



**Fourteenth National Conference on
Artificial Intelligence (AAAI-97)
Ninth Conference on Innovative Applications of
Artificial Intelligence (IAAI-97)**

July 27-31, 1997

Providence, Rhode Island

Sponsored by the American Association for Artificial Intelligence

Cosponsored by NASA Ames Research Center and Microsoft Corporation

In cooperation with Brown University

Program & Exhibit Guide

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Acknowledgments

The American Association for Artificial Intelligence wishes to acknowledge and thank the following individuals for their generous contributions of time and energy to the successful creation and planning of the Fourteenth National Conference on Artificial Intelligence and the Ninth Conference on Innovative Applications of Artificial Intelligence.

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- *AAAI-97 / SIGART Doctoral Consortium
Organizers*
Vibhu O. Mittal, University of Pittsburgh
Loren G. Terveen, AT&T Research

A complete listing of the AAAI-97 and IAAI-97 Program Committee members appears in the AAAI-97 / IAAI-97 *Proceedings*.

Corporate Sponsorship

AAAI gratefully acknowledges the generous contributions of the following corporations and organizations to AAAI-97:

- Brown University
- Caelum Research
- Defense Advanced Research
Projects Agency
- General Motors Corporation
- Microsoft Corporation
- NASA Ames Research Center
- National Science Foundation

Special Events & Programs

1997 AAI Fellows Recognition Dinner

Each year the American Association for Artificial Intelligence recognizes a small number of members who have made significant sustained contributions to the field of artificial intelligence, and who have attained unusual distinction in the profession. AAI is pleased to announce the five newly elected Fellows for 1997.

- Henry A. Kautz, AT&T Laboratories — Research
- Pat Langley, Daimler-Benz Research and Technology Center and Institute for the Study of Learning and Expertise
- Robert M. MacGregor, USC / Information Sciences Institute
- David Allen McAllester, AT&T Laboratories — Research
- Stuart Russell, University of California at Berkeley

The 1997 Fellows Recognition Dinner will be held Monday, July 28, from 7:00 - 10:30 PM in the Narragansett A Ballroom, ground floor, Westin Hotel. A reception will begin at 7:00 PM, followed by dinner at 7:30 PM. (By invitation only).

Fredkin Prize Presentation and Chess Panel

The presentation of the \$100,000 Fredkin Prize to the members of the IBM Deep Blue team, in recognition of the computer's victory over Kasparov earlier this year, will be held on Tuesday, July 29 at 4:30 PM in Ballroom A of the Rhode Island Convention Center. Feng H. Hsu, Murray Campbell, and A. Joseph Hoane, Jr. will split the prize. The Fredkin Prize was originally established at Carnegie Mellon University seventeen years ago by Massachusetts Institute of Technology Computer Science Professor Edward Fredkin to encourage continued research progress in computer chess. The prize is three-tiered. The first award of \$5,000 was given to two scientists from Bell Laboratories who in 1981 developed the first chess machine to achieve master status. The intermediate prize of \$10,000 for the first chess machine to reach international

master status was awarded in 1988 to five Carnegie Mellon graduate students who built Deep Thought, the precursor to Deep Blue, at the university. The \$100,000 third tier of the prize is being awarded to the first computer chess machine that beat the world chess champion.

The members of the Deep Blue team will also be honored for their achievement with the Allen Newell Research Excellence Medal, sponsored by Carnegie Mellon University. Allen Newell Medals will also be presented to each of the major researchers in the field whose earlier contributions ultimately led to the success of Deep Blue. These individuals include Richard Greenblatt (MacHack VI); David J. Slate and Lawrence R. Atkin (CHESS 4.7); Ken Thompson and Joe Condon (Belle); Hans Berliner, Carl Ebeling, Gordon Goetsch and Murray Campbell (Hitech); and Feng H. Hsu, Murray Campbell, Thomas Anantharaman, Andreas Nowatzyk, and Mike Browne (Deep Thought).

A special Chess Panel will be held immediately following the awards ceremony from 5:00 - 6:00 PM. The panel members will consist of one member of each research team, and will concentrate on the following issues:

- What were the major contributions to progress that the team made?
- What was the motivation for doing this in the first place?
- What were the major milestones in computer chess, and who achieved them?
- What, if anything, do they see left to do in computer chess?

AAAI-97 Opening Reception

The AAI-97 Opening Reception will be held in Exhibit Hall C / D, Rhode Island Convention Center on Tuesday, July 29 from 6:00 - 7:00 PM. Attendees will have an opportunity to view the exhibits and perhaps challenge one of the computer players of a variety of classic games of strategy in the Hall of Champions. The AAI-97 Student Abstract Poster Session will be held simultaneously, as will the poster session for the AAI-97 / SIGART Doctoral Consortium. A variety of hors d'oeuvres, some served by robots from the Sixth Annual Mobile Robot Competition, and a no-host bar will be available. Admittance to the reception is included in the AAI-97 technical registration. A \$20.00 per person fee will be charged for guests, spouses, and children. Guest tickets are available in onsite registration.

Special Meetings

AAAI-97 Program Committee Dinner

AAAI-97 Program Committee Dinner will be held Wednesday, July 30, from 7:00 – 10:30 pm in the Narragansett A Ballroom, ground floor, Westin Hotel to honor the contributions of all the members of the AAAI-97 and IAAI-97 Program Committees. (By invitation only.)

AAAI-97 Student Abstract Poster Program

Students whose abstracts were chosen for inclusion in the AAAI-97 Conference *Proceedings* will display their work at the Student Abstract Poster Session in Exhibit Hall C / D, Rhode Island Convention Center on Tuesday, July 29 from 6:00 – 7:00 pm in conjunction with the AAAI-97 Opening Reception. In addition, participants in the AAAI / SIGART Doctoral Consortium will display their poster presentations during this session. All students will be available for questions.

AAAI / SIGART Doctoral Consortium (DC-97)

The AAAI / SIGART Doctoral Consortium program will be held Monday, July 28 from 8:30 am – 6:00 pm in Room 552A, Rhode Island Convention Center. This small, focused gathering will allow selected students to present their work to a faculty panel, who will provide feedback on participants' current research and guidance on future research directions. All participants in the AAAI-97 Student Abstract and Poster Program are invited to attend these panel discussions. AAAI gratefully acknowledges a grant from the National Science Foundation for student travel to this event.

Special Meetings

AAAI Annual Business Meeting

The Annual Business Meeting will be held Thursday, July 31, from 11:45 am – 12:15 pm in the Providence Room I / II, Westin Hotel.

AAAI Conference Committee Meeting

The AAAI Conference Committee Meeting will be held Thursday, July 31, from 7:30 – 9:00 am in the Boardroom, third floor, Westin Hotel.

AAAI Executive Council Meeting

The AAAI Executive Council Meeting will be held Sunday, July 27, from 9:00 am – 5:00 pm in the Boardroom, third floor, Westin Hotel. Continental breakfast will be available at 8:30 am.

AAAI Press Editorial Board Meeting

The AAAI Press Editorial Board lunch meeting will be held Wednesday, July 30, from 12:45 – 2:00 pm in the Boardroom, third floor, Westin Hotel.

AAAI Publications Committee Meeting

The AAAI Publications Committee lunch meeting will be held Tuesday, July 29, from 12:45 – 2:00 pm in the Boardroom, third floor, Westin Hotel.

ARPA Meeting

The ARPA Meeting will be held Sunday and Monday, July 27 – 28, from 8:30 am – 6:00 pm in the State Suite C Room, second level, Biltmore Hotel.

SIGART Annual Business Meeting

The SIGART Annual Business Meeting will be held Tuesday, July 29, from 12:40 – 2:00 pm in the Bristol / Kent Rooms, third level, Westin Hotel.

Conference at a Glance

MORNING	AFTERNOON	EVENING
SUNDAY, JULY 27 Registration Tutorial Forum Workshops RBL-97	Registration Tutorial Forum Workshops RBL-97	
Monday, July 28 Registration Tutorial Forum Workshops IAAI-97 AAAI/SIGART DC RBL-97	Registration Tutorial Forum Workshops IAAI-97 AAAI/SIGART DC RBL-97	1997 Fellows Dinner
TUESDAY, JULY 29 Registration AAAI-97 Keynote & Invited Talks IAAI-97 Exhibition Robot Competition Hall of Champions	Registration AAAI-97 Invited Talks / Fredkin Prize IAAI-97 Exhibition Robot Competition Hall of Champions	AAAI-97 Opening Reception Student Poster Session Exhibition Robot Competition Hall of Champions
WEDNESDAY, JULY 30 Registration AAAI-97 Invited Talks IAAI-97 Exhibition Robot Competition Hall of Champions	Registration AAAI-97 Invited Talks IAAI-97 Exhibition Robot Competition Hall of Champions	Program Committee Dinner
THURSDAY, JULY 31 Registration AAAI-97 Invited Talks Exhibition Robot Competition Hall of Champions	Registration AAAI-97 Invited Talks Exhibition Robot Competition Hall of Champions	

Tutorial Forum

Tutorial Forum

Tutorial forum registration includes admission to up to four tutorials and the corresponding four tutorial syllabi. A maximum of four consecutive tutorials may be taken due to parallel schedules. Tutorial attendees may redeem their tutorial syllabi tickets at the tutorial rooms. Attendees who wish to obtain syllabi from other tutorials may purchase them separately for \$15.00 per syllabus in onsite registration.

Session I: Sunday, July 27

9:00 am – 1:00 pm

SA1: Belief Networks and Decision-Theoretic Reasoning for Artificial Intelligence

Daphne Koller and Jack Breese
Room 555A, Rhode Island Convention Center

SA2: Evolutionary Computation and Artificial Life

Melanie Mitchell and John Batali
Narragansett A, Westin Hotel

SA3: Agent Development in Soar

John Laird, Clare Congdon, and Randolph Jones
(Please note: This is a full-day tutorial.)
Room 556B, Rhode Island Convention Center

SA4: Data Mining

Usama Fayyad and Evangelos Simoudis
Narragansett B, Westin Hotel

Session II: Sunday, July 27

2:00 – 6:00 pm

SP1: Reinforcement Learning

Leslie Pack Kaelbling and Richard S. Sutton
Room 555A, Rhode Island Convention Center

SP2: Model-Based Autonomous Systems

Brian Williams and Pandurang Nayak
Narragansett A, Westin Hotel

SP3: Modeling with Defaults: Causal and Temporal Reasoning

Hector Geffner
Narragansett C, Westin Hotel

SP4: Principles of Ontological Engineering

Michael Gruninger and Mike Uschold
Narragansett B, Westin Hotel

Session III: Monday, July 28

9:00 am – 1:00 pm

MA1: Topics in the Theory of the Practice of Machine Learning

Michael Kearns
Room 555A, Rhode Island Convention Center

MA2: Genetic Programming

Astro Teller and David Andre
Narragansett B, Westin Hotel

MA3: The Database Perspective on Knowledge Representation and Information Integration

Alon Levy and Jeffrey D. Ullman
Providence I-II, Westin Hotel

MA4: Physics-Based Modeling for Vision and Virtual Human Animation

Dimitris Metaxas and Norman Badler
Providence III-IV, Westin Hotel

Session IV: Monday, July 28

2:00 – 6:00 pm

MP1: Compute-Intensive Methods in Artificial Intelligence

Henry Kautz and Bart Selman
Room 555A, Rhode Island Convention Center

MP2: Computer Vision

Daniel Huttenlocher and Todd Cass
Narragansett B, Westin Hotel

MP3: Practical Planning

Steve Chien and Brian Drabble
Providence I-II, Westin Hotel

MP4: Mobile Robot Control Architectures

R. James Firby and Reid G. Simmons
Providence III-IV, Westin Hotel

Robot Building Lab

The Robot Building Laboratory will be held Sunday and Monday, July 27 – 28, in Ballroom D-E of the Rhode Island Convention Center. Preregistration is required. Participants will spend the day learning about how AI can (and can't) be integrated into the world of mobile robots. Most of the day will be hands-on: building and programming small mobile robots to do a variety of tasks. Functional mechanical modules will be available from the start of the program. Participants will be able to spend their time designing and programming the robot, with only a bare minimum of LEGO-hacking to get their robots to move reliably. The lab will begin with a brief tutorial on sensors, effectors and robot capabilities to get everyone up to speed, followed by the actual robot building. Throughout the day there will be a series of short tutorials, both for individual teams and for the group as a whole, on particular aspects of robot building and programming. On Monday, July 28, all the robots will be displayed in the arena to show off their special capabilities and to compete head to head in a contest of speed and intelligence. This exhibition will be open to all of the conference attendees. The lab is being organized and taught by the KISS Institute for Practical Robotics (KIPR) for AAIL. Instructors and assistants are from KIPR's trained staff. David Miller is the lead instructor.

