches and algorithms, while sophisticated computational analysis often leads to new scientific knowledge. This is an excellent domain for AI because it offers challenging but solvable problems; enthusiastic, supportive domain experts; large on-line databases; a weak domain theory that your program can help build; accessible frontiers of knowledge; and is fun, exciting, important.

This tutorial will provide a selected introduction to the multidisciplinary interface between advanced computation and the information-intensive fields of biology, biotechnology, and medicine. Topics will include an introduction to the molecular domain, methods of sequence analysis and comparison, atomic and molecular modeling, phylogenetic tree reconstruction, biological data- and knowledge-bases, rational drug design and discovery, combinatorial chemistry and gene-chip machines, and related topics. The tutorial assumes no prior biological knowledge.

Rick Lathrop received a Ph.D in artificial intelligence from the Massachusetts Institute of Technology in 1990. He is now an associate professor of computer science at the University of California, Irvine, conducting research in artificial intelligence and computational molecular biology. He has published numerous book chapters, journal articles, and conference papers in that field, including cover articles of *Communications of the ACM* and the *Journal of Molecular Biology;* is on the board of directors of the International Society for Computational Biology; is a cofounding scientist of Arris Pharmaceutical Corporation; and is on the Scientific Advisory Board of CombiChem, Inc.

Economically Founded Multiagent Systems (SA2)

Tuomas Sandholm
9:00 am – 1:00 pm, Sunday, July 26

In multiagent systems such as those for agent-mediated electronic commerce, computational agents find contracts on behalf of the real world parties that they represent. This automation saves human negotiation time. Computational agents are often better at finding beneficial deals in combinatorially and strategically complex settings. Applications include electronic trading, manufacturing planning and scheduling among companies, electricity markets, allocating and pricing bandwidth in multi-provider multi-consumer computer networks, digital libraries, vehicle routing among dispatch centers, and resource allocation in distributed operating systems, to name just a few.

A key research goal is to design open distributed systems in a principled way that leads to globally desirable outcomes even though every participating agent only considers its own good and may act insincerely. This tutorial covers relevant topics in AI, game theory, market mechanisms, voting, auctions, coalition formation, and contract nets. Emphasis is given to rigorous results and algorithms—both classic ones from microeconomics and recent ones from the distributed AI community—that have direct applications to computational multiagent systems. Effects of computational limitations (agents' bounded rationality) are discussed as a key feature that has not received adequate attention. Implementation experiences will be shared, and real world applications presented.

Tuomas Sandholm is an assistant professor of computer science at Washington University. He received his Ph.D. and M.S. degrees in computer science from the University of Massachusetts at Amherst in 1996 and 1994. He earned an M.S. (B.S. included) with distinction in industrial engineering and management science from the Helsinki University of Technology in 1991. He has eight years of experience building multiagent systems. He has also codeveloped two fielded AI systems, and is the chief scientist of an electronic commerce startup company. He has published over sixty technical papers, and received several academic awards including the NSF Career award.

Photo courtesy William Patterson

From Action Theories to Agent—Planning Control Strategies for Reactive Agents (MA3)

Chitta Baral and Froduald Kabanza
9:00 am – 1:00 pm, Monday, July 27

This tutorial will show how to formulate the correctness of control programs of an agent in a dynamic world and how to automatically construct them using action theories together with paradigms such as Markov decision theory, automata theory, control theory, and model checking.

We will first give an overview of action theories and their concerns and discuss the role they play in agents in a static world, and deliberative agents in a dynamic world. We will then describe how reactive and hybrid agents can also be related to actions theories. In particular, we will formulate the notion of correctness of a reactive agent with respect to an action theory and a simple goal, give sufficiency conditions for the correctness, and discuss automatic generation of reactive rules using action theories.

We will then consider more general action theories that allow probabilities and are based on Markov decision theory. Together with it we will also consider more general goals (that will allow us to express temporal aspects, cyclic behaviors, real time deadlines, fuzzy perceptions), and more general environments, and describe recent planning paradigms that can be used to construct reactive control for agents in such a world.

Chitta Baral is an associate professor at the University of Texas at El Paso. He obtained his Ph.D in computer science from the University of Maryland in 1991. He has published many articles in AI conferences and journals. He was awarded NSF RIA and Career awards for his research on actions and agents. He led two mobile robot teams to third place and first place finish in AAAI-96 and -97 robot contests.

Froduald Kabanza is associate professor at the Université de Sherbrooke where he leads efforts in automated planning and process control for multimedia interface agents and mobile robotics systems. He obtained his Ph.D in computer science in 1992 and a B.Sc. in computer science in 1988, both from Université de Liege. He is the author of several papers on planning and control in AI as well as control conferences and journals.

Getting that First Grant: A Young Scientist's Guide to (AI) Funding in America (MP5)

Jim Hendler
Monday, July 27, 7:00 – 8:30 pm

Please see description under Special Programs, page 8. This tutorial is open to all AAAI-98 attendees, and requires no preregistration.

Genetic Algorithms, Operations Research and AI (MA2)

Darrell Whitley
9:00 am – 1:00 pm, Monday, July 27

Genetic algorithms employ a form of simulated evolution to solve optimization problems when more conventional methods cannot be applied. Increasingly, evolutionary algorithms borrow from operations research (OR) and heuristic search. Hybridization with local search operators coupled with complex representations is common. The practical implications of the existing theory will be explored with respect to applying evolutionary algorithms to complex problems. Special attention will be given to problem representation, especially in OR and AI problem domains. Walsh analysis will be introduced as a tool for understanding how problem nonlinearity changes as a function of representation. The tutorial will also review how Walsh analysis can be used to understand NK-landscapes (from theoretical biology) and K-Sat problems.

Applications in three areas will be reviewed. First, evolutionary algorithms and hybrid algorithms have been applied to discrete parameter optimization problems; genetic algorithms will be contrasted with other methods that do not use gradient information. Second, successful applications of genetic algorithms for combinatorial problems such as the traveling salesrep problem (TSP) and scheduling will be reviewed. Genetic algorithms have solved 3,000 city TSPs to optimality; genetic scheduling systems are now being used in various industries. Finally, the combination of genetic algorithms and neural networks will be discussed, with particular emphasis on reinforcement learning and neurocontrol.

No background knowledge will be assumed. A tutorial for the course is available electronically from: www.cs.colostate.edu/~whitley/Pubs.htm

Darrell Whitley is a professor of computer science and director of the Colorado State Artificial Intelligence Laboratory at Colorado State University. He developed some of the first evolutionary methods for solving scheduling applications and the traveling salesrep problem. He also pioneered some of the first systems combining genetic algorithms and neural networks. He has served as chair of the governing board of the International Society for Genetic Algorithms (1993-1997) and is currently Editor-in-Chief of *Evolutionary Computation*.

