AAAI-88
Conference Program

**Seventh National Conference
on
Artificial Intelligence**

**August 21-26, 1988
Saint Paul, Minnesota
USA**

About AAAI

Founded in late 1979, the AAAI consists of 15,500 university professors, students, academic and industrial researchers, business planners, consultants, engineers, and other industrial scientists. Membership in the AAAI is open to anyone with an interest in Artificial Intelligence science and technology. Benefits associated with membership include the following:

- *AI Magazine* (included in membership dues)

- *AAAI Membership Directory* (included in membership dues)

- *Proceedings of the National Conference on Artificial Intelligence* (reduced price for members)

- National Conference on Artificial Intelligence (reduced price for members)

- Financial support for scientific and technology-based workshops

- Support of subgroups interested in medical and manufacturing applications of AI

- Dissemination of information about other AI conferences and AI companies in the United States and abroad

If you are interested in joining the association, please write or call:

American Association for Artificial Intelligence

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Menlo Park, California 94025-3496
(415) 328-3123
AAAI-Office@sumex-aim.stanford.edu

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General Information

Registration   Conference registration will take place in the Saint Paul Civic Center Lobby beginning Saturday, August 20. Registration hours are:

Saturday, August 20	2:00 pm – 6:00 pm
Sunday, August 21	8:00 am – 5:00 pm
Monday, August 22	8:00 am – 6:00 pm
Tuesday, August 23	8:00 am – 5:00 pm
Wednesday, August 24	8:00 am – 5:00 pm
Thursday, August 25	8:00 am – 5:00 pm

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

Admission   Each conference attendee will receive a name badge upon registration. This badge is required for admittance to the technical, tutorial, and exhibit programs. Admittance to the tutorials is by TICKET ONLY.

Proceedings   Each registrant for the technical program will receive a ticket with the registration materials for one copy of the conference proceedings. The ticket may be redeemed at the Morgan Kaufmann Publishers booth. This booth will be located on the lower level of the Saint Paul Civic Center in Rooms C1 and C2 Saturday, August 20 through Monday, August 22 during registration hours, and Tuesday, August 23 through Thursday, August 25 from 8:00 to 10:00 am. The Morgan Kaufmann booth will move to the Arena Tuesday through Thursday during exhibit hours. Proceedings will not be available at the conference site on Friday, August 26. Proceedings can also be redeemed by mailing the ticket with your name and address to Morgan Kaufmann Publishers Inc., 2929 Campus Drive, San Mateo, California 94403.

Extra proceedings may be purchased at the conference site at the above locations. THURSDAY, AUGUST 25, WILL BE THE LAST DAY TO PURCHASE EXTRA COPIES OF THE PROCEEDINGS.

AI Magazine   Order forms for the purchase of back issues of the *AI Magazine* are available on the lower level of the Saint Paul Civic Center, Room C1.

Tutorial Syllabi   Extra AAAI-88 Tutorial Syllabi will be on sale on the lower level of the Saint Paul Civic Center, Room C1, beginning Tuesday, August 23, from 8:00 am to 5:00 pm. Quantities are limited.

List of Attendees   A list of preregistered attendees of the conference will be available for review at the Registration Desk in the Saint Paul Civic Center Lobby. Lists of attendees will **not** be distributed.

Press   All members of the press are requested to register in the Press Room on the lower level of the Saint Paul Civic Center, Room C23. Press badges will only be issued to individuals with appproved credentials. The Press Room will be open for advance registration on Saturday, August 20 from 1:00 to 5:00 pm. During the conference, the Press Room will be open during the following hours:

Press

Sunday, August 21	8:00 am – 4:00 pm
Monday, August 22	8:00 am – 4:00 pm
Tuesday, August 23	7:30 am – 3:30 pm

Wednesday, August 24	8:30 am – 3:30 pm
Thursday, August 25	8:30 am – 12:30 pm
Friday, August 26	CLOSED

A representative from the AAAI will be on duty during press room hours to assist the members of the press and media.

Recording

No audio or video recording is allowed in the TUTORIALS. Tapes of TECHNICAL sessions will be for sale in the Saint Paul Civic Center Lobby. A representative from First Tape Incorporated will be available to take your order during regular registration hours, beginning Tuesday, August 23. Order forms are included with registration materials. Tapes may also be ordered by mail from First Tape Incorporated, 730 North LaSalle Street, Suite 200, Chicago, Illinois 60610.

Message Center

A message desk will be manned in the Saint Paul Civic Center Lobby during registration hours commencing Saturday, August 20 and closing Thursday, August 25. The telephone number for **leaving messages only** is (612) 224-2433. THERE IS NO MEANS OF PAGING CONFERENCE ATTENDEES. All phone messages will be deposited in message pockets near the message center alphabetically by surname. These pockets will be left outside the lobby during the night to enable attendees to check their messages at any time. Since there will be no one at the message desk after hours, however, we suggest that hotel phone numbers be used as primary contact points.

There will also be message desks at each of the dormitories at the University of Minnesota. These numbers are: Centennial, (612) 625-4452 and Territorial, (612) 625-0971.

Announcements

Announcements regarding meetings not listed in the conference program will be posted in the Saint Paul Civic Center Lobby.

Baggage Claim

There will be no baggage claim/check area at the Saint Paul Civic Center or the University of Minnesota. Neither the AAAI nor the Saint Paul Civic Center accept liability for the loss or theft of any suitcase, briefcase, or other personal belongings brought to the site of AAAI-88.

Public Telephones

Pay telephones are located in the Saint Paul Civic Center Lobby and Arena.

Information Desk

An information desk staffed by AAAI and Saint Paul Visitors and Convention Bureau representatives will be open Saturday through Thursday during posted conference registration hours to assist conference attendees.

General Information/ Printed Materials

Display tables for the distribution of promotional or informational materials of interest to conference attendees will be located on the lower level of the Saint Paul Civic Center, Rooms C1 and C2.

Speakers Ready Rooms

Speakers ready rooms will be located on the lower level of the Saint Paul Civic Center in Rooms C8 and C9, and in the Radisson Hotel in the Mayors Suite. These rooms will have audio-visual equipment to assist speakers with their preparations. It is important that speakers utilize these rooms to organize their materials. The rooms will be open during the following hours: Saturday, August 20, 2:00 to 5:00 pm; Monday, August 22 through Thursday, August 25, 8:00 am to 5:00 pm; and Friday, August 26, 8:00 to 11:30 am.

T-Shirt Sales

T-shirts will be for sale on the lower level of the Saint Paul Civic Center, Room C1, beginning Sunday, August 21, and continuing through Thursday, August 25. Supplies are limited.

Copiers

The closest copying center to the Saint Paul Civic Center is Minute Man Press at 384 Saint Peter Street (behind the Commercial State Bank). The copying center closest to the Radisson Hotel is PIP Printing located in the skyway adjacent to the Garden Court (second floor).

Banking/ Currency Exchange

The closest full service banks to the Saint Paul Civic Center are the First Bank of Saint Paul and the American National Bank on the corner of Fifth and Minnesota Streets. They will provide currency exchange for most Western European currencies and Japanese yen. Bank hours are 10:00 am to 5:00 pm, Monday through Friday. The telephone number for the First Bank of Saint Paul is (612) 291-5000 and for the American National Bank is (612) 298-6000.