Workshop Program

Workshop Program

Attendance at the workshops is limited, and participation is by invitation only. All workshop participants must register for the AAAI-97 technical program or pay a \$150.00 fee per workshop. Registration onsite for a workshop is possible with the prior permission of the corresponding workshop organizer. All workshops will begin at 8:30 am and conclude at 6:00 pm, unless otherwise noted below.

Sunday, July 27

W2: AI and Knowledge Management

Organizer: Bradley Whitehall
Room 552A, Rhode Island Convention Center

W3: AI Approaches to Fraud Detection and Risk Management

Organizer: Tom Fawcett
8:30 am – 5:45 pm
Room 552B, Rhode Island Convention Center

W4: Building Resource-Bounded Reasoning Systems

Organizer: Shlomo Zilberstein
Room 555B, Rhode Island Convention Center

W5: Constraints and Agents

Organizer: Eugene C. Freuder
Room 556A, Rhode Island Convention Center

W7: Language and Space (two-day workshop)

Organizer: Patrick Olivier
Room 554, Rhode Island Convention Center

W13: Verification & Validation of Knowledge-Based Systems

Organizer: Robert Plant
8:45 am – 4:15 pm
Room 558, Rhode Island Convention Center

Monday, July 28

W1: Abstraction, Decisions, and Uncertainty

Organizer: Christopher Geib
Room 558, Rhode Island Convention Center

W6: Deep Blue Versus Kasparov: The Significance for Artificial Intelligence

Organizer: Robert Morris
Room 552B, Rhode Island Convention Center

W7: Language and Space (two-day workshop)

Organizer: Patrick Olivier
Room 554, Rhode Island Convention Center

W8: Multiagent Learning

Organizer: Sandip Sen
8:30 am – 5:50 pm
Room 555B, Rhode Island Convention Center

W9: On-Line Search

Organizer: Sven Koenig
Room 556A, Rhode Island Convention Center

W10: Robots, Softbots, Immobots: Theories of Action, Planning and Control

Organizer: Chitta Baral

Room 556B, Rhode Island Convention Center

W11: Spatial and Temporal Reasoning

Organizer: Frank D. Anger

Room State Suite A, Biltmore Hotel

W12: Using AI in Electronic Commerce, Virtual Organizations and Enterprise Knowledge Management to Reengineer the Corporation

Organizer: Daniel E. O'Leary

Room State Suite B, Biltmore Hotel

AAAI-97 / IAAI-97 Invited Talks

All AAAI-97 invited presentations will be held in Ballroom A, fifth level, Rhode Island Convention Center. IAAI-97 invited presentations will be held in Room Narragansett C, Westin Hotel. The presentations are listed chronologically below.

Monday, July 28

5:40 – 6:40 pm

Joint AAAI-97 / IAAI-97 Invited Talk: Recent Advances in Knowledge Discovery in Databases (KDD)

Padhraic Smyth, University of California, Irvine

Room Narragansett C, Westin Hotel

KDD is currently a “hot” topic for a very practical reason: performance improvements and reduced costs in data acquisition, transmission and storage have transformed how organizations and individuals collect and manage data. From the local grocery store to the NASA spacecraft monitoring the surface of Mars, collecting massive amounts of data is now routine. KDD consists of methods and algorithms for finding structure in such data, with a particular focus on “massive data sets.” Not surprisingly, much of the current interest in KDD is applications-driven. Smyth will provide a brief history of KDD, review the basic technical ideas in the field (largely from AI, statistics, and databases), discuss current and emerging applications, outline recent research advances, and identify future challenges. A key component of this talk will be a discussion of the current and potential future role of AI in this area. In particular, Smyth will argue that there are several open research challenges in KDD where AI can play a significant role.

Tuesday, July 29

9:00 – 10:00 am

Keynote Address: AI Growing Up: The Changes and Opportunities

James F. Allen, University of Rochester

If we draw an analogy between the development of AI and the stages of human development, Allen would argue that AI research so far has been a varied and exploratory childhood-with false starts, great leaps of faith, no clearly defined goals, and even some antisocial behavior. Yet, like most people, we have somehow survived and have learned some of the basic facts of life. But we are now moving onto adolescence, where we must learn much of our self-discipline and acquire a set of life-long habits. The reason that Allen thinks we are at this profound transition point is that it is now possible to build simple intelligent artifacts, from simple robots, to reasoning systems

Invited Talks

that analyze and predict phenomena, to simple natural language dialog systems. The presence of such artifacts will enable us, in fact require us, to develop a new paradigm of research that combines theoretical work with a significant empirical component. Allen will draw from his own and other's work in natural language, especially work aimed at defining conversationally proficient intelligent agents, to illustrate why we are at such a critical point. He'll then lay out some choices we have to make and explore what he believes are our excellent prospects for the future.

10:30 – 11:30 am

Invited Talk: The Ascent of Soar

Paul S. Rosenbloom, USC / Information Sciences Institute; John Laird, University of Michigan; and Jill Lehman, Carnegie Mellon University

For the past fifteen years, Soar has been evolving from its origins as a problem solving agent towards the grand challenge of a humanlike intelligent agent. In this talk, Rosenbloom reflects on this past history, describes Soar's present form, and speculates on the future path towards humanlike intelligent agents.

10:30 – 11:30 am

IAAI-97 Invited Talk: Taming the Jabberwock

*Alexa T. McCray, National Library of Medicine
Room Narragansett C, Westin Hotel*

Making sense of language may be seen as the essential issue in information retrieval (IR). Mediating between the language of users and the language of the databases they attempt to access is a thorny problem and continues to be the principal research agenda for many IR researchers. McCray will outline some of the approaches taken in research at the National Library of Medicine. The work on the Unified Medical Language System (UMLS) project has resulted in very large knowledge sources that may be effectively used to test a number of hypotheses about the appropriate role of both linguistic and domain knowledge in information retrieval systems. The knowledge sources include the Metathesaurus, a structure that integrates more than thirty biomedical thesauri and which contains more than 300,000 concepts, a semantic network of some 130 high level semantic categories with over 50 relationships, a lexicon of 100,000 entries containing morphosyntactic information, and a set of morphological analysis programs and databases. McCray and colleagues are currently testing the UMLS knowledge sources in the context of a project that is developing and evaluating automated techniques for indexing the biomedical literature.

11:40 am – 12:40 pm

Invited Talk: What Does KR Have to Say to AI?

David Etherington, CIRL / University of Oregon

In recent years, knowledge representation (KR) has become more and more of a discipline unto itself, focusing on artificial problems while other areas of AI have tended to develop their own representations and algorithms. Etherington will consider what traditional KR has to offer to AI.

2:00 – 3:00 pm

Invited Talk: The AAAI-97 Mobile Robot Competition: Martians, Remotes, Hors d'Oeuvres, and Cleaning up the Mess Afterwards

Ronald C. Arkin, Georgia Institute of Technology and R. James Firby, University of Chicago

This year's competition, the sixth annual held at AAAI, continues to expand upon the legacy of those which preceded it. In this talk we first review the event's history and goals. This year, however, marks a significant departure from the past. Arkin and Firby survey the four different events which make up this year's competition (find life on Mars, find the remote

control, home vacuuming, and hors d'oeuvres anyone?). Their significance to the AI and robotics communities lies along several lines: addressing opportunities in the exploration of Mars that are inspired by NASA's recent launch of the Pathfinder mission and its Sojourner robot, coupled with the teasing scientific possibility of life on that planet; developing assistive robotic technology for the disabled; mainstreaming service robot applications; and heightening human-robot interaction by having robots serve food to the AAAI conference attendees at this year's conference reception. This talk aspires to provide the research and intellectual backdrop that highlights the various aspects of AI, robotics, and computer vision which are challenged by each event, and to describe which specific research approaches are being used by the various competitors, that you may have only read about but not actually seen in action.

3:10 – 4:10 pm

Invited Talk: Machine Learning for Intelligent Systems
Pat Langley, Daimler-Benz Research and Technology Center and Institute for the Study of Learning and Expertise

Recent research in machine learning has focused on supervised induction for simple classification or prediction and, in the process, has become disconnected from AI's original goal of creating complete intelligent agents. Langley reviews recent work on machine learning for planning, natural language, and related topics that runs counter to this trend and thus holds interest for the AI research community at large.

4:30 – 5:00 pm

Fredkin Prize and Allen Newell Research Excellence Medals Presentation: Deep Blue Team and Chess Pioneers
(Please see description under *Special Events* on page 3.)

5:00 – 6:00 pm

Chess Panel: Deep Blue Team and Chess Pioneers
Organizers: *Raj Reddy and Hans Berliner, Carnegie Mellon University*

Wednesday, July 30

9:00 – 10:00 am

AAAI-97 / IAAI-97 Joint Invited Talk: The Emergence of Spacecraft Autonomy
Richard J. Doyle, Jet Propulsion Laboratory

The challenge of space flight in NASA's future is to enable more frequent and more intensive space exploration missions at lower cost. Nowhere is this challenge more acute than among the planetary exploration missions which JPL conducts for NASA. The launching of a new era of solar system exploration — beyond reconnaissance — is being designed for the first time around the concept of sustained intelligent presence on the space platforms themselves. Artificial intelligence, spacecraft engineering, mission design, software engineering and systems engineering all have a role to play in this vision, and all are being integrated in new work on spacecraft autonomy.

10:30 – 11:30 am

Invited Talk: Resource-Bounded Language Processing
Fernando Pereira, AT&T Bell Labs

Much of natural-language processing research in the past thirty years assumed a ready supply of general and linguistic knowledge, and limitless computational resources to use it in understanding and producing language. However, in practice accurate knowledge is hard to acquire and computational power is limited. Trying to keep within that resource budget, approximate, often statistical, knowledge sources and less profligate,

Invited Talks

often finite-state, processing models have been developed and applied with remarkable success to problems such as speech recognition, parsing and translation. Furthermore, the new approaches have close connections with recent developments elsewhere in AI.

11:40 am – 12:40 pm *Invited Panel: Computer Game Players: What They Mean for Society and for Science*

Organizer: *Matthew L. Ginsberg, CIRL / University of Oregon*

Computer game players have come of age, exhibiting world class performance in many — if not yet quite all — games of strategy. Panelists will focus on the lessons to be drawn from these successes: How can the rest of AI duplicate the successes of the game players? Is the fact that humans are being displaced as the world's best game players an anomaly, or a harbinger of things to come? The panelists will be drawn from the participants in the Hall of Champions, and will include both program authors and human champions.

2:00 – 3:00 pm

Invited Talk: Embodied Intelligent Agents: Issues and Trends in Robotics
George Bekey, University of Southern California

Bekey surveys some of the changes in robotics during the past 20 years, from simple industrial manipulators to autonomous intelligent agents, with an emphasis on the role of AI. Included are developments in robot control, learning, locomotion and group behavior, and current trends such as miniaturization, humanoids, robot colonies and human-robot interaction.

3:10 – 4:10 pm

Invited Talk: Performance Models for Dialogue Agents
Marilyn Walker, ATT Laboratories

Recent advances in dialogue modeling and spoken language processing have made it possible to build spoken dialogue agents for many tasks. However, one obstacle to progress in spoken dialogue is the lack of a general performance model for comparing agent strategies. Walker discusses recent empirical studies whose goal is to develop and test such a performance model.

3:10 – 4:10 pm

IAAI-97 Invited Talk: Artificial Intelligence and Education
Jack Mostow, Carnegie Mellon University
Room Narragansett C, Westin Hotel

Attempts to apply artificial intelligence to education date back at least three decades. Mostow considers: What AI techniques are applicable to education? What breakthroughs have happened recently to make AI applications feasible in education? What educational applications of AI are starting to appear? What are some remaining technical and institutional roadblocks to widespread use of AI in education? What can and should the AI community do to overcome these barriers?

4:30 – 6:00 pm

Invited Talk: Advances in Uncertain Reasoning
Eric Horvitz, Microsoft Research

For thirteen years, the Conference on Uncertainty and Artificial Intelligence (UAI) has been a central meeting for researchers from computer science, decision science, operations research, statistics, and psychology with interest in developing computational methods for grappling effectively with inescapable uncertainties in the real world. Horvitz discusses recent advances in uncertain reasoning, highlighting key developments in representation, inference, and learning.