Graphical Models and Variational Approximation (MA1)

Michael I. Jordan
9:00 am – 1:00 pm, Monday, July 27

Graphical models (also known as Bayesian belief networks) provide an elegant formalism for managing uncertainty that unifies much of the literature on stochastic modeling. For sparse networks (such as networks in the form of chains or trees), graphical model algorithms are exact, efficient, and practical. For dense networks, however, the exact algorithms are often hopelessly inefficient, and this fact has hindered the application of this richer class of models to large-scale problems. I discuss variational methodology, which provides a general framework for approximate graphical model inference. The variational methods I present are efficient; moreover, they tend to be more accurate for dense networks than for sparse networks. They can readily be combined with exact techniques to yield a class of algorithms that perform well for a variety of network architectures. I illustrate these ideas with examples of applications of dense networks to problems in diagnosis, prediction, and control.

No previous knowledge of graphical models or variational methods is required (although a certain degree of comfort with basic probability theory and basic optimization theory will be assumed). The talk will include an overview of graphical models, including a discussion of exact inference methods, with an emphasis on the links between graphical models and closely related ideas in pattern recognition, information theory and physics.

Michael I. Jordan is a professor at the University of California, Berkeley in the Department of Computer Science and the Department of Statistics. He has published over 100 articles in the area of machine learning, focusing on neural networks and graphical models. He earned his Ph.D from the University of California, San Diego in 1986 and taught at the Massachusetts Institute of Technology from 1988 to 1998.

Photo courtesy Joe DeMaio

Integration of Artificial Intelligence and Operations Research Techniques (SP4)

Carla P. Gomes, Ken McAloon, and Carol Tretkoff
2:00 – 6:00 pm, Sunday, July 26

Due to a confluence of research in AI, operations research (OR), and computer science, we can combine these areas in new ways to address problems in planning and scheduling, and combinatorial optimization in general. We will review recent progress using AI based phase-transition analysis to better understand the complexity of combinatorial problems, using CSP methods from AI to solve OR scheduling problems, employing AI search techniques in integer programming, exploiting the properties of the probability distributions of randomized search methods for boosting combinatorial search, with applications in planning and scheduling, and more generally, applying hybrid systems using cooperating solvers. The tutorial is meant for a general AI audience; no prior knowledge of OR techniques is assumed.

Carla P. Gomes received her Ph.D. in computer science, area of artificial intelligence and operations research, from the University of Edinburgh in 1993. She also has an M.Sc. in applied mathematics from the University of Lisbon. She is a research associate at Cornell University and she is also affiliated with the Air Force Research Lab (Rome Laboratory; knowledge-based systems area). Her research interests include, among other subjects, planning and scheduling, and multidisciplinary approaches for solving combinatorial problems.

Ken McAloon is Broeklundian Professor of Computer Science and Mathematics at City University New York. A coauthor of *Optimization and Computational Logic,* McAloon has worked in constraint based programming for ten years now. He holds his Ph.D in mathematics from Berkeley and has taught at Princeton and the University of Paris. His current research is in hybrid constraint solving systems.

Carol Tretkoff received her Ph.D in mathematics from the Courant Institute of New York University. She has held teaching and research positions at Bell Labs, IDA, and the City University of New York. She is currently a senior consultant in optimization at Ilog in Mountain View, California.

Intelligent Simulation (MP2)

Feng Zhao and Chris Bailey-Kellogg
2:00 – 6:00 pm, Monday, July 27

Intelligent simulation is a new problem-solving paradigm for data interpretation and control tasks in science and engineering. Because of rapid advances in information processing and microelectronics, many practical applications require real-time interpretation of information in order to effectively interact with the environment. The information is often in a data-rich form such as images, videos, or spatially distributed measurements of physical processes. For example, a network of computational agents embedded in a "smart building" must stitch together local measurements in order to ensure occupant comfort while minimizing energy consumption.

This tutorial introduces a body of computational theories, techniques, and languages collectively called intelligent simulation. We will develop imagistic reasoning techniques for finding structures in large scientific and engineering data sets and the spatial aggregation (SA) language for rapid prototyping of imagistic problem solvers. SA draws upon the experience gained in developing applications in a number of challenging domains such as data analysis and visualization (KAM), control (MAPS), and mechanical design (HIPAIR); it incorporates techniques from computer vision, qualitative reasoning, scientific computing, and computational geometry. We will demonstrate how new applications can be prototyped with the SA language, using case studies including weather data interpretation, fluid simulation, and nonlinear maglev control design. No previous knowledge of intelligent simulation is required.

Feng Zhao is a member of the research staff at Xerox PARC, and has been an associate professor of computer and information science at the Ohio State University. His main research interest is in developing effective computational mechanisms to solve hard scientific and engineering problems. He has worked on the well-known *n*-body algorithms, qualitative analysis of nonlinear dynamical systems, massively parallel computation, and information technology for MEMS, and has been leading the Intelligent Simulation Group at The Ohio State University. Zhao received his Ph.D from the Massachusetts Institute of Technology Artificial Intelligence Laboratory, was awarded NSF and ONR Young Investigator Awards, and is a Sloan Research Fellow. He has published over forty papers on qualitative reasoning, machine learning, scientific computing, and applications to nonlinear dynamics and control.

Chris Bailey-Kellogg is a Ph.D candidate in computer and information science at The Ohio State University and is conducting dissertation research at Xerox PARC. His research deals with using physical knowledge to extract structures from spatially distributed data in order to guide decentralized control design. He has implemented a language toolbox to support applications in this style.

Learning Bayesian Networks from Data (MP1)

Nir Friedman and Moises Goldszmidt
2:00 – 6:00 pm, Monday, July 27

Bayesian networks are compact and computationally efficient representations of probability distributions. Over the last decade, they have become the method of choice for the representation of uncertainty in artificial intelligence. Today, they play a crucial role in modern expert systems, diagnosis engines, and decision support systems. In recent years, there has been significant progress in methods and algorithms for inducing Bayesian networks directly from data. Learning these particular models is desirable for several reasons. First, there is a wide array of off-the-shelf tools that can apply the learned models for prediction, decision making, and diagnosis. Second, learning Bayesian networks also provide a principled approach for semi-parametric density estimation, data analysis, pattern classification, and modeling. Third, in some situations they allow us to provide causal interpretation of the observed data. Finally, they allow us to combine knowledge acquired from experts with information from raw data.