Handicapped Facilities

The Saint Paul Civic Center, the University of Minnesota, and the Radisson Saint Paul all have handicapped facilities. The Saint Paul Convention Bureau has extensive information regarding handicapped accessibility in the city from transportation needs to hotel facilities. For further information, please call 612/297-6985, or contact the Minnesota Council for the Handicapped at 612/296-6785.

Child Care Services

The following agencies provide in-room child care in the downtown Saint Paul area:

The Pitter Patter of Little Feats

Contact: Wendy Nielsen
345 North Smith Avenue
Saint Paul, MN 55102
612/298-8832

Nanny Temporaries	4-hour minimum
Contact: Dr. Jean Hanson	$6.00 per hour
245 East Sixth Street #703	Parking and mileage extra
Saint Paul, MN 55101	
Jack & Jill Babysitting Services	4-hour minimum
Contact: Mrs. Kremer	$4.25+ per hour/One child
1651 Fourth Street	$4.50+ per hour/Two children
White Bear Lake, MN 55110	Parking and mileage extra

Dining Facilities

Concession stands will be open in the Saint Paul Civic Center Arena (Exhibit area) and Forum, Tuesday through Friday from 11:00 am to 2:00 pm. For those attendees staying at the University of Minnesota, the Centennial Hall Food Service will be open. The conference packet has a restaurant guide and map listing dining facilities in the Saint Paul area.

SMOKING, DRINKING AND EATING ARE NOT ALLOWED IN ANY OF THE TECHNICAL, TUTORIAL, OR EXHIBIT SESSIONS.

Coffee/Coffeehouse

Coffee breaks for the Technical Sessions will be located at the Civic Center as follows:

Theater	*Wilkins Auditorium*
Wilkins Ballroom	*Lobby*
Radisson Hotel	*Governors North*

AAAI is sponsoring a coffeehouse featuring several international coffees in the tented O'Shaughnessy Plaza. Coffeehouse hours will begin Tuesday, August 23 at 9:00 am and will continue during posted registration hours until Thursday, August 25 at 5:00 pm. Please take advantage of this area to catch up with colleagues.

Parking   Parking is available at each of the meeting sites. A parking ramp is located directly across the street from the Saint Paul Civic Center at 150 West Kellogg. The cost is $4.00 per day. The entrance to the parking garage at the Radisson Hotel Saint Paul is located one-half block off Kellogg on Wabasha. Rates are $1.50 for the first hour and $1.00 each additional hour. The maximum per day is $6.50 or $5.50 for guests of the hotel.

Campus Tours   The University of Minnesota offers free tours of the Minneapolis campus twice daily at 11:15 am and 2:15 pm. Tours are also available of the Saint Paul campus at 12:00 noon each day.

Transportation   Custom Travel Consultants, the AAAI-88 travel agent, will be staffing the Transportation Desk in the Saint Paul Civic Center Lobby to assist with changes in travel plans.

Air

Northwest Airlines has been selected as the official domestic carrier for AAAI-88. If you wish to change your reservation, you may call Northwest directly at (800) 328-1111 or (800) 272-1408 within Minnesota between 8:00 am and 8:00 pm CST. Please remember to provide the AAAI-88 Conference Code number 13209 when you make your arrangements.

Airport Connections

The airport shuttle links each hotel to the Minneapolis-Saint Paul Airport. Current costs range from $4.50 to $6.50. No advance reservation is required.

AAAI Shuttle Service

AAAI is providing complimentary shuttle bus service between most hotels and the Saint Paul Civic Center during all conference event hours. Because of the proximity of the Radisson Hotel Saint Paul and the Quality Inn to the Civic Center, these two hotels will not be included in the shuttle bus system. Evening service will be continued to AAAI sponsored/co-sponsored functions only. Shuttle bus schedules are included in the conference registration packet and are also available at the Message/Information Desk and AAAI room block hotels. Shuttle service will begin Saturday, August 20 at 12:30 pm and terminate at 5:00 pm on Friday, August 26.

Special Tours   AAAI has arranged with Liemandt's Tour and Convention Service to conduct four different tours of the Twin Cities area. They include *Twin Cities and Lakes, Old Log Dinner Theater, Shop Till You Drop,* and *Minneapolis from the Mississippi.* More information regarding these tours can be obtained at the Transportation Booth in the Saint Paul Civic Center Lobby on Saturday and Sunday, August 20 and 21 during registration hours.

Volunteer Room   Volunteer Headquarters, located on the lower level of the Saint Paul Civic Center in Rooms C6 and C7, will be open Saturday, August 20, until Thursday, August 25, from 8:30 am to 5:30 pm, and Friday, August 26 from 8:30 am to 12:00 noon.

Exhibit Program An important service to conference attendees is the Exhibit Program to be held Tuesday, August 23 through Thursday, August 25. Hardware and software manufacturers, publishers, universities, and nonprofit organizations involved in artificial intelligence will display and demonstrate their current products, services, or research. Once again AAAI has given complimentary booths to university and nonprofit research organizations to demonstrate current AI research. The AAAI

would like to thank the major computer equipment suppliers for donating equipment and technical support toward this demonstration program.

Location
Saint Paul Civic Center Arena

Exhibit Hours

Tuesday, August 23	10:00 am − 6:00 pm
Wednesday, August 24	10:00 am − 6:00 pm
Thursday, August 25	10:00 am − 3:00 pm

Vendor Presentations The Exhibit Program will once again include a Vendor Presentation Series to be held in the Weyerhauser Auditorium in the Landmark Center. The purpose of these presentations is to provide attendees the opportunity to discuss the technical aspects of a vendor's product or service with a member of the companies technical staff. The schedule of presentation can be found in the *AI Review.*

Exhibit Entrance Conference attendees must be wearing their conference registration or exhibitor badge to enter the Exhibition or Vendor Presentations. Vendor issued guest passes will also be honored. Further information regarding access to the Exhibition can be obtained from the Exhibitor Information Desk in the Saint Paul Civic Center Lobby.

Exhibitors The *AI Review* has a complete list of exhibitors, booth locations, outline of products, services or research efforts, and a contact person for exhibiting organizations. In addition, there are short articles submitted by exhibitors discussing technical aspects of their products or services. Extra copies of this review are available at the Exhibitor Information Desk.

Special Meetings

AAAI Executive Council Meeting The Executive Council Meeting will be held on Monday, August 22 from 9:00 am to 5:00 pm.

AAAI Business Meeting The Annual Business Meeting will be held on Tuesday, August 23, from 12:30 to 1:30 pm in the Saint Paul Civic Center Forum Theater.

AI in Manufacturing Sub-Group Meeting The AI in Manufacturing meeting will be held on Thursday, August 25 at the Saint Paul Civic Center, Wilkins A/B, at 12:30 pm.

AI in Medicine Sub-Group Meeting The AIM meeting will be held on Thursday, August 25 at the Saint Paul Civic Center, Wilkins C/D, at 12:30 pm.

AIAA Meeting The Computer Systems Technical Committee of the American Institute of Aeronautics and Astronautics will hold a meeting on Monday and Tuesday, August 22-23 in the Saint Paul Civic Center, Rooms C15 and C16.

SIGART Meeting The SIGART Meeting will be held on Wednesday, August 24, at the Saint Paul Civic Center, Wilkins A/B, at 12:30 pm.