5:00 – 6:30 pm *IAAI-97 Invited Panel: Knowledge Management: How Can AI Contribute to this Field?*
Room Narragansett C, Westin Hotel
Organizer: *Neena Buck, Common Knowledge*
Panelists: *Greg Burnett, Ford Motor Company, Liam Fahey, Babson College; Phil Klahr, Inference Corporation; Tom Gruber, Intraspect; Sam Uthurusamy, General Motors*

Ever since a series of Fortune magazine articles on the value of intellectual capital, the issue of managing knowledge as a corporate asset has become a hot topic within business circles. Today's business proponents of knowledge management believe that they are on the cutting edge of something new. Meanwhile, AI researchers have been addressing issues of managing knowledge for some time. Today, these two groups are largely unaware of each other, and each is working separately on how to address issues in knowledge management. This panel will bring the two communities together for the first time and address ways that ideas derived from AI can contribute to the field of knowledge management.

Thursday, July 31

9:00 – 10:00 am *Invited Talk: James Bond and Mike Ovitz: The Secret Life of Agents*
Katia P. Sycara, Carnegie Mellon University

As agents populate cyberspace in their many guises and roles, they coordinate and interact in different ways, spanning self-interested, as well as collaborative interactions. Agent coordination should be supported by an agent's internal architecture and agent societal frameworks. Sycara takes a micro-economic view of coordination, and reports on work on adaptive agent architecture and the primitive agent behaviors it supports, agent organizations, contracting protocols among agents and presence of middle agents.

10:30 – 11:30 am *Invited Talk: Market-Oriented Programming*
Mike Wellman, University of Michigan

Market-oriented programming is the construction of computational economies, where agents interact through a price system. Markets can provide effective allocation of resources for a variety of distributed environments, and economic analysis a powerful design tool for interaction mechanisms. The spread of electronic commerce puts a premium on market-aware agents, and presents a case for market awareness on the part of agent developers and AI researchers as well.

1:00 – 2:00 pm *Invited Talk: Preaching What We Practice: How AI is Changing the Concept of Computation*
Lynn Andrea Stein, Massachusetts Institute of Technology

AI is transforming computer science, replacing notions of computation as calculation with computation as interaction, shifting focus from algorithmic I/O to sustained behavior patterns. Yet the pedagogy remains virtually unchanged. Stein will describe a radical introduction to computer science that teaches students this model from the outset.

2:10 – 3:10 pm *Invited Panel: Prospects, Trends and Issues in Government Support of AI: Views of the Funding Agencies*
Organizer: *Mel Montemerlo, NASA*

Innovative Applications of Artificial Intelligence (IAAI-97)

All IAAI-97 sessions will be held in the Narragansett Ballroom B or C of the Westin Hotel. Monday's schedule of award-winning deployed papers is listed below. The emerging applications papers will be presented in parallel with the AAAI-97 technical program on Tuesday, July 29 and Wednesday, July 30. Please refer to the daily schedule on the following pages for times.

Monday, July 28

(IAAI-97 Award-Winners: Narragansett Ballroom C)

9:00 – 10:00 am **Session 1: IAAI-97: Introduction / Scheduling I**

Opening Remarks

Ted Senator, IAAI-97 Conference Chair

CREWS_NS: Scheduling Train Crew in The Netherlands

Ernesto M. Morgado and João P. Martins

10:00 – 10:30 am Coffee Break

10:30 – 11:30 am **Session 2: IAAI-97: Scheduling II**

The Scheduling of Rail at Union Pacific Railroad

Kathleen Murphy, Elizabeth Ralston, David Friedlander, Rodney Swab and Paul Steege

SunRay V — An Intelligent Container Trucking Operations Management and Control System

Ina Ng, Andrew Gill, Ian Chia, Mei-Leng Koh, Christopher Yeung and Lih-Wee Chew

11:40 am – 12:40 pm **Session 3: IAAI-97: Planning / Layout**

Case and Constraint Based Apartment Construction Project Planning System: FASTrak-APT

Kyoung Jun Lee, Hyun Woo Kim, Jae Kyu Lee, Tae Hwan Kim, Chang Gon Kim, Myoung Kyun Yoon, Eui Jun Hwang and Hyun Jeong Park

STHANA: Profitability Forecast and Situation Analysis for Automated Teller Machines

Cyril Way

12:40 – 2:00 pm Lunch Break

2:00 – 3:00 pm **Session 4: IAAI-97: Regulatory Compliance / Eligibility Determination I**

ChemReg: Using Case-Based Reasoning to Support Health and Safety Compliance in the Chemical Industry

Kirk D. Wilson

DISXPERT: A Social Security Disability Screening Expert System

James R. Nolan



IAAI Conference

3:10 – 4:10 pm

Session 5: IAAI-97: Regulatory Compliance / Eligibility Determination II

Desktop Underwriter: Fannie Mae's Automated Mortgage Underwriting ExpertSystem

David W. McDonald, Charles O. Pepe, Henry M. Bowers and Edward J. Dombroski

PST: The Provider Selection Tool

Howard Marmorstein, Jayesh Ghia, Sandeep Sathaye, Akshay Gupta and Eva Baron-Vartian

4:10 – 4:30 pm

Coffee Break

4:30 – 5:30 pm

Session 6: IAAI-97: Computer Diagnosis

PIMTOOL, An Expert System to Troubleshoot Computer Hardware Failures

Narendra Dev and Bart Anderson

Design of High Performance Help Desk Application and Its Implementation Results

Charles S. Moon, Thomas A. Shore, Gary Brophy and Dennis Koski

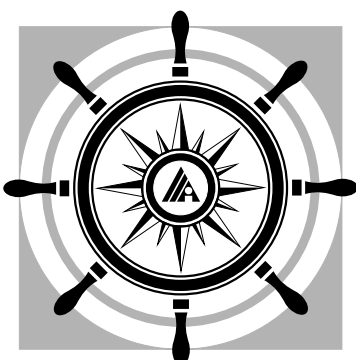
5:40 – 6:40 pm

AAAI-97 / IAAI-97 Joint Invited Talk

Recent Advances in Knowledge Discovery in Databases (KDD)

Padhraic Smyth, University of California, Irvine



7/29 Ballroom A Rhode Island Convention Center	8:45 – 10:00 AM Welcome, Opening Remarks, and AAAI-97 Best Paper Awards <i>Benjamin J. Kuipers and Bonnie Webber, AAAI-97 Program Cochairs</i> Keynote Address AI Growing Up: The Changes and Opportunities <i>James F. Allen, University of Rochester</i>		10:30 – 11:30 AM Invited Talk The Ascent of Soar <i>Paul S. Rosenbloom, USC/Information Sciences Institute; John Laird, University of Michigan; and Jill Lehman, Carnegie Mellon University</i>	11:40 AM – 12:40 PM Invited Talk WhatDoes KR Have to Say to AI? <i>David Etherington, CIRL/University of Oregon</i>	
Narragansett B Westin Hotel	 AAAI-97 & IAAI-97 Technical Sessions	10:00 – 10:30 Coffee Break Tuesday, July 29	Session 7 Planning Under Uncertainty <i>Chair: Nevin Lianwen Zhang</i> A Heuristic Variable Grid Solution Method for POMDPs by Ronen I. Brafman Incremental Methods for Computing Bounds in Partially Observable Markov Decision Processes by Milos Hauskrecht	Session 16 IAAI-97: Complex Systems Design I An Intelligent Control Architecture for Accelerator Beamline Tuning by William B. Klein, Carl R. Stern, George F. Luger and Eric T. Olsson MultiADD: A Multiagent Active Design Document Model to Support Group Design by Adriana Santarosa Vivacqua and Ana Cristina Bicharra Garcia	
Providence I-II Westin Hotel				Session 8 Qualitative Reasoning <i>Chair: Gautam Biswas</i> Model Decomposition and Simulation: A Component Based Qualitative Simulation- Algorithm by Daniel J. Clancy and Benjamin Kuipers Static and Dynamic Abstraction Solves the Problem of Chatter in Qualitative Simulation by Daniel J. Clancy and Benjamin Kuipers	Session 13 Automated Reasoning/Diagnosis <i>Chair: Jeff Rickel</i> Fast Context Switching in Real-Time Propositional Reasoning by P. Pandurang Nayak and Brian C. Williams Representing Actions and State Constraints in Model-Based Diagnosis by Sheila A. McIl- raith
Providence III-IV Westin Hotel				Session 9 Description Logics <i>Chair: Mark Johnson</i> Representing Sequences in Description Logics by Haym Hirsh and Daniel Kudenko P-CLASSIC: A Tractable Probabilistic Description Logic by Daphne Koller, Alon Levy and Avi Pfeffer	Session 14 Multi-Agent Systems <i>Chair: Jack J. Gelfand</i> Using Communication to Reduce Locality in Multi-Robot Learning by Maja J. Mataric Interference as a Tool for Designing and Evaluating Multi-Robot Controllers by Dani Goldberg and Maja J. Mataric
Bristol / Kent Westin Hotel				Session 10 Constraint Satisfaction Problems: Symmetry <i>Chair: Tom Ellman</i> Exploiting Symmetry in Lifted CSPs by David E. Joslin and Amitabha Roy Interchangeability Supports Abstraction and Reformulation for Multi-Dimensional Con- straint Satisfaction by Eugene C. Freuder and Daniel Sabin	Session 12 Classification Symbolic Nearest Mean Classifiers by Piew Datta and Dennis Kibler Classification and Reductio-ad-Absurdum Optimality Proofs by Haim Schweitzer
Narragansett C Westin Hotel				Session 11 IAAI-97 Invited Talk Taming the Jabberwock <i>Alexa T. McCray, National Library of Medicine</i>	Session 15 IAAI-97: Information Extraction I Information Extraction Based Multiple-Cate- gory Document Classification for the Global Legal Information Network by Richard D. Holowczak and Nabil R. Adam Smokey: Automatic Recognition of Hostile Messages by Ellen Spertus

2:00 – 3:00 PM

Invited Talk

The AAAI-97 Mobile Robot Competition: Martians, Remotes, Hors d'Oeuvres, and Cleaning up the Mess Afterwards
 Ronald C. Arkin, Georgia Institute of Technology and R. James Firby, University of Chicago

**Session 20
IAAI-97: Military I**

Intelligent Agents for the Synthetic Battlefield: A Company of Rotary Wing Aircraft by Randall W. Hill, Jr., Johnny Chen, Jonathan Gratch, Paul Rosenbloom and Milind Tambe
A Hybrid Architecture for Real-Time Mixed Initiative Planning and Control by Steven W. Mitchell

**Session 19
Text Retrieval and Learning**

Chair: Robert Holte
Transferring and Retraining Learned Information Filters by William W. Cohen and Daniel Kudenko
Active Learning with Committees for Text Categorization by Ray Liere and Prasad Tadepalli

**Session 18
Constraint Satisfaction Problems and Bayes Networks**

Chair: Nir Friedman
Bayes Networks for Estimating the Number of Solutions to a CSP by Amnon Meisels, Solomon Eyal Shimony, and Gadi Solotorevsky
A Practical Algorithm for Finding Optimal Triangulations by Kirill Shoikhet and Dan Geiger

**Session 17
Natural Language Generation**

Chair: Ingrid Zukerman
From Local to Global Coherence: A Bottom-Up Approach to Text Planning by Daniel Marcu
Multi-Document Summarization by Graph Search and Matching by Inderjeet Mani and Eric Bloedorn

**Session 21
IAAI-97: Transportation Diagnosis**

IDS: Improving Aircraft Fleet Maintenance by Rob Wylie, Robert Orchard, Michael Halasz and François Dubé
Multiple Fault Diagnosis from FMEA by Chris Price and Neil Taylor

3:10 – 4:10 PM

Invited Talk

Machine Learning for Intelligent Systems
 Pat Langley, Daimler-Benz Research and Technology Center and Institute for the Study of Learning and Expertise

**Session 26
IAAI-97: Design II**

Intelligent Command Control for VLSI CAD Systems by Motohide Otsubo, Satoru Fujita and Toru Yamanouchi
Blackboard Agents for Mixed-Initiative Management of Integrated Process-Planning/Production-Scheduling Solutions across the Supply Chain by David W. Hildum, Norman M. Sadeh, Thomas J. Laliberty, John McA'Nulty, Stephen F. Smith, and Dag Kjenstad

**Session 23
Agent Architecture**

Chair: James Lester
Modeling Emotions and Other Motivations in Synthetic Agents by Juan D. Velásquez
If at First You Don't Succeed... by Kentaro Toyama and Gregory D. Hager

**Session 24
Knowledge Representation: Ontologies**

Chair: Nancy Lehrner
Efficient Management of Very Large Ontologies by Kilian Stoffel, Merwyn Taylor and Jim Hendler
Tools for Assembling Modular Ontologies in Ontolingua by Richard Fikes, Adam Farquhar, and James Rice

**Session 22
Reactive Behavior**

Chair: Reid Simmons
Detecting and Reacting to Unplanned-for World States by Ella M. Atkins, Edmund H. Durfee and Kang G. Shin
Reinforcement Learning with Time by Daishi Harada