In this tutorial we will first review the basic concepts behind Bayesian networks. We will then describe the fundamental theory and algorithms for inducing these networks from data including learning the parameters and the structure of the network, how to handle missing values and hidden variables, and how to learn causal models. Finally, we will discuss advanced methods, open research areas, and relate to applications such as pattern matching and classification, speech recognition, data analysis, and scientific discovery. This tutorial is intended for people interested in data analysis, data mining, pattern recognition, machine learning and reasoning under uncertainty. Familiarity with the basic concepts of probability theory will be helpful.

Nir Friedman earned his Ph.D in computer science from Stanford University in 1997. Since the fall of 1996, he has been a postdoctoral scholar in the Computer Science Division of the University of California at Berkeley. In recent years, he has been extensively working on inference, planning, and learning with probabilistic representations of uncertainty. This work mainly focuses on using Bayesian networks for concept learning, data mining, reinforcement learning, and more recently computational biology.

Moises Goldszmidt is a senior computer scientist at SRI International, where he conducts research and directs several projects in the area of learning and adaptive systems. From 1992-1996 he was a research scientist with the Rockwell Science Center in Palo Alto. He received a Ph.D in computer science from the University of California Los Angeles in 1992. Goldszmidt has numerous publications on topics related to representation and reasoning under uncertainty, automatic induction of Bayesian networks, decision making, and nonmonotonic reasoning.

Model-Based Autonomous Systems (SP2)

Pandu Nayak and Brian Williams
2:00 – 6:00 pm, Sunday, July 26

A new generation of autonomous systems are being developed that have the potential for profound social, environmental, and economic change. These include autonomous space probes, chemical plant control systems, power grids, life support systems, and reconfigurable traffic systems, to highlight but a few. To be economically viable these autonomous systems will need to be programmable purely through high level compositional models, supporting a plug-and-play approach to software and hardware development. This tutorial is a comprehensive introduction to the science and art of building the executive kernel that provides the sense/response loop for such model-based autonomous systems.

The focus of building a model-based executive kernel provides a framework for unifying a diverse set of research results. We discuss representation formalisms, starting with component-based propositional representations and building up to concurrent transition systems and qualitative algebras. We discuss the core algorithms, starting with the basics of model-based diagnosis, planning, real-time propositional reasoning, and model compilation, ultimately working towards a model-based executive with extensive diagnosis and planning embedded within the reactive control loop. We present a modeling "style" guide, where we discuss specific methods for modeling a variety of different autonomous systems. We conclude with a discussion of research on developing hybrid model-based executives that coordinate continuous adaptive estimation and control methods. Throughout the tutorial we illustrate the issues with examples drawn from fielded applications, including NASA's first autonomous space probe Deep Space One.

Pandurang Nayak is a senior computer scientist at the NASA Ames Research Center, and coleader of the model-based autonomous systems project. He received a B.Tech. in computer science and engineering from the Indian Institute of Technology, Bombay, and a Ph.D. from Stanford University. His Ph.D. dissertation was an ACM Distinguished Thesis. Nayak received a AAAI best paper award in 1997 for his work on incremental truth maintenance. He is currently an Associate Editor of the *Journal of Artificial Intelligence Research* and the deputy project leader of the Remote Agent Experiment.

Brian Williams is Technical Group Supervisor of the Intelligent Autonomous Systems Group at the NASA Ames Research Center, and coleader of the model-based autonomous systems project. He received his B.S. in electrical engineering at the Massachusetts Institute of Technology, continuing on to receive a M.S. and Ph.D. in computer science. While at MIT he developed TQA, a hybrid qualitative/quantitative symbolic algebra system, MINIMA, and a system IBIS for synthesizing innovative controller designs. Williams was at Xerox PARC from 1989 to 1994, where he is best known for his work on the GDE and Sherlock model-based diagnosis systems. Williams received AAAI best paper awards in 1988 and 1997. He was guest editor for the *Artificial Intelligence Journal* in 1992, Chair of the AAAI Tutorial Forum in 1996 and 1997, and is currently on the editorial board of the *Journal of Artificial Intelligence Research*.

Principles and Strategies of Automated Inference: A Unifying View (SP3)

Rina Dechter and Irina Rish
2:00 – 6:00 pm, Sunday, July 26

This tutorial will assess problem solving algorithms in terms of two complementary strategies: elimination (or deduction) and conditioning (or systematic guessing). The analysis will be presented using a domain-independent framework, called *bucket elimination,* which permits one to observe the interplay between the two strategies and to adjust the balance between them. Bucket elimination is an algorithmic framework that generalizes dynamic programming to accommodate many complex problem-solving and reasoning tasks. The basic step in this framework is the elimination of variables, by transforming a problem into an equivalent form involving the remaining variables. Algorithms such as directional-resolution for propositional satisfiability, adaptive-consistency for constraint satisfaction, Fourier and Gaussian elimination, for solving linear equalities and inequalities and dynamic programming for combinatorial optimization, can all be accommodated within the bucket elimination framework. Many probabilistic inference tasks can, likewise, be expressed as bucket-elimination algorithms. These include belief updating, finding the most probable explanation and expected utility maximization. The algorithms above share the same performance guarantees; all are time and space exponential in the tree-width embedding of the problem's interaction graph. While elimination strategies have extensive demands on memory, pure conditioning algorithms require only linear space. Conditioning is a generic name for algorithms that split a problem into subproblems by instantiating a subset of variables, called a *conditioning set,* or a *cutset*. Search algorithms such as backtracking for constraint satisfaction, Davis-Putnam for propositional satisfiability and branch and bound for combinatorial optimization belong to this class.

This tutorial will demonstrate the use of elimination and conditioning algorithms across areas such as constraint processing, propositional satisfiability, probabilistic inference, and decision theoretic planning. We will then present uniform ways of combining conditioning with elimination that can be used to trade space for time. Additionally, we will present a systematic approach to approximation methods that allows flexible trade-off between accuracy and efficiency. Applications to medical diagnosis, circuit diagnosis, and decoding algorithms will be given.

Rina Dechter is a professor of computer science at the University of California, Irvine. She received her Ph.D in computer science at the University of California, Los Angeles in 1985. Dechter is an AAAI Fellow, has published over fifty research articles, and is now serving on the editorial boards of *Artificial Intelligence, JAIR, Constraints Journal,* and the *Encyclopedia of Artificial Intelligence.*

Irina Rish is currently completing her Ph.D in computer science at the University of California, Irvine. She received an M.S. in applied mathematics in 1992 from Moscow Gubkin Institute. Her industrial experience includes development of an expert system for geophysical applications.