Conference Program Schedule

Tutorial Program Schedule

SATURDAY, AUGUST 20

2:00 – 6:00 pm	Conference Registration Opens

Civic Center Lobby

1:00 – 5:00 pm	Press Room Opens

Civic Center Room C23

SUNDAY, AUGUST 21

8:00 am – 5:00 pm	Conference Registration

Civic Center Lobby

8:00 am – 4:00 pm	Press Room Open

Civic Center Room C23

TUTORIAL SESSIONS (being held at the Saint Paul Civic Center and Radisson Hotel Saint Paul)

9:00 am – 1:00 pm
BREAK—10:30 – 11:00 am

Wilkins Ballroom A/B **and** *Civic Center*
Tutorial SA1: Introduction to AI and Expert Systems I: Their Application Consequences
Randall Davis and Patrick Winston

Wilkins Ballroom C/D
Civic Center
Tutorial SA2: Programming with the Common Lisp Object System
Daniel G. Bobrow and Gregor Kiczales

Minnesota Ballroom
Radisson Hotel
Tutorial SA3: Knowledge Representation: Design Issues
Doug Skuce and John Sowa

Wilkins Auditorium
Civic Center
Tutorial SA4: Artificial Intelligence Applications in Hardware Diagnosis
Matthew L. Ginsberg and Narinder P. Singh

Capitol Room
Radisson Hotel
1:00 – 2:00 pm
Tutorial SA5: Machine Learning
Pat Langley and Jaime Carbonell
LUNCH

2:00 – 6:00 pm
BREAK—3:30 – 4:00 pm

Wilkins Ballroom A/B
Civic Center
Tutorial SP1: Introduction to AI and Expert Systems-II: Getting Started
Avron Barr and Dina Barr

Wilkins Ballroom C/D
Civic Center
Tutorial SP2: Verification and Validation of Expert Systems
Rolf A. Stachowitz and Chin-Liang Chang

Minnesota Ballroom
Radisson Hotel
Tutorial SP3: Artificial Intelligence and Design
Louis Steinberg and Christopher Tong

Wilkins Auditorium
Civic Center
Tutorial SP4: Constraint Directed Reasoning
Rina Dechter and Mark Fox

Capitol Room	**Tutorial SP5: Logic Programming Techniques**
Radisson Hotel	Steven Hardy and Leon Sterling

MONDAY, AUGUST 22

8:00 am – 6:00 pm	Conference Registration
Civic Center Lobby	
8:30 am – 4:00 pm	Press Room Open
Civic Center Room C23	
9:00 am – 5:00 pm	AAAI Executive Council Meeting
8:00 am – 5:00 pm	AIAA Computer Systems Technical Committee Meeting
Rooms C15 and C16	
Civic Center	

TUTORIAL SESSIONS   (being held at the Saint Paul Civic Center and Radisson Hotel Saint Paul)

9:00 am – 1:00 pm
BREAK—10:30 – 11:00 am

Wilkins Ballroom A/B	**Tutorial MA1: Uncertainty Management in AI Systems**
Civic Center	Judea Pearl and Glenn Shafer
Wilkins Ballroom C/D	**Tutorial MA2: Neural Network Architectures for Artificial Intelligence**
Civic Center	Geoffrey E. Hinton and David E. Rumelhart
Minnesota Ballroom	**Tutorial MA3: Evaluating Knowledge Engineering Tools**
Radisson Hotel	Paul Harmon and Ric Mayer
Wilkins Auditorium	**Tutorial MA4: Planning and Reasoning About Time**
Civic Center	Thomas Dean and Yoav Shoham
Capitol Ballroom	**Tutorial MA5: Natural Language—Beyond Single Sentence Systems**
Radisson Hotel	James F. Allen and Bonnie L. Webber
1:00 – 2:00 pm	LUNCH

2:00 – 6:00 pm
BREAK—3:30 – 4:00 pm

Wilkins Ballroom A/B	**Tutorial MP1: Truth Maintenance Systems**
Civic Center	David McAllester and Drew McDermott
Wilkins Ballroom C/D	**Tutorial MP2: Task-Specific Problem Solving Architectures**
Civic Center	B. Chandrasekaran and Tom Bylander
Minnesota Ballroom	**Tutorial MP3: Managing Expert Systems Projects**
Radisson Hotel	Gary Kahn and Neil Jacobstein
Wilkins Auditorium	**Tutorial MP4: Knowledge Acquisition for Knowledge-Based Systems**
Civic Center	John H. Boose and Brian R. Gaines
Capitol Ballroom	**Tutorial MP5: Qualitative Simulation and Causal Models**
Radisson Hotel	Benjamin Kuipers and Brian Williams

TUESDAY MORNING, AUGUST 23

8:00 am – 5:00 pm *Civic Center Lobby*	Conference Registration
7:30 am – 3:30 pm *Civic Center Room C23*	Press Room Open
8:00 am – 5:00 pm *Rooms C15 & C16* *Civic Center*	AIAA Computer Systems Technical Committee Meeting
10:00 am – 6:00 pm *Civic Center Arena*	Exhibition Open

Technical Paper Sessions   (Saint Paul Civic Center and Radisson Hotel Saint Paul)

9:00 – 10:40 am *Forum Theater* *Civic Center*	**Invited Talk—Title: *What is the Computational Power of the Brain?*** Terrence Sejnowski, Johns Hopkins University
9:00 – 10:40 am *Minnesota Ballroom* *Radisson Hotel*	**Paper Session: Planning 1** (Session Chair: Barbara Hayes-Roth)
9:00 – 9:25 am	**Prevention Techniques for a Temporal Planner** John C. Hogge, Texas Instruments
9:25 – 9:50 am	**An Analysis of Time Dependent Planning** Thomas Dean and Mark Boddy, Brown University
9:50 – 10:15 am	**Extending Conventional Planning Techniques to Handle Actions with Context-Dependent Effects** Edwin P.D. Pednault, AT&T Bell Laboratories
10:15 – 10:40 am	**Goals as Parallel Program Specifications** Leslie Pack Kaelbling, SRI International and Stanford University
9:00 – 10:40 am *Wilkins Ballroom A/B* *Civic Center*	**Paper Session: Search 1** (Session Chair: David McAllester)
9:00 – 9:25 am	**Parallel Heuristic Search of State-Space Graphs: A Summary of Results** Vipin Kumar, K. Ramesh, and V. Nageshwara Rao, University of Texas at Austin
9:25 – 9:50 am	**Distributed Tree Search and its Application to Alpha-Beta Pruning** Chris Ferguson and Richard E. Korf, University of California, Los Angeles
9:50 – 10:15 am	**Some Experiments with Case-Based Search** Steven Bradtke and Wendy G. Lehnert, University of Massachusetts
10:15 – 10:40 am	**Real-Time Heuristic Search: New Results** Richard E. Korf, University of California, Los Angeles