**Session 25
IAAI-97: Military II**

Multimodal Interaction for Distributed Interactive Simulation by Philip R. Cohen, Michael Johnston, David McGee, Sharon Oviatt, Jay Pittman, Ira Smith, Liang Chen and Josh Clow
Rationale-Supported Mixed-Initiative Case-Based Planning by Manuela M. Veloso, Alice M. Mulvehill and Michael T. Cox

4:30 – 6:00 PM

4:30 PM – 5:00 PM

Fredkin Prize and Allen Newell Research Excellence Medals Presentation
 Deep Blue Team and Chess Pioneers

5:00 – 6:00 PM

Chess Panel: Deep Blue Team and Chess Pioneers

Organizers: Raj Reddy and Hans Berliner, Carnegie Mellon University

**Session 28
Plan Generation**

Chair: Karen L. Myers
Planning by Rewriting: Efficiently Generating High-Quality Plans by José Luis Ambite and Craig A. Knoblock
Planning with Concurrent Interacting Actions by Craig Boutiller and Ronen I. Brafman
A Robust and Fast Action Selection Mechanism for Planning by Blai Bonet, Gábor Loerincs and Héctor Geffner

**Session 30
Structure of Constraint Satisfaction Problems**

Chair: Bart Selman
Clustering at the Phase Transition by Andrew J. Parkes
Exploiting the Deep Structure of Constraint Satisfaction Problems with Quantum Computers by Tad Hogg
Summarizing CSP Hardness ... by Daniel Frost, Irina Rish, and Lluis Vila

**Session 27
Spatial Uncertainty**

Noise, Non-Determinism and Spatial Uncertainty by Murray P. Shanahan
Integrating a Spatial Reasoner with a Resolution Theorem-Prover by Thomas R. Loerger
Projective Relations for 3D Space: Computational Model, Application, and Psychological Evaluation by Constanze Vorweg, Gudrun Socher, Thomas Fuhr, Gerhard Sagerer and Gert Rickheit

**Session 29
Model Selection and Overfitting**

Chair: Wayne Iba
An Empirical Evaluation of Bagging and Boosting by Richard Maclin and David Opitz
A New Metric-Based Approach to Model Selection by Dale E. Schuurmans
Lessons in Neural Network Training: Overfitting May Be Harder Than Expected by Steve Lawrence, C. Lee Giles and Ah Chung Tsoi

7/30		9:00 – 10:00 AM	10:30 – 11:30 AM		11:40 AM – 12:40 PM
Ballroom A Rhode Island Convention Center	AAAI-97 / IAAI-97 Joint Invited Talk The Emergence of Spacecraft Autonomy <i>Richard J. Doyle, Jet Propulsion Laboratory</i>		Invited Talk Resource-Bounded Language Processing <i>Fernando Pereira, AT&T Bell Labs</i>		Invited Panel Computer Game Players: What They Mean for Society and for Science <i>Organizer: Matthew L. Ginsberg, CIRL/University of Oregon</i>
	Narragansett B Westin Hotel	Session 31 Problem Solving & Computational Resources <i>Chair: Stephen F. Smith</i> Complex Goal Criteria and Its Application in Design-to-Criteria Scheduling by <i>Thomas Wagner, Alan Garvey and Victor Lesser</i> Models of Continual Computation by <i>Eric J. Horvitz</i>		Session 39 IAAI-97: Multimedia Anymation with CATHI by <i>Andreas Butz</i> Building Brains for Rooms: Designing Distributed Software Agents by <i>Michael H. Coen</i>	
Providence I-II Westin Hotel		Session 32 Belief and Decision <i>Chair: Adam Grove</i> Possibilistic and Standard Probabilistic Semantics of Conditional Knowledge by <i>Salem Benferhat, Didier Dubois and Henri Prade</i> On the Axiomatization of Qualitative Decision Criteria by <i>Ronen I. Brafman and Moshe Tennenholtz</i>		Session 36 Diagnosis <i>Chair: Dan Clancy</i> Monitoring, Prediction, and Fault Isolation in Dynamic Physical Systems by <i>Pieter J. Mosterman and Gautam Biswas</i> The Effect of Observations on the Complexity of Model-Based Diagnosis by <i>Adnan Y. Darwiche and Gregory M. Provan</i>	
	Providence III-IV Westin Hotel	Session 33 Information Retrieval <i>Chair: Alon Levy</i> Query Optimization Using Local Completeness by <i>Oliver M. Duschka</i> Template-Based Information Mining from HTML Documents by <i>Jane Yung-jen Hsu and Wen-tau Yih</i>		Session 35 Parallelism in Learning <i>Chair: Jonathan Schaeffer</i> Generating C4.5 Production Rules in Parallel by <i>Richard Kuftrin</i> Maximizing the Benefits of Parallel Search Using Machine Learning by <i>Diane J. Cook and R. Craig Varnell</i>	
Bristol / Kent Westin Hotel		Session 34 Computational Systems for Education <i>Chair: Michelle Kim</i> The Sounds of Silence ... by <i>Jack Mostow and Gregory S. Aist</i> Realtime Generation of Customized 3D Animated Explanations for Knowledge-Based Learning Environments by <i>William H. Bares and James C. Lester</i>		Session 38 Flexible Hierarchical Planning <i>Chair: James Hendler</i> Abductive Completion of Plan Sketches by <i>Karen L. Myers</i> Dynamic Abstraction Planning by <i>Robert P. Goldman, David J. Musliner, Kurt D. Krebsbach and Mark S. Boddy</i>	
	Narragansett C Westin Hotel			Session 37 IAAI-97: Space Using a Robot Control Architecture to Automate Space Shuttle Operations by <i>R. Peter Bonasso, David Kortenkamp and Troy Whitney</i> Attitude and Position Control Using Real- Time Color Tracking by <i>David P. Miller, Anne Wright, Randy Sargent, Rob Cohen and Teresa Hunt</i>	

10:00 – 10:30 Coffee Break

Wednesday, July 30

2:00 – 3:00 PM

Invited Talk

Embodied Intelligent Agents: Issues and Trends in Robotics
George Bekey, University of Southern California

**Session 48
Modeling for Decision Processes**

Chair: Mark Peot
Structured Solution Methods for Non-Markovian Decision Processes by Fahiem Bacchus, Craig Boutilier and Adam Grove
Model Minimization in Markov Decision Processes by Thomas Dean and Robert Givan

**Session 46
Local Search: Beyond SAT**

Chair: Adnan Darwiche
Local Search Algorithms for Partial MAXSAT by Byungki Cha, Kazuo Iwama, Yahiko Kambayashi and Shuichi Miyazaki
Solving Linear Pseudo-Boolean Constraint Problems with Local Search by Joachim P. Walsler

**Session 47
Automated Reasoning & the User Interface**

Chair: George Ferguson
Visual Prompts and Graphical Design: A Framework for Exploring the Design Space of 2-D Charts and Graphs by Vibhu O. Mittal
Navigation and Planning in a Mixed Initiative User Interface by Robert St. Amant

**Session 45
Knowledge Representation: Reasoning about Action I**

Chair: G. Neelakantan Kartha
Qualified Ramifications by Michael Thielscher
Adding Knowledge to the Action Description Language A by Jorge Lobo, Gisela Mendez and Stuart R. Taylor

**Session 49
IAAI-97: Information Extraction II**

MITA: An Information Extraction Approach to Analysis of Free-Form Text in Life Insurance Applications by Barry Glasgow, Alan Mandell, Dan Binney, Lila Ghemri and David Fisher
The Role of WordNet in the Creation of a Trainable Message Understanding System by Amit Bagga, Joyce Yue Chai and Alan W. Biermann

3:10 – 4:10 PM

Invited Talk

Performance Models for Dialogue Agents
Marilyn Walker, ATT Laboratories

**Session 50
Negotiation**

Chair: Marcus J. Huber
Benefits of Learning in Negotiation by Dajun Zeng and Katia Sycara
Negotiation on Data Allocation in Multi-Agent Environments by Rina Schwartz and Sarit Kraus

**Session 51
Knowledge Representation: Expert Systems**

Chair: Ramon Lopez de Mantaras
Applications of Rule-Base Coverage Measures to Expert System Evaluation by Valerie B. Barr
Detecting Redundant Production Rules by James G. Schmolze and Wayne Snyder

**Session 52
Probability and Planning**

Chair: Robert Laddaga
Probabilistic Propositional Planning: Representations and Complexity by Michael L. Littman
Effective Bayesian Inference for Stochastic Programs by Daphne Koller, David McAllester and Avi Pfeffer

**Session 53
Search (Cost)**

Chair: Darrell Whitley
Evidence for Invariants in Local Search by David McAllester, Bart Selman and Henry Kautz
The Scaling of Search Cost by Ian P. Gent, Ewan MacIntyre, Patrick Prosser and Toby Walsh

**Session 54
IAAI-97 Invited Talk**

Artificial Intelligence and Education
Jack Mostow, Carnegie Mellon University

4:30 – 6:00 PM

Invited Talk

Advances in Uncertain Reasoning
Eric Horvitz, Microsoft Research

**Session 56
Constraint Satisfaction Techniques**

Chair: Eugene C. Freuder
Using CSP Look-Back Techniques to Solve Real-World SAT Instances by Roberto J. Bayardo, Jr. and Robert C. Schrag
Detecting Unsatisfiable CSPs by Coloring the Micro-Structure by Daya Ram Gaur, W. Ken Jackson and William S. Havens
Using Branch-and-Bound with Constraint Satisfaction in Optimization Problems by Stephen Beale

**Session 55
Navigation & Perception**

Chair: Robin R. Murphy
Spatial Navigation With Uncertain Deviations by Michel de Rougement and Christoph Schlieder
A Color Interest Operator ... by Zachary Dodds and Gregory D. Hager
Combining Approximate Front End Signal Processing with Selective Reprocessing in Auditory Perception by Frank Klassner, Victor Lesser and Hamid Nawab

**Session 58
Formal Analyses of Learning**

Chair: Richard S. Sutton
Worst-Case Absolute Loss Bounds for Linear Learning Algorithms by Tom Bylander
Representation, Search and Genetic Algorithms by Darrell Whitley and Soraya B. Rana
Version Spaces without Boundary Sets by Haym Hirsh, Nina Mishra and Leonard Pitt

**Session 57
Language and Learning**

Chair: Claire Cardie
Statistical Parsing with a Context-Free Grammar and Word Statistics by Eugene Charniak
A New Supervised Learning Algorithm for Word Sense Disambiguation by Ted D. Pedersen and Rebecca F. Bruce

**Session 59
IAAI-97: Knowledge Management/Invited Panel**

A Generic Knowledge-Base Browser and Editor by Suzanne M. Paley, John D. Lowrance and Peter D. Karp
IAAI-97 Invited Panel
 (5:00–6:30 PM)
Knowledge Management: How Can AI Contribute to this Field?
Moderator: Neena Buck, Common Knowledge

7/31		9:00 AM – 10:00 AM	10:30 AM – 11:30 AM	
Ballroom A Rhode Island Convention Center	Invited Talk James Bond and Mike Ovitz: The Secret Life of Agents <i>Katia P. Sycara, Carnegie Mellon University</i>		Invited Talk Market-Oriented Programming <i>Mike Wellman, University of Michigan</i>	
	Newport / Washington Westin Hotel	Session 60 Machine Learning (Probabilistic) <i>Chair: Daphne Koller</i> Intelligent Methods for File System Optimization <i>by Leonid Kuvayev, C. L. Giles, James F. Philbin and Henry Cejtin</i> Learning Bayesian Networks from Incomplete Data <i>by Moninder Singh</i>		Session 64 Scheduling <i>Chair: Nicola Muscettola</i> Stochastic Procedures for Generating Feasible Schedules <i>by Angelo Oddi and Stephen F. Smith</i> Effective Redundant Constraints for Online Scheduling <i>by Lise Getoor, Greger Ottosson, Markus Fromherz and Björn Carlsson</i>
		Session 61 Optimal Planning <i>Chair: Dana Nau</i> A Linear Programming Heuristic for Optimal Planning <i>by Tom Bylander</i> Finding Optimal Solutions to Rubik's Cube Using Pattern Databases <i>by Richard E. Korf</i>		Session 65 Reasoning about Physical Systems <i>Chair: Richard Doyle</i> The "Inverse Hollywood Problem:" From Video to Scripts and Storyboards via Causal Analysis <i>by Matthew E. Brand</i> Qualitative Rigid Body Mechanics <i>by Thomas F. Stahovich, Randall Davis and Howard Shrobe</i>
	Providence I-II Westin Hotel	Session 62 Knowledge Representation: Theorem Proving <i>Chair: James Crawford</i> Extending the Regular Restriction of Resolution to Non-Linear Subdeductions <i>by Bruce Spencer and J. D. Horton</i> Ordered Semantic Hyper Linking <i>by David A. Plaisted and Yunshan Zhu</i>		Session 66 Building and Modifying Knowledge Bases <i>Chair: Peter Clark</i> Building Concept Representations from Reusable Components <i>by Peter Clark and Bruce Porter</i> A Script-Based Approach to Modifying Knowledge Bases <i>by Yolanda Gil and Marcelo Tallis</i>
		Providence III-IV Westin Hotel	Session 63 Efficient Reasoning <i>Chair: Craig Boutilier</i> Model-Theoretic Semantics and Tractable Algorithm for CNF-BCP <i>by Rahul Roy-Chowdhury and Mukesh Dalal</i> Problem Structures in the Presence of Perturbations <i>by Carla P. Gomes and Bart Selman</i>	
Bristol / Kent Westin Hotel				