Recent Advances in AI Planning (SA3)

Craig Knoblock and Qiang (Chung) Yang
9:00 am – 1:00 pm, Sunday, July 26

AI planning is becoming a mature field. New tools and techniques are being developed at a very fast rate. New analysis techniques for planning algorithms and systems are being developed to provide tradeoffs in selecting different solutions to planning problems. This tutorial will provide a comprehensive overview on the most current and promising directions in this field. Using a ground-zero approach, we aim to present algorithms and techniques in AI planning both in theory and in fielded applications. Topics include fundamental and advanced algorithms for plan generation, planning algorithm comparison and complexity analysis, planning with incomplete information, hierarchical and task network based planning, plan reuse, constraint satisfaction in planning and plan merging. Applications topics include logistics planning, planning for database retrieval and information gathering, planning in software engineering, transportation and operations support planning, and many more.

Researchers and students will benefit from a very clear introduction to the problems and solutions addressed by AI planning, and from an in-depth discussion of the well-developed representations, algorithms, systems and techniques. Practitioners will benefit by mastering a rich collection of tools and techniques as well as methods for evaluating their relative tradeoffs in order to effectively select the most appropriate tools and methods to their practical application domains. Knowledge of basic concepts in computer science will be assumed. Knowledge of general artificial intelligence topics will be helpful, but are not required.

Craig Knoblock is a project leader at the Information Sciences Institute, a research assistant professor in the Computer Science Department at the University of Southern California, and on the faculty of the Integrated Media Systems Center. He received his Ph.D. in computer science from Carnegie Mellon University in 1991 and joined USC that year. He has published over thirty articles, book chapters, and conference papers in planning, machine learning and information integration, as well as *Generating Abstraction Hierarchies: An Automated Approach to Reducing Search in Planning*. He received the Best Paper Award with Qiang Yang at the 1994 Canadian Artificial Intelligence Conference. He is also on the Senior Program Committee of AAAI–98.

Qiang (Chung) Yang is currently holding a Canadian Ebco/Epic NSERC Industrial Chair and is an associate professor at Simon Fraser University. Yang has published over fifty papers in artificial intelligence, five of which appeared in the *Artificial Intelligence Journal.* He is the author of two recent books on AI planning and plan recognition. His primary interests lie in the design and formalization of intelligent planning algorithms and the application of intelligent information technology to industrial problems. He is a leader of several Canadian industrial and military projects on artificial intelligence planning, case based reasoning and knowledge base management. Yang received his Ph.D at the University of Maryland, College Park in 1989.

Statistical Methods in Natural Language Processing(MA4)

John Lafferty and Lillian Lee
9:00 am – 1:00 pm, Monday, July 27

Natural language processing (NLP) is concerned with enabling computers to understand, extract information from, and generate human language. While many early NLP systems relied heavily on hand-crafted rules, during the past ten years a great deal of progress has been made using probabilistic methods that automatically and implicitly learn about language by extracting statistics from large quantities of text, thus reducing the knowledge acquisition bottleneck. Currently, statistical techniques have proven to be effective in a number of areas; as the computational capacity of computers improves and more natural language data becomes available on-line, statistical methods will become increasingly attractive and powerful in the future.

This tutorial will introduce some of the central themes and techniques that have emerged in statistical methods for natural language processing. Examples include the source-channel paradigm, predictive language models, and hidden Markov models. Selected case studies involving technologies such as word and document clustering, word sense disambiguation, parsing, and machine translation will also be presented. The material draws upon machine learning, statistics, and information theory, but only an elementary knowledge of probability will be assumed.

John Lafferty received his Ph.D. in mathematics from Princeton University in 1986, and taught in the Department of Mathematics at Harvard University before joining the Computer Sciences Department of the IBM Thomas J. Watson Research Center in Yorktown Heights as a research staff member in 1988. Since 1994 he has been a member of the faculty of the Computer Science Department at Carnegie Mellon University, where he is currently a senior research scientist. His research interests include statistical methods for natural language and speech processing, machine translation, information retrieval, and coding and information theory.

Lillian Lee is an assistant professor of computer science at Cornell University. She received an A.B. in mathematics and computer science from Cornell University in 1993 and a Ph.D. in computer science from Harvard University in 1997. Her research interests are in language modeling, data clustering, statistical natural language processing, machine learning, and formal language theory.

Support Vector Learning (MP3)

Bernhard Schoelkopf
2:00 – 6:00 pm, Monday, July 27

The support vector (SV) learning algorithm provides a method for solving pattern recognition, regression estimation and operator inversion problems. The method is based on results in the statistical theory of learning with finite sample sizes developed by Vapnik and coworkers. Crucial to SV learning are two ideas: automatic capacity control, and nonlinear maps into feature spaces given via kernel functions.

The tutorial will introduce elements of statistical learning theory (learning as risk minimization, risk bounds, VC-dimension and other capacity concepts) and of functional analysis (Mercer kernels, reproducing kernel Hilbert spaces) which are beneficial for understanding the above ideas. It will then cover SV machines in detail, including the derivation of the algorithm, theoretical and empirical results, and a survey of the latest developments. Moreover, it will describe connections to other learning techniques, such as regularization networks and nonlinear principal component analysis using SV kernels. Some previous knowledge of linear algebra is required.

Bernhard Schoelkopf earned his Ph.D. in computer science from the University of Technology Berlin in 1997. He wrote his dissertation on SV machines at AT&T Bell Labs and at the Max-Planck-Institut fur biologische Kybernetik. He has an M.Sc. in mathematics from the University of London and a diploma in physics from the Eberhard-Karls-Universitat Tubingen. He is currently at GMD FIRST Berlin, and he has recently coorganized a NIPS workshop on SV machines.