9:00 – 10:40 am *Wilkins Ballroom C/D* *Civic Center*	**Paper Session: Robotics**
9:00 – 9:25 am	**Compliance Viewed as Programming a Damped Spring** Stephen J. Buckley, IBM Thomas J. Watson Research Center
9:25 – 9:50 am	**Reasoning About Grasping** S. A. Stansfield, Sandia National Laboratories
9:50 – 10:15 am	**A Robust, Qualitative Method for Spatial Learning in Unknown Environments** Benjamin Kuipers and Yung-Tai Byun, University of Texas at Austin
10:15 – 10:40 am	**Subassembly Stability** Nico Boneschanscher and Hans van der Drift, Delft University of Technology Stephen J. Buckley and Russell H. Taylor, IBM Thomas J. Watson Research Center
10:40 – 11:10 am	BREAK
11:10 am – 12:25 pm *Forum Theater* *Civic Center*	**Invited Talk** Takeo Kanade, Carnegie Mellon University
11:10 am – 12:25 pm *Minnesota Ballroom* *Radisson Hotel*	**Paper Session: Inheritance 1** (Session Chair: Bill Mark)
11:10 – 11:35 am	**A Deductive Pattern Matcher** Robert M. MacGregor, USC-Information Sciences Institute
11:35 am – 12:00 pm	**A Model and Representation for Type Information and Its Use in Reasoning with Defaults** Lin Padgham, Linkoping University
12:00 – 12:25 pm	**Beyond ISA: Structures for Plausible Inference in Semantic Networks** Paul R. Cohen and Cynthia L. Loiselle, University of Massachusetts
11:10 am – 12:25 pm *Wilkins Ballroom A/B* *Civic Center*	**Paper Session: Search 2** (Session Chair: Vipin Kumar)
11:10 – 11:35 am	**An Exact Best-First Search Procedure for the Constrained Rectangular Guillotine Knapsack Problem** K. V. Viswanathan and A. Bagchi, Indian Institute of Management
11:35 am – 12:00 pm	**Tree-Clustering Schemes for Constraint-Processing** Rina Dechter and Judea Pearl, University of California, Los Angeles
12:00 – 12:25 pm	**A Rearrangement Search Strategy for Determining Propositional Satisfiability** Ramin Zabih, Stanford University and David McAllester, Cornell University

11:10 am – 12:25 pm *Wilkins Ballroom C/D* *Civic Center*	**Paper Session: Architectures and Language for Problem Solving** (Session Chair: Greg Clemenson)
11:10 – 11:35 am	**Tuning A Blackboard-Based Application: A Case Study Using GBB** Daniel D. Corkill and Kevin Q Gallagher, University of Massachusetts
11:35 am – 12:00 pm	**A Tree Representation for Parallel Problem Solving** L. V. Kale, University of Illinois
12:00 – 12:25 pm	**Parallel Hardware for Constraint Satisfaction** Michael J. Swain and Paul R. Cooper, University of Rochester

TUESDAY AFTERNOON, AUGUST 23

12:25 – 2:00 pm	LUNCH
12:30 – 1:30 pm *Forum Theater* *Civic Center*	**AAAI Annual Business Meeting**

Technical Paper Sessions   (Saint Paul Civic Center and Radisson Hotel Saint Paul)

2:00 – 3:15 pm *Forum Theater* *Civic Center*	**Invited Talk—Title: *Exploiting Task Structure to Automate Knowledge Acquisition*** John McDermott, Digital Equipment Corporation
2:00 – 3:15 pm *Minnesota Ballroom* *Radisson Hotel*	**Paper Session: Inheritance 2** (Session Chair: David Etherington)
2:00 – 2:25 pm	**Tractable Theories of Multiple Defeasible Inheritance in Ordinary Nonmonotonic Logics** Brian A. Haugh, Martin Marietta Laboratories
2:25 – 2:50 pm	**Mixing Strict and Defeasible Inheritance** John F. Horty, Carnegie Mellon University and Richmond H. Thomason, University of Pittsburgh
2:50 – 3:15 pm	**Nonmonotonic Inheritance and Generic Reflexives** David Touretzky, Carnegie Mellon University and Richmond H. Thomason, University of Pittsburgh
2:00 – 2:50 pm *Wilkins Ballroom A/B* *Civic Center*	**Paper Session: Natural Language—Syntax** (Session Chair: Eugene Charniak)
2:00 – 2:25 pm	**Representing Pronouns in Logical Form: Computational Constraints and Linguistic Evidence** Mary P. Harper, Brown University

2:25 – 2:50 pm	**Principle-Based Interpretation of Natural Language Quantifiers** Samuel S. Epstein, Bell Communications Research
2:00 – 3:15 pm *Wilkins Ballroom C/D* *Civic Center*	**Paper Session: Vision** (Session Chair: Steven Barnard)
2:00 – 2:25 pm	**On the Extraction of Shape Information from Shading** Alex Pentland, Massachusetts Institute of Technology
2:25 – 2:50 pm	**Feature Recognition Using Correlated Information Contained in Multiple Neighborhoods** Andrea Califano, IBM Thomas J. Watson Research Center
2:50 – 3:15 pm	**Performance of a System to Locate Address Blocks on Mail Pieces** Ching-Huei Wang, Paul W. Palumbo, and Sargur N. Srihari, State University of New York at Buffalo
3:15 – 3:45 pm	BREAK
3:45 – 5:25 pm *Forum Theater* *Civic Center*	**Invited Panel—Title: *Results from a Study of the First Wave of Expert System*** ***Applications to Business*** Edward Feigenbaum, Stanford University
3:45 – 5:25 pm *Minnesota Ballroom* *Radisson Hotel*	**Paper Session: Planning 2** (Session Chair: Tom Dean)
3:45 – 4:10 pm	**Predictability Versus Responsiveness: Coordinating Problem Solvers in Dynamic Domains** Edmund H. Durfee and Victor R. Lesser, University of Massachusetts
4:10 – 4:35 pm	**Intelligent Real-Time Monitoring** Thomas J. Laffey, Scott M. Weitzenkamp, James L. Schmidt, Jackson Y. Read and Simon A. Kao, Lockheed Artificial Intelligence Center
4:35 – 5:00 pm	**Reactive Plan Revision** Peng Si Ow, Stephen F. Smith, and Alfred Thiriez, Carnegie Mellon University
5:00 – 5:25 pm	**Integrating Planning, Execution and Monitoring** Jose A. Ambros-Ingerson, University of California, Irvine and Sam Steel, University of Essex
3:45 – 5:25 pm *Wilkins Ballroom A/B* *Civic Center*	**Paper Session: Nonstandard Logics** (Session Chair: Kurt Konolige)
3:45 – 4:10 pm	**Investigations into a Theory of Knowledge Base Revision** Mukesh Dalal and Alex Borgida, Rutgers University
4:10 – 4:35 pm	**Towards a Theory of Hypothetical Reasoning** Anthony J. Bonner, Rutgers University

4:35 − 5:00 pm	**Adding Number Restrictions to a Four-Valued Terminological Logic** Peter F. Patel-Schneider, Schlumberger Palo Alto Research
5:00 − 5:25 pm	**Normal Multimodal Logics** Laurent Catach, IBM Paris Scientific Center
3:45 − 5:25 pm *Wilkins Ballroom C/D* *Civic Center*	**Paper Session: Production Systems** (Session Chair: Robert Cassels)
3:45 − 4:10 pm	**Suitability of Message Passing Computers for Implementing Production Systems** Anoop Gupta, Stanford University and Milind Tambe, Carnegie Mellon University
4:10 − 4:35 pm	**Comparison of the Rete and Treat Production Matchers for Soar (A Summary)** Pandurang Nayak and Anoop Gupta, Stanford University and Paul Rosenbloom, USC-Information Sciences Institute
4:35 − 5:00 pm	**Optimizing Rules in Production System Programs** Toru Ishida, NTT Communications and Information Processing Laboratories
5:00 − 5:25 pm	**The Challenge of Real-Time Process Control for Production Systems** Franz Barachini and Norbert Theuretzbacher, ALCATEL Austria

TUESDAY EVENING, AUGUST 23

6:30 − 9:00 pm	**Reception: Minneapolis Zoological Gardens**

WEDNESDAY MORNING, AUGUST 24

8:00 am − 5:00 pm *Civic Center Lobby*	Conference Registration
8:30 am − 3:30 pm *Civic Center Room C23*	Press Room Open
10:00 am − 6:00 pm *Civic Center Arena*	Exhibition Open