10:00 – 10:30 Coffee Break
 Thursday, July 31

11:30 – 1:00 Lunch Break
Thursday, July 31

1:00 PM – 2:00 PM

Invited Talk

**Preaching What We Practice:
How AI Is Changing the Concept of Computation**
Lynn Andrea Stein, Massachusetts Institute of Technology

**Session 68
Knowledge Representation for Automated Reasoning**

Chair: P. Pandurang Nayak
A Reflective Proof System for Reasoning in Contexts
by Pierre E. Bonzon
Obvious Properties of Computer Programs
by Robert L. Givan

**Session 69
Learning in Linguistic Domains**

Chair: Fernando Pereira
Maximally Parsimonious Discrimination: A Generic Task from Linguistic Discovery
by Raúl E. Valdes-Pérez and Vladimir Pericliev
Sparse Representations for Fast One-Shot Learning
by Kenneth Yip and Gerald Jay Sussman

**Session 70
Case-Based Reasoning and Planning**

Chair: Jonathan Gratch
Analogical Replay for Efficient Conditional Planning
by Jim S. Blythe and Manuela M. Veloso
Case-Based Similarity Assessment: Estimating Adaptability from Experience
by David B. Leake, Andrew Kinley and David Wilson

**Session 71
Local Search Techniques**

Chair: Tad Hogg
Tabu Search for SAT
by Bertrand Mazure, Lakhdar Sais and Eric Grégoire
Variable-Selection Heuristics in Local Search for SAT
by Alex S. Fukunaga

2:00 – 2:10 Break
Thursday, July 31

2:10 PM – 3:10 PM

Invited Panel

**Prospects, Trends and Issues in Government Support of AI:
Views of the Funding Agencies**
Organizer: Mel Montemerlo, NASA

**Session 73
Experimental Methodology**

Chair: Gerald Tesaro
**Presenting and Analyzing the Results of AI Experiments:
Data Averaging and Data Snooping**
by C. Lee Giles and Steve Lawrence

**Session 74
Techniques for Temporal Reasoning**

Chair: Chitta Baral
A New Unification Method for Temporal Reasoning with Constraints
by Eddie Schwalb
Connection Based Strategies for Deciding Propositional Temporal Logic
by Subash Shankar and James R. Slagle

**Session 72
Knowledge Representation: Reasoning about Action II**

Chair: Murray Shanahan
Causal Theories of Action and Change
by Norman McCain and Hudson Turner
Beyond Minimizing Change
by Tom Costello

3:10-3:25 PM—Closing Remarks, Benjamin J. Kuipers and Bonnie Webber, AAAI-97 Program Cochairs, Ballroom A, RICC

Exhibition

Exhibition

The Exhibition will be held in Exhibit Hall C / D, Rhode Island Convention Center, Tuesday, July 29 through Thursday, July 31. Admittance is restricted to badged conference attendees. Vendor-issued guest passes must be redeemed at the Exhibitor Registration Counter, outside Hall D, third level, Rhode Island Convention Center. Further information regarding access to the Exhibition can be obtained from the Exhibitor Registration Desk.

Exhibit Hours

Tuesday, July 29	10:00 am – 7:00 pm
Wednesday, July 30	9:00 am – 5:00 pm
Thursday, July 31	10:00 am – 3:00 pm

Exhibitors

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Booth #101

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AAAI Press continues to feature excellent books of the highest quality. Featured this year are Mark Maybury's *Intelligent Multimedia Information Retrieval*, Jeff Bradshaw's *Software Agents*, and Feltovitch's *Expertise in Context*, along with the *AAAI Proceedings*. Also on display are David Leake's *Case Based Reasoning*, George Luger's *Computation and Intelli-*

gence, Ed Feigenbaum's *Computers and Thought*, Glasgow et al.'s *Diagrammatic Reasoning*, and Ford et al.'s *Android Epistemology*.

Booth #111

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Booth #301

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Booth #408

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Exhibition

Base Reasoning: Techniques for Enterprise Systems by Ian Watson and the forthcoming *Predictive Data Mining* by Sholom M. Weiss and Nitin Indurkha. Also available, *Foundations of Genetic Algorithms, Volume 4*, edited by Richard K. Belew and Michael D. Vose; the *Journal of Artificial Intelligence Research, Volume 5*, edited by Steven Minton; and the 1997 *Uncertainty in Artificial Intelligence, Machine Learning, Genetic Programming, and Genetic Algorithms* conference proceedings. Order your copies of the 1997 IJCAI Proceedings too! 15% discount on all titles!

Booth #201

NASA Ames Research Center

Contact: Brian Williams
Computational Sciences Division
NASA Ames Research Center
Mail Stop: 269-1
Moffett Field, CA, 94035-1000.
Tel: (415) 604-4776

NASA's bold missions in space exploration and aeronautics will require advances in many areas of science and technology. Paramount among these enabling technologies is computer science. Toward this end, Ames Research Center was recently designated the NASA Center of Excellence in Information Technology.

NASA is seeking ways to put an unprecedented level of intelligence into the vehicles and experiments we send out to explore the universe for us. Ames Research Center is seeking outstanding computer scientists to engage in strategic AI / CI research.

Located in the heart of Silicon Valley and near such premier academic institutions as Stanford University and the University of California at Berkeley, the Ames Research Center offers a unique environment in which to work on many of the grand challenge problems of our time.

Booth #404

Nomadic Technology

2133 Leghorn Street
Mountain View, CA 94043
Tel: (415) 988-7200
Fax: (415) 988-7201

Building on the industry standard Nomad 200 and Nomad 150, Nomadic Technologies is proud to introduce two new robots!

The first robot in our EXTREME ROBOTICS series, the Nomad XR4000 sets the standard for the next generation of mobile robots, while the small, economical Nomad Scout provides the unrivaled price / perfor-

mance for use in research and education.

The XR4000 is an advanced mobile system that incorporates state of the art in holonomic drives, control, networking, power management, sensing, communication and advanced software development technologies. For serious research in mobile manipulation, high speed visual servoing, machine learning, and sensor based navigation, the XR4000 offers unparalleled capabilities.

Booth #102

PC AI Magazine

Post Office Box 30130
Phoenix, AZ 85046
Tel: (602) 971-1869
Fax: (602) 971-2321
Email: info@pcai.com
Web: www.pcai.com/pcai/

PC AI Magazine provides the information necessary to help managers, programmers, executives, and other professionals understand the quickly unfolding realm of artificial intelligence (AI) and intelligent applications (IA). *PC AI* addresses the entire range of personal computers including the Mac, IBM PC, NeXT, Apollo, and more. *PC AI* is an application-oriented magazine designed to give readers useful "hands-on" information. *PC AI* features developments in expert systems, neural networks, object oriented development, and all other areas of artificial intelligence. Feature articles, product reviews, real-world application stories, and a *Buyer's Guide* present a wide range of topics in each issue.

Booth #100

Prentice Hall

One Lake Street
Upper Saddle River, NJ 07458
Tel: (201) 236-7283
Fax: (201) 236-7210

Prentice Hall is proud to offer an array of innovative AI titles. In particular, we will be featuring the worldwide best-seller *Artificial Intelligence: A Modern Approach*, by Stuart Russell and Peter Norvig. Come find out about the long-awaited revision of this market leading text.

Booth #409

Real World Interface, Inc.

32 Fitzgerald Drive
Jaffrey, NH 03452
Tel: (603) 532-6900
Fax: (603) 532-6901

Robots for the Real World! — Come see our new BeeSoft robotics applications development environment and take home a free

BeeSoft CD! BeeSoft lets you get a robot up and running in minutes with autonomous navigation, map building, features recognition, collision avoidance, sensor fusion and a simulator. Also new RWI and ActivMedia: the Pioneer gripper and Pioneer Applications Interface (PAI) software. PAI makes our low-priced robot easier to program than ever in C or Lisp subset on Linux, UNIX or Windows machines. And register to win one of fifty exceptionally cool Pioneer T-shirts we'll be giving away at the show!

Booth #108

Springer-Verlag

175 Fifth Avenue
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Take advantage of the exclusive 20% AAI discount at the Springer-Verlag booth. Springer is an international publisher of cutting-edge computer science books, journals, and lecture notes. Whenever there's an important new breakthrough in the field of computer science, chances are, Springer will publish it. Come by the booth for a selection of Springer's latest books, including Kingdon's *Intelligent Systems and Financial Forecasting*, Newborn's *Kasparov Versus Deep Blue*, Yang's *Intelligent Planning*, the new fourth edition of Bundy's *Artificial Intelligence Techniques*, Michalewicz's *Genetic Algorithms + Data Structures = Evolution Programs*, Muller's *The Design of Intelligent Agents*, and Denning and Metcalfe's *Beyond Calculation: The Next Fifty Years of Computing*.

Booth #200

US Department of Energy / Office of Science and Technology

DOE Headquarters in Washington, DC
Tel: (202) 586-5000
Contact: Robin Stone
191 Waukegan Road, Suite 201
Northfield, Illinois 60093
Tel: (847) 784-8000
Fax: (847) 784-8010

For over 40 years, the US Department of Energy (DOE) designed, manufactured and tested nuclear weapons at its facilities across the country. Now DOE is faced with the enormous challenge of cleaning up the extensive hazardous and radioactive waste that has been left behind. Since 1989, DOE's Office of Science and Technology (OST) has been developing new technologies to process, destroy, store, recycle, and / or reuse radioactive and hazardous waste. Safety, efficiency and cost-effectiveness are central to these efforts. Our CD-ROM presentation highlights several DOE sites and technologies.

Hall of Champions

Hall of Champions

The AAAI Hall of Champions is an exhibition of game-playing programs, focusing (though not exclusively) on those that compete at or near the human world-champion level.

The fundamental goal of the Hall of Champions is to educate the public about AI problems, methods, and successes. We want to convey the following points:

- Successful game-playing programs are a success of AI.
- Chess is only one among many successful game-playing programs.
- Some games are solved mathematically; some are not solved, but programs are better than any human; some programs are competing at the world champion level; some are approaching that level; and in some cases we are not even close.
- There are concepts from AI that help people understand why some problems are easy and some are hard: game tree, branching factor, search, evaluation, etc.

The Hall of Champions will be open during exhibit hours (see the schedule in the box below).

AAAI-97 attendees will be able to interact with these programs in a variety of ways. First, all of the programs themselves will be available during the conference and attendees will be able to compete against them. Second, many of the programs' authors will be avail-

able to discuss both the technical issues involved in creating the programs and the social issues involved in introducing world-class computer players into tournament play. And finally, human experts will be on hand to play a series of challenge matches against the programs themselves.

The Hall of Champions includes a spectators' area where AAAI attendees can view these matches as they progress. Admittance to the Hall of Champions is included in the technical program registration fee or the on-site exhibits-only registration fee. High-school students are welcome and will be admitted without fee upon presentation of a valid high-school student ID. Children under 12 will also be admitted without fee, but must be accompanied by an adult conference registrant.

Disclaimer

This is an educational exhibition, not a competition. The programs and humans participating in the Hall of Champions are all outstanding; each participant may or may not be the human or computer champion of the game. The persons or programs currently holding championships are determined by the governing organizations of the various games. Participation in the AAAI Hall of Champions has been determined primarily by excellence of play, but also by suitability for our educational mission and by the scheduling constraints of the event.

Expert Players Schedule

Tuesday, July 29

- 10:00 am *Backgammon*—Malcolm Davis
- 12:30 pm *Bridge*—Jeff Meckstroth & Eric Rodwell
- 2:30 pm *Checkers*—Ron King

Wednesday, July 30

- 9:00 am *Chess*—Gabriel Schwartzman
- 11:40 am *Games Panel*—Organized by Matthew L. Ginsberg
Ballroom A, Rhode Island Convention Center
- 1:00 pm *Scrabble*—Adam Logan
- 3:00 pm *Go*—Janice Kim

Thursday, July 31

- 10:00 am *Othello*—Tetsuya Nakajima and David Parsons

Robot Competition & Exhibition

Sixth Annual AAI Mobile Robot Competition & Exhibition

The Robot Competition and Exhibition will be held in Exhibit Halls C&D of the Rhode Island Convention Center, and will be open to registered conference attendees during exhibit hours.