Workshops

Preliminary Schedule (by invitation only)

AI and Information Integration (1-1/2 day workshop) (W1)
Craig Knoblock (knoblock@isi.edu) and
Alon Levy (levy@research.att.com)
Sunday pm and Monday, July 26-27

Case-Based Reasoning Integrations (W2)
David Aha (aha@aic.nrl.navy.mil) and
Jody Daniels (jdaniels@atl.lmco.com)
Monday, July 27

Functional Modeling and Teleological Reasoning (W3)
Jon Sticklen (sticklen@cps.msu.edu)
Monday, July 27

The Grounding of Word Meaning: Data and Models (W4)
Jointly Sponsored by the Cognitive Science Society
Michael Gasser (gasser@cs.indiana.edu)
Friday, July 31

Integrating Artificial Intelligence and Assistive Technology (W5)
Rich Simpson (rsimpson@traclabs.com)
Sunday, July 26

Knowledge Sharing across Biological and Medical Knowledge Based Systems (W6)
Gary Merrill (ghm48805@glaxowellcome.com) and
Dhiraj Pathak (dp33010@glaxowellcome.com)
Sunday, July 26

Learning for Text Categorization (W7)
Jointly Sponsored by the International Conference on Machine Learning
Mehran Sahami (sahami@cs.stanford.edu)
Monday, July 27

The Methodology of Applying Machine Learning: Problem Definition, Task Decomposition and Technique Selection (W8)
Jointly Sponsored by the International Conference on Machine Learning
Robert Engels (engels@aifb.uni-karlsruhe.de)
Monday, July 27

Predicting the Future: AI Approaches to Time-Series Analysis (W9)
Jointly Sponsored by the International Conference on Machine Learning
Andrea Danyluk (andrea@cs.williams.edu)
Monday, July 27

Recommender Systems (W10)
Henry Kautz (kautz@research.att.com)
Sunday, July 26

Representations for Multi-Modal Human-Computer Interaction (2-day workshop) (W11)
Syed Ali (syali@tigger.cs.uwm.edu) and Susan McRoy
Sunday and Monday, July 26-27

Software Tools for Developing Agents (W12)
Brian Logan (B.S.Logan@cs.bham.ac.uk) and
Jeremy Baxter (jbaxter@signal.dera.gov.uk)
Sunday, July 26

Textual Case-Based Reasoning (W13)
Mario Lenz (lenz@informatik.hu-berlin.de) and
Kevin Ashley (ashley+@pitt.edu)
Sunday, July 26

Using AI for Knowledge Management and Business Process Reengineering (W14)
Rose Gamble (gamble@utulsa.edu)
Sunday, July 26

Verification & Validation of Knowledge-Based Systems (W15)
Daniel O'Leary (oleary@rcf.usc.edu) and
Alun Preece (apreece@csd.abdn.ac.uk)
Monday, July 27

CRA Workshop Series

Sponsored by the Computing Research Association

The CRA workshops are being held just prior to AAAI-98 in Madison. We include them here as a courtesy to AAAI-98 attendees who might be interested. For more information, please write to info@cra.org or visit one of the websites listed below.

Effective Teaching in Computer Science and Engineering Workshop
July 23, 1998
www.cra.org/Activities/workshops/effective_teaching_home.html

Academic Careers Workshop
July 24, 1998
www.cra.org/Activities/workshops/98academic_careers.html

Registration Fees

AAAI has made special registration arrangements with a number of the collocated conferences being held in Madison just prior to AAAI-98. In some cases where AAAI is processing preregistrations for other conferences, a joint registration discount is being offered. Please read this section carefully to see how you should register for AAAI-98, IAAI-98, COLT'98, ICML'98, and ILP'98.

Your **AAAI-98/IAAI-98 program registration** includes admission to all sessions, invited talks, exhibitions, the Student Abstract Poster Session, the opening reception, the Festival, the AAAI-98/IAAI-98 Conference Proceedings, and the Special Tutorial MP5. Onsite registration will be located near the main entrance on the fourth level of the Monona Terrace Convention Center, One John Nolen Drive, Madison, Wisconsin, 53703.

Early Registration (Postmarked by May 27)

AAAI Members	Regular $395	Students $120
Nonmembers	Regular $475	Students $185

Late Registration (Postmarked by June 24)

AAAI Members	Regular $445	Students $145
Nonmembers	Regular $525	Students $210

On-Site Registration (Postmarked after June 24 or onsite)

AAAI Members	Regular $495	Students $170
Nonmembers	Regular $575	Students $235

AAAI-98/IAAI-98 attendees who are also preregistering for one of the following collocated conferences may deduct $20 from their AAAI-98/IAAI-98 technical preregistration fee:

- Eleventh Annual Conference on Computational Learning Theory (COLT'98)
- Fifteenth International Conference on Machine Learning (ICML'98)
- Eighth International Conference on Inductive Logic Programming (ILP'98)

Collocated Conference Registration

AAAI will be processing preregistrations for COLT'98, ICML'98 and ILP'98. Onsite registration for these conferences will be held in the main lobby of the University of Wisconsin Business School (Grainger Hall), 975 University Avenue, Madison, Wisconsin, 53706. Registrants to COLT'98, ICML'98, or UAI'98 will be allowed to attend, without additional cost, the technical sessions of the other two conferences. Registration includes a copy of the proceedings of the conference for which one registers, a joint preconference reception, a joint banquet, and snacks and refreshments during the technical sessions and joint evening poster session. Registration for ILP'98 includes a copy of the proceedings, snacks and refreshments, lunch on Wednesday and Thursday, and the joint poster session, reception, and banquet arranged by COLT/ICML/UAI.

Eleventh Annual Conference on Computational Learning Theory (COLT'98)

Early Registration (Postmarked by May 27)
Regular $185 Student $140

*Late Registration (*Postmarked by June 24)
Regular $190 Student $150

Onsite Registration (Postmarked after June 24 or onsite)
Regular $250 Student $170

Fifteenth International Conference on Machine Learning (ICML '98)

Early Registration (Postmarked by May 27)
Regular $200 Student $130

Late Registration (Postmarked by June 24)
Regular $220 Student $150

On-Site Registration (Postmarked after June 24 or onsite)
Regular $250 Student $170

Eighth International Conference on Inductive Logic Programming (ILP'98)

Early Registration (Postmarked by May 27)
ILP'98 Only $210
ILP'98 with ICML'98 Registration $85

Late Registration (Postmarked by June 24)
ILP'98 Only $230
ILP'98 with ICML'98 Registration $105

On-Site Registration (Postmarked after June 24 or onsite)
ILP'98 Only $255
ILP'98 with ICML'98 Registration $130

AAAI-98 Tutorial Forum Fees

Your tutorial program registration includes admission to no more than four consecutive tutorials and the corresponding four tutorial syllabi. A maximum of four consecutive tutorials may be attended due to parallel schedules. Extra syllabi from other tutorials will be available for purchase onsite for $15.00 each. Your tutorial program registration also includes admission to the exhibition program. Please note that you need not register for the Tutorial Forum to attend the Special Tutorial MP5 on Monday, July 27.