Technical Plenary Sessions   (Saint Paul Civic Center)

9:00 − 10:40 am *Forum Theater* *Civic Center*	**Presidential Address: *Towards a Theory of Knowledge*** Raj Reddy, Carnegie Mellon University
10:40 − 11:10 am	BREAK

11:10 am – 12:25 pm *Forum Theater* *Civic Center*	**Best Papers Award Winners** Donation provided by the Editorial Board of the journal, *Artificial Intelligence*, published by Elsevier-North Holland
11:00 – 11:25 am	**Presentation of Award by Daniel Bobrow, Editor-in-Chief, *Artificial Intelligence***
11:25 – 11:55 am	**MINIMA: A Symbolic Approach to Qualitative Algebraic Reasoning** Brian C. Williams, Massachusetts Institute of Technology
11:55 am – 12:25 pm	**Quantitative Results Concerning the Utility of Explanation** Steven Minton, Carnegie Mellon University

WEDNESDAY AFTERNOON, AUGUST 24

12:30 – 2:00 pm	LUNCH
12:30 – 1:30 pm *Wilkins Ballroom A/B* *Civic Center*	**SIGART Meeting**

Technical paper sessions   (Saint Paul Civic Center and Radisson Hotel Saint Paul)

2:00 – 3:15 pm *Forum Theater* *Civic Center*	**Invited Talk—Title: *In Search of the Real World: Practical Utility of AI*** Earl Sacerdoti, SoftTouch Systems
2:00 – 3:15 pm *Minnesota Ballroom* *Radisson Hotel*	**Paper Session: Qualitative Reasoning 1** (Session Chair: Johan de Kleer)
2:00 – 2:25 pm	**A Qualitative Approach to Mechanical Constraint** Paul Nielsen, University of Illinois at Urbana-Champaign
2:25 – 2:50 pm	**Global Filters for Qualitative Behaviors** Peter Struss, Siemens Corporation
2:50 – 3:15 pm	**Generating Global Behaviors Using Deep Knowledge of Local Dynamics** Kenneth Man-Kam Yip, Massachusetts Institute of Technology
2:00 – 3:15 pm *Wilkins Ballroom A/B* *Civic Center*	**Paper Session: Learning and Knowledge Acquisition 1** (Session Chair: Bruce Porter)
2:00 – 2:25 pm	**The Utility of Difference-Based Reasoning** Brian Falkenhainer, University of Illinois at Urbana-Champaign
2:25 – 2:50 pm	**Learning from Opportunities: Storing and Re-using Execution-Time Optimizations** Kristian Hammond, Tim Converse, and Mitchell Marks, University of Chicago

2:50 – 3:15 pm	**Explanation-Based Indexing of Cases** Ralph Barletta and William Mark, Lockheed Artificial Intelligence Center
2:00 – 3:15 pm *Wilkins Ballroom C/D* *Civic Center*	**Paper Session: Natural Language—Speech** (Session Chair: Julia Hirschberg)
2:00 – 2:25 pm	**The Integration of Unification-Based Syntax/Semantics and Memory-Based Pragmatics for Real-Time Understanding of Noisy Continuous Speech Input** Hideto Tomabechi and Masaru Tomita, Carnegie Mellon University
2:25 – 2:50 pm	**Using Dialog-Level Knowledge Sources to Improve Speech Regulation** Alexander G. Hauptmann, Sheryl R. Young, and Wayne H. Ward, Carnegie Mellon University
2:50 – 3:15 pm	**Data-Driven Execution of Multi-Layered Networks for Automatic Speech Recognition** Renato De Mori, Yoshua Bengio, and Regis Cardin, McGill University
3:15 – 3:45 pm	BREAK
3:45 – 5:25 pm *Forum Theater* *Civic Center*	**Invited Panel—Title:** *Where We Are and Where We Are Going* Howard Shrobe, Symbolics
3:45 – 5:25 pm *Minnesota Ballroom* *Radisson Hotel*	**Paper Session: Qualitative Reasoning 2** (Session Chair: Walter Hamscher)
3:45 – 4:10 pm	**Non-Intersection of Trajectories in Qualitative Phase Space: A Global Constraint for Qualitative Simulation** Wood W. Lee and Benjamin J. Kuipers, University of Texas at Austin
4:10 – 4:35 pm	**Exaggeration** Daniel S. Weld, Massachusetts Institute of Technology
4:35 – 5:00 pm	**Qualitative Reasoning at Multiple Resolutions** Seshashayee S. Murthy, IBM Thomas J. Watson Research Center
5:00 – 5:25 pm	**Setting up Large-Scale Qualitative Models** Brian Falkenhainer and Kenneth D. Forbus, University of Illinois
3:45 – 5:25 pm *Wilkins Ballroom A/B* *Civic Center*	**Paper Session: Formal Results in Learning** (Session Chair: Stuart Russell)
3:45 – 4:10 pm	**Infering Probabilistic Theories from Data** Edwin P.D. Pednault, AT&T Bell Laboratories
4:10 – 4:35 pm	**Cumulative Learning in Neural Nets** L. G. Valiant, Harvard University

4:35 – 5:00 pm	**Learning Complicated Concepts Reliably and Usefully** Ronald L. Rivest and Robert Sloan, Massachusetts Institute of Technology
5:00 – 5:25 pm	**Tree-Structured Bias** Stuart J. Russell, University of California, Berkeley

3:45 – 5:25 pm *Wilkins Ballroom C/D* *Civic Center*	**Paper Session: Natural Language—Dialogue** (Session Chair: Lynn Bates)
3:45 – 4:10 pm	**Acquiring Lexical Knowledge from Text: A Case Study** Paul Jacobs and Uri Zernik, General Electric Research and Development Center
4:10 – 4:35 pm	**The Interpretation of Temporal Relations in Narrative** Fei Song and Robin Cohen, University of Waterloo
4:35 – 5:00 pm	**Beyond Semantic Ambiguity: Dealing with an Extended Notion in Dialogue Supporting Systems** Galina Datskovsky Moerdler and Kathleen R. McKeown, Columbia University
5:00 – 5:25 pm	**Exploiting User Expertise in Answer Expression** David N. Chin, University of Hawaii at Manoa

THURSDAY MORNING, AUGUST 25

8:00 am – 5:00 pm *Civic Center Lobby*	Conference Registration
8:30 am – 12:30 pm *Civic Center Room C23*	Press Room Open
10:00 am – 3:00 pm *Civic Center Arena*	Exhibition Open

Technical paper sessions   (Saint Paul Civic Center and Radisson Hotel Saint Paul)

9:00 – 10:40 am *Forum Theater* *Civic Center*	**Invited Talk—Title: *Physically-Based Modeling for Vision and Graphics*** Andrew Witkin, Schlumberger Palo Alto Research
9:00 – 10:40 am *Minnesota Ballroom* *Radisson Hotel*	**Paper Session: Planning 3** (Session Chair: Mike Wellman)
9:00 – 9:25 pm	**Reasoning about Action Using a Possible Models Approach** Marianne Winslett, University of Illinois
9:25 – 9:50 pm	**A Theory of Debugging Plans and Interpretations** Reid G. Simmons, Massachusetts Institute of Technology
9:50 – 10:15 pm	**Plan Abstraction Based on Operator Generalization** John S. Anderson and Arthur M. Farley, University of Oregon