Following in a long tradition of popular mobile robot competitions, this year's event will provide conference attendees with a first hand look at the progress in the fields of artificial intelligence and robotics. The competition will consist of four events which will focus on detecting signs of past and current life on Mars, the robots ability to perform "fetch-it" tasks, to show the value of a robot completing a rudimentary service task, and testing the robots ability to safely serve refreshments and interact with guests.

Event 1: Find Life on Mars

Mission Objectives

This task is inspired by the Pathfinder Mission to Mars, as well as the tantalizing (albeit limited) possibility of life on Mars as depicted by a recent meteorite analysis. The robot's mission is to explore a large area of Mars, looking for signs of past and current life, and return the life-forms, and only those life-forms, to the lander for further analysis. From satellite imagery, we have some clues as to where life may exist, but it is up to the robot to make a thorough exploration before its batteries run dead.

Event Specifics

The robot will be placed in a large physically bounded area. The arena will be approximately 1000 square feet in area (either rectangular or hexagonal), with lexan walls delimiting the boundaries (assume the robot landed in a crater). The floor of the arena will be littered with a variety of small objects. The "past life-forms" will be stationary spheres and cubes, about the size and weight of tennis balls. Currently, we anticipate having three or four different colors for each shape. The "current life-forms" will be squiggle balls (they will all be the same color). The rocks will all be larger than the other objects — at this time, we expect they will be real rocks.

In about the center of the arena will be a

small enclosed pen with two openings (the "lander"). The pen will be a square 1 – 2 meters in length and width, will have lexan or cardboard walls, and the openings will be about 0.5 meters wide. The openings of the pen will have small lips (~ 5 cm) to prevent the squiggle balls from escaping. The doors will be hinged at the top. One will be colored blue and the other will be red.

The robots will start adjacent to the pen. The objective is for them to collect as many of the colored objects and squiggle balls in the given time (5 – 10 minutes), and deposit them in the pen, sorted by mobility (that is, the opening of the pen with the blue door is for squiggle balls, the red door is for all the different colored objects). Penalties are given for mixing mobile and nonmobile objects in the pen, and for putting any of the rocks in the pen. Penalties are also given for colliding with any of the rocks (the Mars rover is fragile!)

Before the contest begins, hand-drawn maps will be provided showing where certain colored objects and large rocklike objects *may* be located. These maps, which are not guaranteed to be totally accurate, may be used by the robots to help them decide where to explore. Teams can enter the map information into the robots in whatever way they want.

In addition, certain areas of the arena will be "danger zones", where travel within the zone will add penalty points. The danger zones will be marked by laying colored paper on the floor and also by marking the location within the map. If possible, we will choose a color that will enable robots with only black-and-white vision to distinguish danger zones from the exhibition hall floor.

Scoring

There will be several categories of robot entries. There will be separate categories (with separate awards) for single robot and multi-robot teams (depending on the number of entries, we may further subdivide multi-robot teams into 2 – 3 robot teams and teams of 4 or more robots). An overall winner from the single and multi-robot entries will be determined by dividing a team's total score by the number of robots in the team.

There is also a separate category for robots without manipulators. Such entries will have to get within 6 inches of an object, indicate somehow that they have spotted the object, and indicate its classification (e.g., using speech). The robot must then pause for at least five seconds (to give humans a chance to remove the object from the arena). In addi-

Robot Competition & Exhibition

tion, in the nonmanipulator category robots do not actually have to return the objects to the lander.

There will be multiple trials, with each trial running for a predetermined length (5 – 10 minutes). The intention is to structure the event so that it would be difficult for an entry to explore the whole arena in the time allotted (for example, each trial may decrease the length of the event). Points and penalties will be given as described below.

In all trials, points will be awarded for the *first* object of a given shape / color, and then a different (typically smaller, but it may be the same) number of points will be awarded for each subsequent object of that particular shape / color. This is to encourage robots to find a diversity of “life-forms”. And, obviously, no additional points will be given for picking up the same object more than once in the same trial.

No modifications to the “Martian” environment will be allowed (rocklike objects, “life-forms”, danger zones, surrounding walls), although modifications to the “lander” itself will be allowed for penalty points (see below).

Several trials will be held, of increasing difficulty. The task itself will not change between trials, only the complexity of the environment (and one aspect of scoring). The parameters of the environment that may be changed are: number of different colored objects (some trials may have fewer different colors); density of rocks; density of “life-forms”; accuracy of the a priori map; placement of objects (e.g., certain objects may be surrounded on three sides by rocks and / or danger zones to make it harder to get at them). Another parameter that may be altered is the ratio between the number of points awarded for the first object of a given type, and the subsequent ones. Probably, the points will be equal for the first trial, but for other trials the first object will be worth significantly more points.

Event 2: Where’s the Remote Control

This event is inspired by the need for robot assistants to perform “fetch-it” tasks in partially known environments. Imagine a robot assistant helping a handicapped person around the home. The person might ask the robot to fetch an orange, the TV remote, a cup of coffee, and so on. While the robot may not know where all of these items are initially, over time

it will learn roughly where they are kept. The event will take place in an arena that contains tables, chairs, and shelves at varying heights. Scattered throughout the area, on the floor, the shelves, and the tables, will be 12 different objects. The robot will start the event near a human sitting in a chair (i.e., judge) who will ask the robot to fetch three items. Once these items have been returned, the human will ask for three more items. The winner will be the robot that can find and return the most items in the allotted time.

The Environment:

The environment will be divided into a kitchenlike area and a living-roomlike area with a partial divider between them. The lexan walls from last year’s contest will be used for the perimeter and the divider. The living-room area will include a TV and a sofa with coffee table between them. The kitchen area will include a sink, cutting board, and kitchen table. Either or both areas may include other distractor items, such as chairs and trash cans, but the area will be mostly free space, so as to allow easy mobility. The planned layout is shown as the “LIVING ROOM” and “KITCHEN” areas of the combined venue for the Home Vacuum event and Find the Remote Event.

The Objects

There will be twelve objects in all. Although their precise locations will not be known in advance, most objects will be constrained to lie on one of a few possible pieces of furniture. Teams are encouraged to use this context information to intelligently search the area.

Scoring

The robot will be started in a randomly chosen location in the rink. This location will be its “home” location to which it must return the objects. The objects will be randomly placed, but will match the location constraints given above.

Each team will rank the objects by perceived difficulty for their system. A random ordering of the objects will be chosen for each team using an algorithm biased to choose easier objects first. The robot will then be given 18 minutes in which to fetch the objects in the specified order. Teams will be awarded one point for each fetched object.

Event 3: Home Vacuum

The point of this contest is to explore the usefulness of intelligence in a task that appears to only require essentially unskilled labor — simple household vacuuming. We believe that unlike vacuuming in the service industry (factories, warehouses, etc.) home vacuuming will require sensate intelligence to deal with the humans in an everyday environment. For the AAAI contest, vacuuming robots ought to be short on vacuum mechanisms and long on intelligence. That is to say, simple suction, storage, and disposal devices are sufficient for these tasks, but the robots will probably have to make reasoned trade-offs among subtasks in real time to achieve a high score.

Objectives

- To show the value of intelligent robotics in a rudimentary service task .
- To let competitors measure the usefulness of their approach to robot intelligence.
- To have fun.

Scenario

We have a three room house (bedroom, family room, den) with a short hallway connecting the rooms. A smart vacuuming robot sits at a charging / disposal station in the hallway where it can see humans going in and out of the rooms (in the contest, charging a waning battery should not be required, but depositing trash will). Periodically, because of the activities of the human family living there, messes appear in the rooms, and sometimes in the hallway. The robot's task is to keep the floors vacuumed with minimum interruption of the activities of the human family living there. As such it is to vacuum on demand, when it knows a room might possibly be messy and on a periodic basis.

Periodically humans will come and go in the rooms. As they do, they may or may not leave "messes". The "messes" will consist of circular piles of paper confetti between 12" and 18" in diameter. Sometimes a human (possibly a teenager) may leave a mess in the hallway. There may be more than one mess in a room.

The vacuuming robots will be restricted to carry no more than two messes worth of trash before they must "deposit" the trash at the deposit site. Simply releasing the confetti at the deposit coordinates is sufficient to constitute a deposit.

The Tasks

Phase 1. "Once a Week" Vacuuming. (First day

trials). All the rooms are to be cleaned once a week. In this phase, the robots will start at the disposal station, clean the each room by vacuuming the entire area of the room, and return to the disposal point. If messes are present (there may be from zero to two messes in each room), the robot must return to deposit the trash after every two messes. No humans will be present for this phase. There will be no messes in the hallway for this phase.

Phase 2: "Tidy Up" (Second Day Trials). The robot starts at the disposal station. Humans will periodically enter and leave the rooms (possibly leaving messes). It's the robot's job is to keep the rooms clean of messes. Robots must not enter a room when a human is present (during this phase, humans will not enter a room while a robot is cleaning). During a given 15 minute run, humans will be present in each room for 1 minute out of every 5, except for the family room which will be occupied 3 minutes out of every 5. Robots may clean messes in the hallway while humans are present there.

Phase 3: "Clean My Room" (Third Day Trials). The robot starts at the disposal station. A human will come into the hallway and indicate to the robot that a room needs to be cleaned. The robot will then move to the room, clean any messes there and return to base to deposit the trash. While the robot is cleaning the room, one or more humans will enter. The robot must not clean while a human is in the room, but must move to the nearest wall and wait until the human leaves.

Event 4: (Special Event) Hors d'Oeuvres Anyone?

This event will occur at the AAAI main reception where there will be heavy interaction with the attendees. Judging will be conducted by the attendees. The goal is to provide solid refreshments to people in close quarters. Safety and self-protection are paramount. A human escort (only one allowed per team within the area) will always be nearby for safety and control of the robot (i.e., if it moves out of the designated area), but will be limited in their interaction with the attendees. The robots must be fully autonomous. The escort will also replenish the hors d'oeuvres on an as needed basis.

Attendees will be milling about taking hors d'oeuvres from off the robotic servers. All robots must be capable of carrying a standard

Robot Competition & Exhibition

tray. Human interaction is the key to success. The robots must move about autonomously within the reception area and can interact by speech, vision, tactile, infrared, or whatever with potential servers. Personality counts here: the job is to have the robots engage the attendees as much as possible, convincing them that they are able servers.

Scoring

Scoring will be based on a combination of audience appreciation (60%) and technical judging (40%).

Audience appreciation: attendees entering the area will receive one token that they can drop in a box corresponding to their favorite server at the exit of the reception. We are really looking for robots with maximum “cute” appeal, so the scoring is biased towards audience participation. The technical points are there so that robots stay within reasonable guidelines.

Robot Event Judges & Chairs

Robot Competition Cochairs

Ronald C. Arkin, Georgia Institute of Tech-

nology and Jim Firby, University of Chicago

Robot Exhibition Chair

Holly Yanco, Massachusetts Institute of Technology

Fundraising Chair

Robin Murphy, Colorado School of Mines

Robot Competition Judges

Find Life on Mars: Reid Simmons, Carnegie Mellon University; Jim Hendler, University of Maryland; and Sridhar Mahadevan, University of South Florida

Where's the Remote? Ian Horswill, Northwestern University; Daniela Rus, Dartmouth; and Robin Murphy, Colorado School of Mines

Home Vacuum: Pete Bonasso, Texas Robotics & Automation Center Labs (TRACLabs); Randy Sargent, Newton Research Labs; and Karen Myers, SRI International

Hors d'Oeuvres Anyone? Kurt Konolige, SRI International

Robot Competition & Exhibition Schedule

Invited Talk on Competition

Ron Arkin, Georgia Institute of Technology and James Firby, University of Chicago
Tuesday, July 29, 2:00 – 3:00 pm

Event One: *Find Life on Mars*

Preliminaries: Tuesday, July 29, 10:00 am – 2:00 pm and 4:00 – 5:30 pm
Finals: Thursday, July 31, 10:00 am – 1:00 pm

Event Two: *Where's the Remote?*

Preliminary / Qualifying — Wednesday, July 30, 11:00 am – 1:00 pm
Finals: Thursday, July 31, 9:00 am – 12:00 pm

Event Three: *Home Vacuum*

Phase 1: Tuesday, July 29, 9:00 – 11:00 am and 3:00 – 5:00 pm
Phase 2: Wednesday, July 30, 1:00 – 5:00 PM
Phase 3: Thursday, July 31, 9:00 am – 1:00 PM

Event Four: *Hors d'Oeuvres Anyone?*

Preliminaries: Tuesday, July 29, 12:00 – 2:00 PM
During the reception: Tuesday, July 29, 6:00 – 7:00 PM

Awards Ceremony

Thursday, July 31, 1:30 PM

Exhibition

The intent of the Robot Exhibition is to showcase current research in robotics that does not fit into the competition tasks. (schedule posted daily)

Tuesday 10:00 am – 5:30 PM

Wednesday 9:00 am – 5:00 PM

Thursday 10:00 am – 1:00 pm

Robot Competition and Exhibition Teams

Many robot teams submitted abstracts for inclusion in the AAAI – 97 *Proceedings*. Additional abstracts are included below.