Early Registration (Postmarked by May 27)

AAAI Members	Regular $170	Students $75
Nonmembers	Regular $225	Students $105

Late Registration (Postmarked by June 24)

AAAI Members	Regular $200	Students $100
Nonmembers	Regular $255	Students $130

On-Site Registration (Postmarked after June 24 or onsite)

AAAI Members	Regular $230	Students $125
Nonmembers	Regular $300	Students $155

Special Second-Day (Monday, July 27 only) Tutorial Forum Registration fee for COLT/ICML/UAI attendees only: Regular attendees may deduct $60.00 and students $25.00 from the fees listed above.

Robot Building Lab (RBL-98)

The Robot Building Lab registration includes admission to the Robot Building Lab and the Exhibition program. Fees are $150 for members or nonmembers and $75.00 for students. Attendance is limited and early registration is strongly encouraged.

Workshop Registration

Workshop registration is limited to those active participants determined by the organizer prior to the conference. All workshop participants must preregister for the AAAI-98 / IAAI-98 technical program or, in the case of the four cosponsored workshops, must register for one of the cosponsoring conferences. (Exceptions to these rules will be required to pay a workshop registration fee of $150 per workshop.) Workshop registration materials will be sent directly to invited participants.

Payment Information

Prepayment of registration fees is required. Checks, international money orders, bank transfers, and traveler's checks must be in US dollars. American Express, MasterCard, VISA, and government purchase orders are also accepted. Registration applications postmarked after the early registration deadline will be subject to the late registration fees. Registration applications postmarked after the late registration deadline will be subject to onsite registration fees. Student registrations must be accompanied by proof of full-time student status.

Refund Requests

The deadline for refund requests is July 6, 1998. All refund requests must be made in writing. A $75.00 processing fee will be assessed for all refunds.

Registration Hours

Registration hours will be Sunday and Monday, July 26-27, 7:30 am – 6:00 pm; Tuesday and Wednesday, July 28-29, 8:00 am – 6:00 pm; and Thursday, July 30, 8:30 am – 2:00 pm. All attendees must pick up their registration packets for admittance to programs.

General Information

AAAI-98 Housing

AAAI has reserved a block of rooms in Madison properties at reduced conference rates. Conference attendees must contact the hotels directly and identify themselves as AAAI-98 registrants to qualify for the reduced rates. *Important!* Attendees must submit their name, address, fax and telephone numbers when making reservations. Please note the cut-off date for reservations and the reservation method and information under each hotel. Hotel rooms are priced as singles (1 person, 1 bed), doubles (2 persons, 2 beds), triples (3 persons, 2 beds), or quads (4 persons, 2 beds). Rooms will be assigned on a first-come first-served basis. All rooms are subject to a 13.5% state and city tax.

The Madison Concourse Hotel

(Headquarters Hotel)
1 West Dayton Street
Madison, WI 53703
Reservations: 1-800-356-8293
Telephone: 608-257-6000
Fax: 608-257-5280
Single: $99.00
Double: $109.00
Additional person: $10.00
Distance to center: three blocks
Cut-off date for reservations: 5:00 pm
CDT July 3, 1998

All reservation requests for arrival after 4:00 pm must be accompanied by a first night room deposit, or guaranteed with a major credit card. The Madison Concourse will not hold any reservations after 4:00 pm unless guaranteed by one of the above methods. Reservations received after the cut-off time will be accepted on a space available basis.

Reservations accepted without a credit card guarantee or advance deposit are subject to cancellation at least 24 hours prior to the day of arrival. A $50.00 fee will be retained if the individual traveler does not arrive or cancels within 24 hours of arrival. Complimentary shuttle service to and from Dane County Regional Airport based upon availability.

Best Western Inn on the Park

22 South Carroll Street
Madison, WI 53703-3372
Reservations: 1-800-279-8811
Telephone: 608-257-8811
Fax: 608-257-5995
Single/double: Park Suites $77.00
Single/double: Standard $77.00 / $87.00
Single/double: Deluxe Standard $87.00 / $97.00
Additional person: $10.00
Distance to center: two blocks
Cut-off date for reservations: 5:00 pm
CDT June 24, 1998

All reservation requests for arrival after 4:00 pm must be accompanied by a first night room deposit, or guaranteed with a major credit card. The Best Western Inn on the Park will not hold any reservations after 4:00 pm unless guaranteed by one of the above methods. Reservations received after the cut-off time will be accepted on a space available basis.

Reservations accepted without a credit card guarantee or advance deposit are subject to cancellation at least 48 hours prior to the day of arrival. Complimentary shuttle service to and from Dane County Regional Airport based upon availability.

Sheraton Madison Hotel

706 John Nolen Drive
Madison, WI 53713
Reservations: 1-800-325-3535
Telephone: 608-251-2300
Fax: 608-251-1189
Single: $89.00
Double: $99.00
Triple: $99.00
Quad: $99.00
Distance to center: 1 mile
Cut-off date for reservations: 5:00 pm
CDT July 24, 1998

All reservation requests for arrival after 6:00 pm must be accompanied by a first night room deposit, or guaranteed with a major credit card. The Sheraton Madison will not hold any reservations after 6:00 pm unless guaranteed by one of the above methods. Reservations received after the cut-off time will be accepted on a space available basis. Complimentary shuttle service to and from Dane County Regional Airport based upon availability.

Collocated Conference Hotels

For information about collocated conference hotels, please visit the appropriate web sites listed elsewhere in this brochure.

Student Housing, University of Wisconsin-Madison

AAAI-98, ILP'98, COLT'98, ICML'98, and UAI'98 have reserved a block of dormitory rooms at the University of Wisconsin-Madison. Accommodations are double or single rooms with shared male and female washrooms. Linen and towels are provided on arrival and towels will be exchanged daily. Each room has a private

telephone. The lines are toll-direct lines, and local telephone calls are free of charge. Long distance telephone calls must be made by using a credit card, calling card or call collect. Breakfast is available in the Gordon Commons from 7:30 – 9:00 am, and is included in the housing package. Public transportation is available to the Monona Terrace Convention Center. More detailed general information will be included with reservation confirmations.

Double room rate per person and night is $27.00 and single room rate per person and night is $40.00. All rooms are air-conditioned. Reservations must be made by June 24, 1998. Reservations received by June 24, 1998 will be confirmed two weeks prior to the conference. A reservation form is enclosed in this brochure. All payments for rooms must be made upon arrival. The university accepts cash, personal and traveler's checks drawn in U.S. dollars on U.S. banks, Mastercard and Visa. Cancellations or changes may be made over the telephone. There are no penalties for cancellations. Reservations should be sent to:

Conference Groups Office
University Housing
625 Babcock Drive
Madison, WI 53706-1213
Phone: 608-262-5576
Fax: 608-262-4082

Parking is available on campus and the cost of parking is $7.00 per day. Please check the registration form to have parking information mailed to you.