10:15 − 10:40 pm	**Geometric Reasoning and Organized Optimization for Automated Process Planning** Yasuyuki Maeda and Katsuya Shinohara, NEC Corporation
9:00 − 10:40 am *Wilkins Ballroom A/B* *Civic Center*	**Paper Session: Truth Maintenance Systems** (Session Chair: Jon Doyle)
9:00 − 9:25 pm	**An Efficient ATMS for Equivalence Relations** Caroline N. Koff, Nicholas S. Flann, and Thomas G. Dietterich, Oregon State University
9:25 − 9:50 pm	**A General Labeling Algorithm for Assumption-Based Truth Maintenance** Johan de Kleer, Xerox Palo Alto Research Center
9:50 − 10:15 pm	**Focusing the ATMS** Kenneth D. Forbus, University of Illinois and Johan de Kleer, Xerox Palo Alto Research Center
10:15 − 10:40 pm	**Massively Parallel Assumption-Based Truth Maintenance** Michael Dixon, Xerox Palo Alto Research Center and Stanford University and Johan de Kleer, Xerox Palo Alto Research Center
9:00 − 10:40 am *Wilkins Ballroom C/D* *Civic Center*	**Paper Session: AI and Education and Cognitive Modeling 1** (Session Chair: William J. Clancey)
9:00 − 9:25 pm	**Facilitating Self-Education by Questioning Assumptive Reasoning** Robert Farrell, Yale University
9:25 − 9:50 pm	**Learning a Second Language** Steven Lytinen and Carol Moon, University of Michigan
9:50 − 10:15 pm	**Ethical Understanding: Recognizing and Using Belief Conflict in Narrative Processing** John F. Reeves, University of California, Los Angeles
10:15 − 10:40 pm	**A Computational Account of Basic Level and Typicality Effects** Douglas Fisher, Vanderbilt University
10:40 − 11:10 am	BREAK
11:10 am − 12:25 pm *Forum Theater* *Civic Center*	**Invited Talk—Title:** *Challenges for AI in Future CAD/CAM Systems* David Gossard, Massachusetts Institute of Technology
11:10 am − 12:25 pm *Minnesota Ballroom* *Radisson Hotel*	**Paper Session: Machine Architectures and and Computer Languages for AI** (Session Chair: Anoop Gupta)

11:10 − 11:35 pm	**Towards a Virtual Parallel Inference Engine** Howard E. Shrobe, John G. Aspinall, and Neil L. Mayle, Symbolics Cambridge Research Center
11:35 am − 12:00 pm	**Generality Versus Specificity: An Experience with AI and OR Techniques** Pascal Van Hentenryck, European Computer-Industry Research Center and Jean-Philippe Carillon, CEGOS
12:00 − 12:25 pm	**Knowledge-Based Real-Time Control: A Parallel Processing Perspective** D. D. Sharma and N. S. Sridharan, FMC Corporation
11:10 am − 12:25 pm *Wilkins Ballroom A/B* *Civic Center*	**Paper Session: Uncertainty** (Session Chair: Ron Loui)
11:10 − 11:35 pm	**Evidential Reasoning Using DELIEF** Debra K. Zarley, Yen-Teh Hsia, and Glenn Shafer, University of Kansas
11:35 am − 12:00 pm	**Belief Maintenance: An Integrated Approach to Uncertainty Management** Kathryn Blackmond Laskey, Decision Science Consortium, Inc. and Paul E. Lehner, Decision Science Consortium, Inc. and George Mason University
12:00 − 12:25 pm	**A Note on Probabilistic Logic** Mary McLeish, University of Guelph
11:10 am − 12:00 pm *Wilkins Ballroom C/D* *Civic Center*	**Paper Session: Knowledge Representation 1** (Session Chair: Richard Fikes)
11:10 − 11:35 pm	**How to Print a File: An Expert System Approach to Software Knowledge Representation** Peter G. Selfridge, AT&T Bell Laboratories
11:35 am − 12:00 pm	**Representing Genetic Information with Formal Grammars** David B. Searls, Unisys Paoli Research Center

THURSDAY AFTERNOON, AUGUST 25

12:00 − 2:00 pm	LUNCH
12:30 − 1:30 pm *Wilkins Ballroom A/B* *Civic Center*	**AAAI AI in Manufacturing Sub-Group Meeting**
12:30 − 1:30 pm *Wilkins Ballroom C/D* *Civic Center*	**AAAI AIM Sub-Group Meeting**

TECHNICAL PAPER SESSIONS   (Saint Paul Civic Center and Radisson Hotel Saint Paul)

2:00 – 2:50 pm *Forum Theater* *Civic Center*	**Invited Talk—Title: *Future Intelligent Information Systems: AI and Database Technologies Working Together*** Michael L. Brodie, GTE Laboratories Incorporated

The effective application of AI Technology and the development of future computing systems requires the integration of AI and Database Technologies. The integration will benefit both AI and Databases and will substantially advance the state of computing.

Information Systems are among the greatest potential beneficiaries of AI Technology. What if advanced reasoning capabilities could be added to any Information System? What if intelligent interfaces could replace unfriendly interfaces? What if AI techniques were used to extend Database Management functionality? At the same time, AI technology will benefit dramatically from Database Technology. What if knowledge could be shared concurrently by existing and unanticipated applications *(Knowledge Independence)*? What if AI systems could contain hundreds of thousands of rules and access millions of facts? What if new reasoning techniques could be directly applied to existing knowledge bases? What if knowledge could be reorganized, independently of applications, to optimize for current usage *(Representation Independence)?* What if AI systems development involved simply incremental augmentation of existing knowledge bases? What if AI systems were as robust as On-Line Transaction Processing Systems?

Future computing systems will require AI and Database Technology to work together with other technologies. These systems will consist of large amounts of heterogeneous, distributed agents with varying abilities to work cooperatively. Each will have its own knowledge and reasoning schemes, languages, and capabilities. Data, procedures, knowledge, and objects in these systems may be shared, incomplete, and inconsistent with those of other agents; but will certainly persist and will together form a massive distributed information base. The current trend to *Interconnectivity* — one system accessing another via standard interfaces — will evolve into *Interoperability* — intelligent cooperation amongst systems to best achieve specified goals.

Such future computing systems pose major challenges for both AI and Database Technologies. Many of these challenges (e.g., managing, structuring, searching, sharing, and modifying objects; reasoning about tasks and specific domains) are present in simpler forms in current AI and Database Systems. Extending existing solutions to new contexts requires a deep understanding of both technologies, their requirements, their capabilities, and their limitations.

Difficulties with current research and commercial AI systems, let alone future systems, are due, in part, to the lack of such a deep understanding. Integration of AI into conventional Information Systems requires resolution of knowledge/object management and access issues addressed by Database Technology for simple tabular and structured data. Basic systems issues underlying this resolution include the appropriate use of secondary storage and effective architectures.

Database Technology currently solves the above problems for about five percent of existing corporate and scientific data. Exciting database research is attempting to extend these solutions to new application domains such as AI. Much of this work utilizes the object paradigm. It is hoped that the use of this evolving pardigm in AI, Databases, Programming Languages, Operating Systems, and other areas will provide a common ground for technology integration. For example, combining the object paradigm with that of heterogeneous, distributed databases could provide network wide object management regardless of the systems in which objects reside. This interoperability could permit systems to cooperate with less need to know exact details of foreign systems and objects. Open problems here include the appropriate partitioning of functionality amongst, and the nature of interfaces between Database, Object Management, AI, and other systems. These issues must be addressed at the Knowledge, Symbol, and Architectural/Organizational Levels.