Exhibitor

ActivMedia / Real World Interface, Inc.

Team Members: Grinnell More (RWI), Tyson Sawyer (RWI), William Kennedy (ActivMedia), Jeanne Dietsch (ActivMedia), Laura Woodbury (RWI), and Travis Woodbury (RWI)

Thanks to RWI, the Pioneer 1 robot now sports a new gripper. Gripper paddles' two break beams sense when an object is placed for pick up. Also, take a look at ActivMedia's new RobotEyes accessories and software that lay a remote camera image side-by-side with a Saphira sonar map of the robot's space. And try out our new PAI and Logo software libraries by Barry Werger. These simple-to-use C libraries, with the inexpensive, reliable Pioneer, can jumpstart research projects in an afternoon.

Please see page 24 for Real World Interface, Inc.'s description.

Exhibitor and Competitor

Brandeis University

Robots: Beni and Mae—

The Interaction Lab RWI Pioneers

Interaction Laboratory

Team Advisor: Maja J. Mataric

Team Leader: Barry Werger

Team Members: Dani Goldberg and Greg Hornby

Competitor

Brown University

Robot: Ramona *Team Advisor:* Leslie Pack Kaelbling

Team Leader: Bill Smart

Team Members: Chris Cantor, Tony Cassandra, Andrew Duchon, Sarah Finney, Hagit Shatkay, and Nathan Sprague

This work will demonstrate the use of optical flow for obstacle avoidance and a simple game of tag. For obstacle avoidance, a few simple control laws based on optical flow allow the robot to wander around at speeds up to 50 cm / second in complex, cluttered environments. In the last five years, a number of groups around the world have used these purely reactive strategies which are based on work with insects. With Ramona, however, a number of factors need to be taken into consideration, most importantly the height of the camera (about 4 feet). Therefore, control laws for

the tilt of the camera and robot speed have also been devised. For tag, the robot fixates moving targets and chases them if they move away and runs away if they move toward it. The robot can also be made to follow someone around, again using only optical flow. If time permits, some simple goal-directed navigation using optical flow (previously worked out in simulation) will also be demonstrated.

Exhibitor and Competitor

Colorado School of Mines

Robot: Silver Bullet, CRISbot

Advisor: Robin R. Murphy

Team Leaders: Matt Long (Hors d'Oeuvres) and Travis Flowers (Find Life)

Team Members: Anne Brigante, Damian Diaz, Cathy Braun, and Chris Nye

Competitor

Dartmouth

Robot: SK

Advisors: Daniela Rus and Keith Kotay

Team Members: Greg Friedland, Will Garner, Artyom Lifshits, Jon Howell

Competitor

Georgia Institute of Technology

Robots: Shannon, Sally & Locorobos

Advisors: Tucker R. Balch and Tom Collins

Team Members: Darrin Bentivigna, Sheree Collins, Lester Davis, Mike Holloway, David Huggins, Lisa Huggins, Erwin Oei, and Juan Carlos Santa Maria

Exhibitor and Competitor

Iowa State University

Robot: Cybot

Advisor: Dr. Patterson

Team Leader: Boone Oshel

Team Members: Ben Amey, Josh Bertram, Troy Polito, and Kelly Rowles

Project Cybot was started six years ago as an ambassador for the Electrical and Computer Engineering Departments at Iowa State University. As ambassador, Cybot has displayed the abilities of many different students that have worked on it throughout the years. Within the past few years Cybot has become more autonomous. Its systems are based on an IBM Pentium Pro running Windows 3.1. Its frame and circuitry have been designed and built by electrical and computer engineering students at Iowa State University. With this years students Cybot now has the ability to move and talk simultaneously. Also a high level compiler has been created to make programming its movements easier. These are just a few of the advancements Project Cybot has had in the past year and there are more to come.

Robot Teams

Competitor

Kansas State University

Robot: Slick Willie

Advisor: David Gustafson

Team Members: Karen Gustafson (photographer), Steve Gustafson, Mike Novak, Todd Prater, Brian Rectanus

Exhibitor and Competitor

KISS Institute for Practical Robotics

Robot: Captain Peacock and Mr. Humphries

Team Members: David P. Miller, Randy Sargent, Cathryne Stein and Anne Wright

Exhibitor

Massachusetts Institute of Technology, Artificial Intelligence Laboratory

Robot: Pebbles Mars Rover

Advisor: Rodney Brooks

Team Leader: Chandana Paul

Team Members: Yoky Matsuoka and Milyn Moy

The Pebbles rover is being designed for Mars exploration. Its high level task is to behave as an "automated geologist" engaging in exploratory navigation and sample rock retrieval. The rover continuously drives around avoiding obstacles and searching for a target. When it locates the target it attempts to approach it. This target may be a rock or a visual marker indicating the location of the base. The rover also continuously searches for objects of interest in an attention window directly in front of it. If such an object is detected, the high-level goal directed navigation is temporarily interrupted. The four degree-of-freedom manipulator reaches for the object and the handlike gripper grasps it. The rock is dropped into the robot's back-pack and the high-level navigation is resumed. The target selection habituates to familiar objects so that only new kinds of rocks are collected.

Exhibitor

Massachusetts Institute of Technology, Artificial Intelligence Laboratory

Robot: Cog

Advisor: Rodney Brooks

Team Members: Cynthia Ferrell, Robert Irie, Charles Kemp, Matt Marjanovic, Jonah Peskin, Brian Scassellati, Matt Williamson

Exhibitor

Massachusetts Institute of Technology, Leg Lab

Robot: Self-Stabilizing Hopper

Advisor: Robert Ringrose

Team: David Robinson

Properly designed legged robots can sustain stable dynamic locomotion without sensors or feedback. The self-stabilizing hopper is a robot which is inherently stable and automatically rejects minor perturbations as it hops. It has neither computer nor sensors. In contrast, most previous attempts to make robots run have used active, high bandwidth feedback control systems. Simulations indicate that self-stabilizing running extends to quadrupedal trotting, pacing, bounding, and galloping.

Exhibitor and Competitor

Massachusetts Institute of Technology, Artificial Intelligence Laboratory / Boston College

Robot: Wheellesley

Advisor: Holly Yanco

Team Members: Jim Gips (Boston College), Jonathan Gips, and Oded Maron

Wheellesley, a robotic wheelchair system, shares control with the user of the wheelchair to navigate indoor and outdoor environments. The user gives high level directional commands to the robot through a user interface on a Macintosh® Powerbook. The robot then carries out the navigational task using common sense constraints such as collision avoidance. Since the system automatically avoids obstacles and makes motor corrections, less effort is required by the user to drive the system. This system can be used by people who are unable to use a traditional electric wheelchair.

Recent work has resulted in the addition of EagleEyes, an eye tracking device for input to the user interface. EagleEyes is a technology that allows a person to control the computer through five electrodes placed on the head. This allows people to control the wheelchair using head and eye movements. We have also developed a head switch interface for the robot. Both EagleEyes and the head switch interface will be demonstrated during the robot exhibition.

Robot Teams

Competitor

McGill University

Robot: Invader

Advisor: Greg Dudek

Team Members: Eric Bourque, Marc Boldoc, François Bélair, Deeptiman Jugessor, Nicholas Roy, Rob Sim

Competitor

Miamisburgh High School

Team Name: Miamisburg Electronics Club

Advisor: Wayne C. King

Team: Wayne Cox, Jon Angel, and Eric Williams

Exhibitor

Michigan State University

Robot: SHOSLIF

Advisor: John J. Weng

Team Members: Shaoyun Chen, Kamen Y. Guentcheu, Gongjun Li, Rossen N. Nedeltchev, Jason Q. Sperber, Jamal A. Wills

SHOSLIF is a scheme for learning sensorimotor behavior through situated, interactive, incremental, real-time training. The primary objective is to achieve a task-independent, learning while performing capability for high dimensional sensory input, such as vision. SHOSLIF automatically derives optimal features in organizing incrementally learned cases into a SHOSLIF hierarchical partition and retrieval tree. It has a correct convergence property and a logarithmic time complexity. The SHOSLIF has been tested for several tasks, including autonomous navigation, object manipulation, face recognition and object recognition, moving hand-sign recognition (from American Sign Language). This exhibit displays an enhanced version of the physical robot. The videotape demonstration shows how the robot performs real-time navigation through the corridors and around turns inside the MSU Engineering Building using a single sensor — a video camera, and how a vision-guided robot manipulator is trained to perform task sequences, such as pouring milk from one cup into another, under the guidance of a stereo camera setup.

Competitor

Navy Center for Applied Research in Artificial Intelligence

Robot: Coyote

Advisor: Alan Schultz

Team Members: Bill Adams, John Grefenstette, Charles Loeffler, Mike Schuresko, and Brian Yamauchi

Exhibitor and Competitor

Northwestern University

Robot: Kluge

Advisor: Ian Horswill

Team Member: Ivan Yen

Competitor

Rob Turner

Team Member: Rob Turner

Competitor

Salem High School Robotics Club

Team Member: Luke Daminan Sowa

Exhibitor and Competitor

Texas Robotics & Automation Center Labs (TRACLabs)

Robot: ServerDroid

Advisor: Peter R. Bonasso

Team Members: David Kortenkamp, Dan Poivot, and Linda Williams

Competitor

University of Arkansas

Robot: Razorbot

Advisor: Douglas S. Blank

Team Members: J. Oliver Ross

Competitor

University of Minnesota

Advisor: Maria Gini

Competitor

University of New Mexico

Advisor: Greg Heileman

Competitor

University of Texas – El Paso

Robot: Diablo

Team Advisor: Chitta Baral

Team Leader: Luis G. Floriano

Team Members: Arron Hardesty and Son Tran

Exhibitor

University of Virginia

Robot: Bruce

Advisor: Worthy Martin

Team Members: Gabriel J. Ferrer and Glenn S. Wasson

As with many other researchers, we are developing a layered architecture for integrating planning and action. Our approach is distinct from the usual approach of interfacing a planner to a reactive system in a layered architecture, in that we replace the reactive system with a different kind of action system. Our action system uses small task-dependent repre-

Robot Teams

sentations called markers. This system can no longer truly be called reactive (because it has state) and so we term it a Perception / Action (PA) system.

A PA system selects its actions from the current values of its sensors and the state of its representation. Here, we will discuss how an agent's PA system can effectively use and maintain its representation. In addition, we will show how the addition of representation to the action layer of an architecture (that layer which controls the sensor / effector sub-systems) facilitates the communication of goal information from higher layers of the architecture. We demonstrate an application testbed in which our agent plays hide and seek against a human controlled opponent. This application allows us to show how our agent can use representation to facilitate behaviors which are difficult for reactive systems and how the highly-structured representation of the PA system provides hooks for communication with the higher layers of the architecture.

Exhibitor and Competitor

University of Waterloo

Robot: Hexotica

Advisor: John McPhee

Team Leader: Dylan Horvath

Team Members: Rachelle Allin and Stefan Williams

Hexotica is a small, robust walking robot with a unique control paradigm. The project goals include the construction of a modular mechanical system capable of replicating the walking motion of biological entities and the development of a distributed control architecture to break up the control problem into manageable sub-problems. These goals must be accomplished at a relatively low cost due to a limited budget. The project emphasizes a modular design process that simplifies the design of individual components of the system.

Hexotica has three degrees of freedom per leg, a feature that differentiates it from many other small walking robots already developed. The modularity of the control architecture simplifies the design and integration of new hardware and software components for the system. This is important as additional sensors and control systems are added. The control algorithms use typical industrial robot path interpolation techniques to move the "foot" of the robot in a straight line between two points in the working envelope of the leg. It is the aim of future research to use more adaptive and "fuzzy" control paradigms to move the robot within its environment, now that it has the ability to move its foot efficiently within its workspace.