Air Transportation and Car Rental

Madison, Wisconsin—Get there for less! Discounted fares have been negotiated for this event. Call Conventions in America at 800-929-4242 and ask for Group #428. You will receive 5%-10% off the lowest applicable fares on American Airlines and United Airlines, or the guaranteed lowest available fare on any carrier. Take an additional 5% off if you purchase at least 60 days prior to departure. Travel between July 23 and August 2, 1998. All attendees booking through Conventions in America will receive free flight insurance. Avis Rent A Car is also offering special low rates with unlimited mileage. Call Conventions in America at 800-929-4242, ask for Group #428. Reservation hours: M-F 6:30 am – 5:00 pm Pacific Time. Outside US and Canada, call 619-453-3686/Fax 619-453-7976. E-mail address flycia@scitravel.com. If you call direct: American 800-433-1790, ask for index #10309, United 800-521-4041, ask for tour code #512QW, Avis 800-331-1600, AWD #J947822.

Ground Transportation

The following information is the best available at press time. Please confirm fares when making reservations.

Hotel Shuttles

Complimentary, Madison Concourse, Best Western Inn on the Park, Madison Sheraton.

Taxi

Taxis are available at the Dane County Regional Airport. Approximate fare from the downtown to Madison is $10.00.

Bus

Van Galder Bus Lines—Downtown Chicago, O'Hare Airport. The depot is located at the University of Wisconsin-Madison Memorial Union. For information on fares and scheduling, call 800-747-0994.

Badger Bus Lines—Mitchell Field, Milwaukee Airport provides service to the University of Wisconsin-Madison campus and the Madison Badger Bus Depot at 2 South Bedford Street, Madison, WI 53703. For information, call 608-255-6771 or see www.badgerbus.com/schedule.htm.

City Transit System

Madison Metro Transit System is a citywide bus transit system. Schedules are available in the Monona Terrace Convention Center. Basic local fare is $1.25. You may buy a booklet of ten rides for $8.50. There is a Free Fare Zone from 10:00 am – 3:00 pm around the center of Madison. For general information, call 608-266-4466.

Parking

A parking garage is available at the Monona Terrace. The maximum daily rate is $10.50

Disclaimer

In offering American Airlines, Avis Rent A Car, Conventions in America, the Best Western Inn on the Park, the Madison Concourse Hotel, the Madison Sheraton, United Airlines, University of Wisconsin-Madison, and all other service providers (hereinafter referred to as "Supplier(s)" for the National Conference on Artificial Intelligence and the Innovative Applications Conference), AAAI acts only in the capacity of agent for the Suppliers which are the providers of the service. Because AAAI has no control over the personnel, equipment or operations or providers of accommodations or other services included as part of the AAAI-98 / IAAI-98 program, AAAI assumes no responsibility for and will not be liable for any personal delay, inconveniences or other damage suffered by conference participants which may arise by reason of (I) any wrongful or negligent acts or omissions on the part of any Supplier or its employees, (2) any defect in or failure of any vehicle, equipment or instrumentality owned, operated or otherwise used by any Supplier, or (3) any wrongful or negligent acts or omissions on the part of any other party not under the control, direct or otherwise, of AAAI.

Madison Visitor Information

The Madison Convention & Visitors Bureau welcomes you to Madison! They can assist with dining reservations, directions, tour bookings, entertainment suggestions, transportation, and hotel information. Maps and brochures are available.

615 East Washington Avenue
Madison, WI 53703
Telephone: 800-373-6376, 608-255-2537
URL: www.visitmadison.com

The organizers of ICML'98 have also put together a very useful web site about local Madison information. Please take a moment to visit it at www.cs.wisc.edu/icml98/madisonInfo.html#trips.

Housing Registration Form

University of Wisconsin-Madison Housing

Fifteenth National Conference on Artificial Intelligence (AAAI-98)—July 26-30, 1998
Eleventh Annual Conference on Computational Learning Theory (COLT'98)—July 24-26, 1998
Fifteenth International Conference on Machine Learning (ICML'98)—July 24-26, 1998
Fourteenth International Conference on Uncertainty in Artificial Intelligence (UAI'98)—July 24-26, 1998
Eighth International Conference on Inductive Logic Programming (ILP'98)—July 22-24, 1998

Conference Attending:
AAAI-98 ☐ COLT'98 ☐ ILP'98 ☐ ICML'98 ☐ UAI'98 ☐

Please Print:
NAME: _____
SEX: M ☐ F ☐

ADDRESS: _____

_____

CITY: _____ STATE: _____ ZIP: _____

COUNTRY: _____ TELEPHONE: _____ FAX: _____

EMAIL ADDRESS: _____

☐ I would like a single room at $40.00 per night including breakfast.
☐ I would like a double room at $27.00 per night including breakfast.

Please check each date you will need housing and breakfast accommodations:

☐ Tuesday, July 21
☐ Wednesday, July 22
☐ Thursday, July 23
☐ Friday, July 24
☐ Saturday, July 25
☐ Sunday, July 26
☐ Monday, July 27
☐ Tuesday, July 28
☐ Wednesday, July 29
☐ Thursday, July 30

TOTAL DUE AT CHECK-IN $ _____

Roommate:_____
(If you do not select a roommate, one will be assigned to you by the University.)

Please return this housing reservation form by June 24, 1998 to:
Conference Groups Office
University Housing, 625 Babcock Drive, Madison, WI 53706-1213
Telephone: 608-262-5576 Fax: 608-262-4082

PLEASE RETURN THIS FORM BY JUNE 24, 1998.