This talk presents a vision of future computing that provides a framework and goals for the AI-Database Integration. Short and long term benefits are illustrated and the critical nature of this progress is emphasized. Progress over the past ten years is illustrated. The applicability of existing Database Techniques to AI systems and of AI Techniques to Database Systems is described. Open problems are identified together with promising research directions.

2:00 – 2:50 pm *Minnesota Ballroom* *Radisson Hotel*	**Paper Session: Analytic Learning 1** (Session Chair: Rich Keller)
2:00 – 2:25 pm	**Approximate Theory Formation: An Explanation-Based Approach** Thomas Ellman, Columbia University
2:25 – 2:50 pm	**IMEX: Overcoming Intractability in Explanation Based Learning** Michael S. Braverman and Stuart J. Russell, University of California, Berkeley

2:00 – 3:15 pm *Wilkins Ballroom A/B* *Civic Center*	**Paper Session: Nonmonotonic Logic 1** (Session Chair: Vladimir Lifschitz)
2:00 – 2:25 pm	**Hierarchic Autoepistemic Theories for Nonmonotonic Reasoning** Kurt Konolige, SRI International
2:25 – 2:50 pm	**Nonmonotonic Reasoning vs. Logic Programming: A New Perspective** Teodor C. Przymusinski, University of Texas
2:50 – 3:15 pm	**On the Logic of Defaults** Hector Geffner, University of California, Los Angeles

2:00 – 3:15 pm *Wilkins Ballroom C/D* *Civic Center*	**Paper Session: Integrated Robotics** (Session Chair: Andrew Witkin)
2:00 – 2:25 pm	**Inferring Ignorance from the Locality of Visual Perception** Ernest Davis, Courant Institute
2:25 – 2:50 pm	**Connectionist Networks for Learning Coordinated Motion in Autonomous Systems** Jahir Pabon and David Gossard, Massachusetts Institute of Technology
2:50 – 3:15 pm	**Situated Vision in a Dynamic World: Chasing Objects** Ian Douglas Horswill and Rodney Allen Brooks, Massachusetts Institute of Technology
3:15 – 3:45 pm	BREAK
3:45 – 5:25 pm *Forum Theater* *Civic Center*	**Paper Session: Diagnosis** (Session Chair: Brian Falkenhainer)
3:45 – 4:10 pm	**The Induction of Fault Diagnosis Systems from Qualitative Models** D. A. Pearce, The Turing Institute
4:10 – 4:35 pm	**Design for Testability** Peng Wu, Massachusetts Institute of Technology
4:35 – 5:00 pm	**Specialized Strategies: An Alternative to First Principles in Diagnostic Problem Solving** Nancy E. Reed, Elizabeth R. Stuck, and James B. Moen, University of Minnesota
5:00 – 5:25 pm	**Robust Operative Diagnosis as Problem Solving in a Hypothesis Space** Kathy H. Abbott, NASA Langley Research Center and Rutgers University
3:45 – 5:25 pm *Minnesota Ballroom* *Radisson Hotel*	**Paper Session: Learning and Knowledge Acquisition 2** (Session Chair: Paul Utgoff)
3:45 – 4:10 pm	**Knowledge Base Refinement Using Apprenticeship Learning Techniques** David C. Wilkins, University of Illinois
4:10 – 4:35 pm	**Parsing to Learn Fine Grained Rules** Subrata Roy and Jack Mostow, Rutgers University
4:35 – 5:00 pm	**Simulation-Assisted Inductive Learning** Bruce G. Buchanan, John Sullivan, and Tze-Pin Cheng, Stanford University
5:00 – 5:25 pm	**The Automatic Acquisition of Methods: A Genetic Approach** Kurt Ammon, University of Hamburg
3:45 – 5:25 pm *Wilkins Ballroom A/B* *Civic Center*	**Paper Session: Nonmonotonic Logic 2** (Session Chair: Peter Ladkin)

3:45 – 4:10 pm	**Compiling Circumscriptive Theories into Logic Programs: Preliminary Report** Michael Gelfond, University of Texas at El Paso and Vladimir Lifschitz, Stanford University
4:10 – 4:35 pm	**Reducing Parallel Circumscription into Basic Circumscription** Li Yan Yuan and Cheng Hui Wang, University of Southwestern Louisiana
4:35 – 5:00 pm	**Some Computational Aspects of Circumscription** Phokion G. Kolaitis, Stanford University and Christos H. Papadimitriou, University of California, San Diego
5:00 – 5:25 pm	**A Circumscriptive Theorem Prover: Preliminary Report** Matthew L. Ginsberg, Stanford University

3:45 – 5:25 pm *Wilkins Ballroom C/D* *Civic Center*	**Paper Session: User Interfaces** (Session Chair: James Miller)
3:45 – 4:10 pm	**Knowledge-Based Spreadsheets** Gerhard Fischer and Christian Rathke, University of Colorado
4:10 – 4:35 pm	**Automatic Construction of User-Interface Displays** Yigal Arens, Lawrence Miller, Stuart C. Shapiro and Norman K. Sondheimer, USC-Information Sciences Institute
4:35 – 5:00 pm	**Specification by Reformulation: A Paradigm for Building Integrated User Support Environments** John Yen, Robert Neches, and Michael DeBellis, USC-Information Sciences Institute
5:00 – 5:25 pm	**Multi-Modal References in Human-Computer Dialogue** Jeannette G. Neal, Zuzana Dobes, Keith E. Bettinger and Jung S. Byoun, Calspan-UB Research Center

THURSDAY EVENING, AUGUST 25

6:30 – 8:00 pm	**Landmark Center Reception**

FRIDAY MORNING, AUGUST 26

Conference Registration Closed

Technical paper sessions   (Saint Paul Civic Center and Radisson Hotel Saint Paul)

9:00 – 10:40 am *Forum Theater* *Civic Center*	**Paper Session: Design** (Session Chair: Peter Friedland)
9:00 – 9:25 am	**Assembling A Device** Jean-Luc Dormoy, Electricite de France Research Center and Olivier Raiman, IBM Scientific Center

9:25 − 9:50 am	**Upgrading Design Processes** Sarosh Talukdar, Jim Rehg, Rob Woodbury and Alberto Elfes, Carnegie Mellon University
9:50 − 10:15 am	**Function Sharing in Mechanical Design** Karl T. Ulrich and Warren P. Seering, Massachusetts Institute of Technology
10:15 − 10:40 am	**From Kinematics to Shape: An Approach to Innovative Design** Leo Joskowicz, Courant Institute and Sanjaya Addanki, IBM Thomas J. Watson Research Center
9:00 − 11:05 am *Minnesota Ballroom* *Radisson Hotel*	**Paper Session: Empirical Learning** (Session Chair: John Laird)
9:00 − 9:25 am	**Credit Assignment In Genetic Algorithm-Based Learning** John J. Grefenstette, Naval Research Laboratory
9:25 − 9:50 am	**Perceptron Trees: A Case Study in Hybrid Concept Representations** Paul E. Utgoff, University of Massachusetts
9:50 − 10:15 am	**Bayesian Classification** Peter Cheeseman, NASA Ames Research Center; Matthew Self, Sterling Software; John Stutz, NASA Ames Research Center; James Kelly, Sterling Software; Will Taylor, Sterling Software; and Don Freeman, University of Pittsburgh
10:15 − 10:40 am	**Combining Statistical Regression Analysis and Inductive Learning Techniques** Carlo Berzuini, University of Pavia
10:40 − 11:05 am	**Recovery from Incorrect Knowledge in Soar** John Laird, University of Michigan
9:00 − 10:40 am *Wilkins Ballroom A/B* *Civic Center*	**Paper Session: Cognitive Modeling 2** (Session Chair: Paul Rosenbloom)
9:00 − 9:25 am	**Waiting on Weighting: A Symbolic Least Commitment Approach** Kevin D. Ashley and Edwina L. Rissland, University of Massachusetts
9:25 − 9:50 am	**Resolving Goal Conflicts via Negotiation** Katia P. Sycara, Carnegie Mellon University
9:50 − 10:15 am	**Evaluating Explanations** David B. Leake, Yale University
10:15 − 10:40 am	**Reasoning about Evidence in Causal Explanations** Phyllis Koton, Massachusetts Institute of Technology
9:00 − 10:40 am *Wilkins Ballroom C/D* *Civic Center*	**Paper Session: Theorem Proving**