Registration

Conference registration will take place outside Hall D, third level, Rhode Island Convention Center, beginning Sunday, July 27. Registration hours are:

Sunday, July 27	7:30 am – 6:00 pm
Monday, July 28	7:30 am – 6:00 pm
Tuesday, July 29	8:00 am – 6:00 pm
Wednesday, July 30	8:00 am – 6:00 pm
Thursday, July 31	8:00 am – 3:00 pm

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

Registration Fees

AAAI-97 / IAAI-97 Technical Program

The AAAI-97 technical program registration fee includes admission to all technical paper sessions, invited talks and panels, the AAAI-97 Exhibition, The Hall of Champions, The Robot Competition, the AAAI-97 Opening Reception, the IAAI-97 sessions and the AAAI-97 / IAAI-97 Conference *Proceedings*. Note: Students must present proof of full-time student status to qualify for student rate. Onsite technical program fees are:

Regular Member	\$495
Regular Nonmember	\$570
Student Member	\$170
Student Nonmember	\$235

Tutorial Forum

The tutorial forum registration fee includes admission to no more than four consecutive tutorials and the corresponding four tutorial syllabi. Extra syllabi from other tutorials may be purchased separately for \$15.00 each. A maximum of four consecutive tutorials may be taken due to parallel schedules. The tutorial forum registration also includes admission to all exhibit hall programs. Onsite Tutorial Forum fees are:

Regular Member	\$230
Regular Nonmember	\$300
Student Member	\$125
Student Nonmember	\$155

Workshop Program

Workshop registration is limited to those active participants determined by the organizer prior to the conference. Individuals attending workshops who are not registered for the AAAI-97 technical program must pay a \$150.00 per workshop registration fee.

Robot Building Lab

The robot building lab registration fee includes admission to the robot building lab and the exhibition program. Fees are \$150.00 for members or nonmembers, and \$75.00 for students. Attendance is limited and preregistration is recommended. Check for availability onsite.

Exhibition

Admission to the exhibit hall programs is included in all other types of registration. For individuals interested in admittance to the exhibit hall only, an exhibits only registration is available in onsite registration. This fee is \$10.00 for a one-day pass, and \$25.00 for a three-day pass. Exhibit hall programs include vendor exhibits, the Robot Competition and the Hall of Champions. High-school students are welcome and will be admitted without fee upon presentation of a valid high-school student ID. Children under 12 will also be admitted without fee, but must be accompanied by an adult conference registrant.

General Information

General Information

AAAI Logo Shirts

Polo shirts with the AAAI logo will be for sale during registration hours in the registration area outside Hall D, third level of the Rhode Island Convention Center. Supplies are limited. Price \$20.00 each onsite.

Admission

Each conference attendee will receive a name badge upon registration. This badge is required for admittance to the technical, tutorial, exhibit, IAAI, and workshop programs. Workshop attendees will also be checked off a master registration list at individual rooms. Smoking, drinking, and eating are not allowed in any of the technical, tutorial, workshop, IAAI, or exhibit sessions.

Baggage Holding

There is no baggage holding area at the Rhode Island Convention Center. Please check your luggage with the bellman at your hotel after you have checked out. Neither the AAAI, the Rhode Island Convention Center, the Westin Hotel, nor the Biltmore Hotel accept liability for the loss or theft of any suitcase, briefcase, or other personal belongings brought to the site of AAAI-97 / IAAI-97.

Banking

The closest bank is the Fleet Bank, located across from Kennedy Plaza. The closest automatic teller machine (ATM) is located on the far side of the Civic Center, which is next to the Rhode Island Convention Center. The networks available are VISA, Mastercard, Cirrus, NYCE, and Plus Systems. The Fleet Bank can also exchange all major foreign currencies.

The Fleet Bank
111 Westminster
Providence, RI
Telephone: (800) 445-4542.
Monday – Thursday: 9:00 am – 3:00 pm
Friday: 9:00 am – 5:30 pm
Closed Saturdays and Sundays.

Business Centers

Business Centers are available at the following locations:

- Third floor of the Westin Hotel.
Hours: 7:00 am – 7:00 pm weekdays, and by appointment only on Saturdays.
- Lobby of the Biltmore Hotel.
Hours: 7:00 am – 11:00 pm daily.
- First floor of the Holiday Inn.
Hours: 7:00 am – 10:00 pm daily.

Services include fax, copies, computer rental, laser printing, and other general office services. The Westin and Biltmore offer shipping by FedEx and UPS. The Holiday Inn offers cell phone and beeper rentals.

Career Information

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

Child Care Services

For information about child care services, you may contact We Sit Better Babysitters and Child Care Registry at (401) 421-1213. (This information is provided for your convenience and does *not* represent an endorsement of this agency by AAAI. Responsibility for all child-care arrangements must be assumed by the parents.)

Coffee Breaks

Coffee will be served outside Ballroom A, fifth level of the Rhode Island Convention Center; in the Narragansett Ballroom prefunction area, ground floor, Westin Hotel; and in the Gallery, third floor, Westin Hotel. Coffee breaks are scheduled for 10:00 – 10:30 am and 4:10 – 4:30 pm each day.

Copy Services

Copy services are available at:
Alphagraphics Printshops of the Future
55 Dorrance Street
Providence, RI 02903
Telephone: (401) 351-4000

Hours:

7:00 am – 9:00 pm, Monday – Thursday

7:00 am – 7:00 pm, Friday

9:00 am – 4:00 pm, Saturday.

Copy service is also available at the Business Centers in the conference hotels.

Dining

A Providence dining guide is available at the Visitor Information Booth in the registration area outside Exhibit Hall D. Concessions will be open in Exhibition Hall C / D during exhibit hours, July 29 – 31.

Handicapped Facilities

The Rhode Island Convention Center, the Westin Hotel, the Holiday Inn Providence Downtown, and the Biltmore Hotel are all equipped with handicapped facilities.

Housing

For information regarding hotel reservations, please contact the hotels directly. For student housing reservations assistance, please contact the Brown University Conference Services at (401) 863-7500, 9:00 am – 4:00 pm, Monday – Friday. Students requiring assistance after hours should refer to the contact information provided in the student housing registration confirmation letter.

Information Desk

An information desk / message desk will be staffed during registration hours, Sunday through Thursday, July 27 – 31. It is located in the registration area, outside Hall D, on the third level of the Rhode Island Convention Center. Messages will be posted on the message boards adjacent to the desk. The telephone number for leaving messages only is (401) 458-6272. *Paging attendees is not possible.*

Internet

AAAI, in cooperation with Microsoft Corporation and Brown University, will be providing internet access in Room 551 on the fifth level of the Rhode Island Convention Center. The internet room will be open during registra-

tion hours. As a courtesy, please limit your access time to 5 – 10 minutes if others are waiting to use the service.

List of Attendees

A list of preregistered attendees of the conference will be available for review at the AAAI Desk in the registration area, third level of the Rhode Island Convention Center. Attendee lists will not be distributed.

Message Center

See Information Desk.

Parking

A parking garage is available at the Rhode Island Convention Center. The maximum daily rate is \$8.50.

Press

All members of the media are requested to register in the Press Room on the fifth level of the Rhode Island Convention Center, Room 553A. Press badges will only be issued to individuals with approved credentials. The Press Room will be open during the following hours:

Monday, July 28 8:00 am – 5:00 pm

Tuesday, July 29 8:00 am – 5:00 pm

Wednesday, July 30 8:00 am – 5:00 pm

Thursday, July 31 8:00 am – 12:00 pm

An AAAI-97 volunteer will be on duty during press room hours to assist the members of the press and media.

Printed Materials

Display tables for the distribution of promotional and informational materials of interest to conference attendees will be located outside Hall D, third level, Rhode Island Convention Center.

Proceedings

Each registrant for the AAAI-97 technical program and IAAI-97 will receive a ticket with the registration materials for one copy of the conference *Proceedings*. During registra-

General Information

tion hours on Sunday, July 27, Monday, July 28, and until 10:00 am on Tuesday, July 29, *Proceedings* tickets can be redeemed at the AAAI Press *Proceedings* booth, located outside Hall D, third level of the Rhode Island Convention Center.

After 10:00 am on Tuesday, the AAAI-97 / IAAI-97 *Proceedings* ticket may be redeemed at the MIT Press booth # 101, located in Exhibit Hall C, during exhibit hours.

Extra *Proceedings* may be purchased at the conference site at the above locations. Thursday, July 31, will be the last day to purchase extra copies of the *Proceedings* onsite.

The AAAI-97 / IAAI-97 *Proceedings* can also be redeemed by mailing the ticket with your name, shipping address and email to:

Exhibits
The MIT Press
5 Cambridge Center
Cambridge, MA 02142

Postage must be prepaid with a check or MasterCard / Visa and expiration date. USA: \$10.50; Outside USA: \$25.00 surface or \$55.00 airmail.

Proceedings Shipping

See Business Centers.

Recording

No audio or video recording is allowed in the Tutorial Forum. Audiotapes of the plenary sessions, invited talks and panels, and the IAAI sessions will be for sale in the registration area, outside Hall D, third level of the Rhode Island Convention Center. A representative from Audio Archives will be available to take your order during registration hours, beginning Monday, July 28. Order forms are included with registration materials. Tapes may also be ordered by mail from:

Audio Archives International, Inc.
3043 Foothill Blvd, Suite 2
La Crescenta, CA 91214
Telephone: (818) 957-0874
Fax: (818) 957-0876

Speaker Ready Room

The Speaker Ready Room will be located in Room 553B on the fifth level of the Rhode Island Convention Center. This room has audio-visual equipment to assist speakers with

their preparations. It is important that speakers visit this room to organize their materials. The room will be open from 8:00 am – 5:00 pm Sunday, July 27, through Wednesday, July 30 and from 8:00 am – 3:00 pm, Thursday, July 31.

Invited speakers are asked to come to Room 553B one day prior to their speech. Representatives from AV Headquarters will be available from 9:00 am to 5:00 pm Sunday – Wednesday, and 9:00 am – 3:00 pm on Thursday to confirm your audiovisual needs, and assist with the preparation of your materials, if necessary.

Transportation

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

Airlines & Rental Cars

The American Association for Artificial Intelligence has selected American Airlines as the official carrier and Hertz Rent A Car as the official car rental agency for AAAI-97 / IAAI-97. If you need to change your airline or car rental reservations, please call Conventions in America, our official travel agency at (800) 929-4242 and ask for Group #428. Internet: scitravel@aol.com.

Airport Shuttles

Airport Van Shuttle
Telephone: 401-736-1900
Located at T.F. Green Airport
\$9.00 one way, \$14.00 round trip
Contact: Richard Sprague

Cline Transportation
Telephone: 401-751-2546
Individual car or limo is \$24.00 T. F. Green Airport to Providence
\$9.00 one way, \$16.00 round trip
Advance reservations needed
Contact: Linda Cline

Providence – Holiday Inn Hotel
Complimentary Hotel Shuttles

Taxi

Taxis are available at T. F. Green Airport. Approximate fare from the airport to downtown Providence is \$24.00.

Bus

Bonanza Bus Lines — New York, Boston. The depot is located at Kennedy Plaza. For infor-

mation on fares and scheduling, call (401) 751-8800.

Rail

The Amtrak station is located at Capitol Hill. For general information and ticketing, call (800) 872-7245.

City Transit System

Rhode Island Public Transit Authority (RIP-TA) is a statewide bus transit. Schedules are available at the main depot located at Kennedy Center (across from the Biltmore Hotel). Basic local fare is \$1.00. For general information, call (800) 244-0444.

Tutorial Syllabi

Extra copies of AAAI-97 tutorial syllabi will be available for purchase in the registration area, outside Hall D, beginning Tuesday, July 29. Supplies are limited. Cost is \$15.00 per syllabus. Preregistration tutorial syllabi tickets may be redeemed in the tutorial rooms.

Visitor Information

The Providence Warwick Convention and Visitors Bureau will have a booth in the registration area, outside Hall D, third floor, Rhode Island Convention Center. Maps and brochures with information on shopping, restaurants, outdoor activities, parks, and tours will be available. Hours are 10:00 am – 4:30 pm, Monday, July 28 – Wednesday, July 30 and 10:00 am – 3:30 pm, Thursday, July 31.

Volunteer Room

The volunteer room is located in Room 550B on the fifth level of the Rhode Island Convention Center. Hours are 8:00 am – 5:00 pm, Sunday, July 27 – Wednesday, July 30 and 8:00 am – 3:00 pm, Thursday, July 31. Extra volunteer instructions and schedules will be available. All volunteers should check in with Josette Mausisa, AAAI Registrar, in the registration area prior to their shifts. The volunteer meeting will be held Saturday, July 26 at 5:00 pm in Room 552 A, fifth level, Rhode Island Convention Center.

Disclaimer

In offering American Airlines, Babysitters, The Biltmore Hotel, Brown University, Conventions in America, Hertz Rent A Car, The Holiday Inn, the Westin Hotel, 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 of providers of accommodations or other services included as part of the AAAI-97 / IAAI-97 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 (1) 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.