Preregistration Form

Name _____ Company/Univ. _____

☐ Home ☐ Work

Address _____ Dept./MS _____

City _____ State _____ Zip _____

Country _____ Daytime Telephone & Fax _____

Membership No. _____ E-mail Address _____

Circle courses and fees that apply. Students must submit registration receipt or letter from faculty advisor.	**Early Registration Rates** *Postmarked by May 27*				**Late Registration Rates** *Postmarked by June 24*				**TOTAL**
AAAI-98/IAAI-98	**AAAI Member**		**Nonmember**		**AAAI Member**		**Nonmember**		
	Regular	**Student**	**Regular**	**Student**	**Regular**	**Student**	**Regular**	**Student**	
	$395	$120	$475	$185	$445	$145	$525	$210	_____
AAAI-98 / IAAI-98 Fees for Persons also preregistering for COLT, ICML, or ILP 98	$375	$100	$455	$165	$425	$125	$505	$190	_____
COLT'98			**Regular**	**Student**			**Regular**	**Student**	
			$185	$140			$190	$150	_____
ICML '98			**Regular**	**Student**			**Regular**	**Student**	
			$200	$130			$220	$150	_____
ILP'98			**ILP Only**	**ILP w/ICML**			**ILP Only**	**ILP w/ICML**	
			$210	$85			$230	$105	_____
Tutorial Forum *(Circle choices, see brochure for details)*	$170	$75	$225	$105	$200	$100	$255	$130	_____
7/26 AM SA1 SA2 SA3 SA4 7/26 PM SP1 SP2 SP3 SP4 7/27 AM MA1 MA2 MA3 MA4 7/27 PM MP1 MP2 MP3 MP4 MP5	*Your tutorial forum registration includes admission to four consecutive tutorials and the accompanying syllabi (There is no fee for MP5)*								_____
Monday Only Tutorial Fee *Special Second-Day (Monday, July 27 only) COLT/ICML/UAI attendees only*	$110	$50	$165	$80	$140	$75	$195	$105	_____
Robot Building Lab *(see reverse)*	$150	$75	$150	$75	$150	$75	$150	$75	_____
AAAI–98 Opening Reception	*Spouse, or guest @ $15.00 per person; child @ $5.00* _____ No. Persons								_____
AAAI Membership / Journals	*(totals continued from reverse)*								_____
AAAI–98 Festival	*Spouse, or guest @ $20.00 per person; child @ $5.00* _____ No. Persons								_____

University of Wisconsin Parking

☐ *Please check here if you are staying in the dorms at the University of Wisconsin and would like information about parking sent to you.*

Total Enclosed

_____

Method of Payment *(Circle One):*

MC Visa Amex Check (payable to AAAI–98 and drawn on a US Bank) US Govt. PO

Card Number _____ Exp. Date _____

Name (as it appears on card) _____ Signature _____

The refund request deadline is July 6, 1998. A $75.00 processing fee will be assessed for all refunds.

Registrations postmarked after June 24 are subject to on-site rates.

On-site registration will be near the main entrance, fourth level, Monona Terrace Convention Center
975 University Avenue, Madison, Wisconsin 53706.

Send with payment to AAAI-98 / IAAI–98 445 Burgess Drive, Menlo Park, CA 94025-3442. 650 / 328-3123; Fax 650 / 321-4457

AAAI Membership Application / Renewal

Now it's even easier to become a member of the AAAI. Just fill out and mail both sides of this form, and we'll ensure that you receive all the benefits that thousands of members worldwide enjoy each year.

Here are just a few of the benefits you'll receive:

• *AI Magazine* • AAAI Electronic Library Access • Reduced rates on selected AI-related journals and publications

Information about all of AAAI's events and programs, including:

• Spring and Fall Symposium Series • AAAI Press Publications • Conference on Innovative Applications
• Tutorial Program • Exhibit Program • KDD Conference
• Technical Program of the National Conference on Artificial Intelligence • AAAI–Sponsored Workshops

Take the initiative to join the association that will keep you informed about the latest developments in your exciting field.

Renew your membership or become a member of the AAAI today.

Application Type

☐ New Application

☐ Change of Address

☐ Renewal

(Please include your membership number on the reverse side of this form)

☐ Do not include me in the *Membership Directory*

☐ Do not release my name to outside groups

☐ I am interested in the following subgroup

☐ AI in Medicine ☐ AI and the Law

☐ AI in Manufacturing ☐ AI in Business

Journals *(Offer limited to individuals only).*

☐ Send me the 1998 *AI Journal.*
I enclose an additional $116.00.

☐ Send me the 1998 *Machine Learning Journal.*
I enclose an additional $170.00.

Membership Categories

Please circle desired term and amount

Individual US / Canadian Member

One Year	*Three Year*	*Five Year*	*Life*
$50	$150	$250	$700

Individual Foreign Member

One Year	*Three Year*	*Five Year*	*Life*
$75	$225	$375	$1000

Institution / Library—US / Canadian

One Year	*Three Year*	*Five Year*	*Life*
$75	$225	$375	n/a

Institution / Library—Foreign

One Year	*Three Year*	*Five Year*	*Life*
$100	$300	$500	n/a

Full-Time US/Canadian Student

One Year	*Three Year*	*Five Year*	*Life*
$20	n/a	n/a	n/a

Full-Time Foreign Student

One Year	*Three Year*	*Five Year*	*Life*
$45	n/a	n/a	n/a

Order cannot be processed if information is incomplete or illegible. Student applicants must send legible proof of student status, i.e., a letter from your faculty advisor verifying full-time enrollment in a degree-bearing program, or a copy of your current registration receipt. Prepayment is required for all orders. Memberships begin with the next published issue of AI Magazine.

Be sure to enter your complete name and address on the reverse side of this form!

Amount

_____

(Enter here and on reverse)

Conference at a Glance

MORNING	AFTERNOON	EVENING
Sunday, July 26		
Registration Tutorial Forum Workshops AAAI/SIGART DC RBL-98	Registration Tutorial Forum Workshops AAAI/SIGART DC RBL-98	
Monday, July 27		
Registration Tutorial Forum Workshops IAAI-98 AAAI/SIGART DC RBL-98	Registration Tutorial Forum Workshops IAAI-98 AAAI/SIGART DC RBL-98	AAAI-98 Rendezvous Special Tutorial MP5 1998 Fellows Dinner
Tuesday, July 28		
Registration Presidential Address and Invited Talks AAAI-98 & IAAI-98 Exhibition / IS Demos Robot Competition Hall of Champions	Registration Invited Talks AAAI-98 & IAAI-98 Exhibition / IS Demos Robot Competition Hall of Champions	AAAI-98 Opening Reception Program Committee Dinner
Wednesday, July 29		
Registration AAAI-98 & IAAI-98 Invited Talks	Registration AAAI-98 & IAAI-98 Invited Talks Exhibition / IS Demos Robot Competition and Exhibition Hall of Champions	AI Festival Student Poster Session Exhibition / IS Demos Robot Competition and Exhibition Hall of Champions
Thursday, July 30		
Registration AAAI-98 Invited Talks Exhibition / IS Demos Robot Competition and Exhibition Hall of Champions	Registration AAAI-98 Exhibition / IS Demos Robot Competition and Exhibition Hall of Champions	
Friday, July 31		
Workshop W4	Workshop W4	