9:00 − 9:25 am	**Using Specialists to Accelerate General Reasoning** Stephanie A. Miller and Lenhart K. Schubert, University of Alberta
9:25 − 9:50 am	**Goal-Directed Equation Solving** Nachum Dershowitz and G. Sivakumar, University of Illinois at Urbana-Champaign
9:50 − 10:15 am	**Tableau-Based Theorem Proving in Normal Conditional Logics** Chris Groeneboer and James P. Delgrande, Simon Fraser University
10:15 − 10:40 am	**A General Proof Method for Modal Predicate Logic without the Barcan Formula** Peter Jackson, McDonnell Douglas Research Laboratories and Han Reichgelt, University of Nottingham
10:40 − 11:10 am	BREAK
11:10 am − 12:25 pm *Forum Theater* *Civic Center*	**Invited Talk—Title:** *How to Draw Three People in a Botanical Garden* Harold Cohen, University of California, San Diego
11:10 am − 12:25 pm *Minnesota Ballroom* *Radisson Hotel*	**Paper Session: Analytic Learning 2** (Session Chair: Tom Dietterich)
11:10 − 11:35 am	**Some Philosophical Problems with Formal Learning Theory** Jonathan Amsterdam, Massachusetts Institute of Technology
11:35 am − 12:00 pm	**Knowledge-Base Reduction: A New Approach to Checking Knowledge Bases for Inconsistency and Redundancy** Allen Ginsberg, AT&T Bell Laboratories
12:00 − 12:25 pm	**Theory Revision via Prior Operationalization** Allen Ginsberg, AT&T Bell Laboratories
11:10 am − 12:00 pm *Wilkins Ballroom A/B* *Civic Center*	**Paper Session: Rule Based Reasoning** (Session Chair: Steve Fickas)
11:10 − 11:35 am	**Inference under Varying Resource Limitations** Eric J. Horvitz, Stanford University
11:35 am − 12:00 pm	**Conflict Resolution in Fuzzy Forward-Chaining Production Systems** James Bowen, North Carolina State University and Jianchu Kang, Beijing Institute of Aeronautics and Astronautics
11:10 am − 12:25 pm *Wilkins Ballroom C/D* *Civic Center*	**Paper Session: Temporal Reasoning 1** (Session Chair: Henry Kautz)
11:10 − 11:35 am	**The Persistence of Derived Information** Karen L. Myers and David E. Smith, Stanford University

11:35 am − 12:00 pm	**Representing and Computing Temporally Scoped Beliefs** Steve Hanks, Yale University

FRIDAY AFTERNOON, AUGUST 26

12:25 − 2:00 pm	LUNCH
2:00 − 3:15 pm *Forum Theater* *Civic Center*	**Invited Talk—Title: *Analog VLSI Models of Neural Systems*** Carver Mead, California Institute of Technology
2:00 − 3:40 pm *Minnesota Ballroom* *Radisson Hotel*	**Paper Session: Qualitative Reasoning 3** (Session Chair: Ken Forbus)
2:00 − 2:25 pm	**Formal Basis for Commonsense Abstraction of Dynamic Systems** Yumi Iwasaki and Inderpal Bhandari, Carnegie Mellon University
2:25 − 2:50 pm	**Causal Ordering in a Mixed Structure** Yumi Iwasaki, Carnegie Mellon University
2:50 − 3:15 pm	**Controlling Qualitative Resolution** Jean-Luc Dormoy, Electricite de France Research Center
3:15 − 3:40 pm	**Using Incomplete Qualitative Knowledge in Qualitative Reasoning** Daniel Berleant and Benjamin Kuipers, University of Texas at Austin
2:00 − 3:40 pm *Wilkins Ballroom A/B* *Civic Center*	**Paper Session: Automatic Programming** (Session Chair: Doug Smith)
2:00 − 2:25 pm	**Integrating Multiple Sources of Knowledge into Designer-Soar, an Automatic Algorithm Designer** David Steier and Allen Newell, Carnegie Mellon University
2:25 − 2:50 pm	**Invariant Logic: A Calculus for Problem Reformulation** Michael R. Lowry, Stanford University and Kestrel Institute
2:50 − 3:15 pm	**Being Suspicious: Critiquing Problem Specifications** Stephen Fickas and P. Nagarajan, University of Oregon
3:15 − 3:40 pm	**Dominic II: Meta-Level Control in Iterative Redesign** Mark F. Orelup, John R. Dixon, Paul R. Cohen, University of Massachusetts and Melvin K. Simmons, General Electric Corporate Research and Development
2:00 − 3:40 pm *Wilkins Ballroom C/D* *Civic Center*	**Paper Session: Temporal Reasoning 2** (Session Chair: Yoav Shoham)
2:00 − 2:25 pm	**Stable Closures, Defeasible Logic and Contradiction Tolerant Reasoning** Paul Morris, IntelliCorp

2:25 – 2:50 pm	**Satisfying First-Order Constraints about Time Intervals** Peter B. Ladkin. Kestrel Institute
2:50 – 3:15 pm	**Why Things Go Wrong: A Formal Theory of Causal Reasoning** Leora Morgenstern and Lynn Andrea Stein, Brown University
3:15 – 3:40 pm	**Probabilistic Temporal Reasoning** Thomas Dean and Keiji Kanazawa, Brown University
3:40 – 4:10 pm	BREAK
4:10 – 5:00 pm *Wilkins Ballroom A/B* *Civic Center*	**Paper Session: Constraints** (Session Chair: Lewis Johnson)
4:10 – 4:35 pm	**FRM: An Intelligent Assistant for Financial Resource Management** Andrew Gelman, Susan Altman, Matt Pallakoff, Ketan Doshi, Catherine Manago, Thomas C. Rindfleisch and Bruce G. Buchanan, Stanford University
4:35 – 5:00 pm	**Belief Maintenance in Dynamic Constraint Networks** Rina Dechter, University of California, Los Angeles and Avi Dechter, California State University, Northridge
4:10 – 5:00 pm *Wilkins Ballroom C/D* *Civic Center*	**Paper Session: Knowledge Representation 2** (Session Chair: Peter Patel-Schneider)
4:10 – 4:35 pm	**Overview of a Theory of Representation Design** Jeffrey Van Baalen and Randall Davis, Massachusetts Institute of Technology
4:35 – 5:00 pm	**Mechanisms for Reasoning about Sets** Michael P. Wellman and Reid G. Simmons, Massachusetts Institute of Technology