2000

REGISTRATION BROCHURE

Seventeenth National Conference on Artificial Intelligence

Twelfth Innovative Applications of Artificial Intelligence Conference

Sponsored by the

American Association for Artificial Intelligence

July 30 – August 3, 2000

Austin Convention Center

Austin, Texas

ncai@aaai.org • www.aaai.org/ • 650-328-3123

Photographs Courtesy, J. Griffis Smith, Austin Convention and Visitors Bureau.

Please Join Us for AAAI–2000

"We generally overestimate what a technology can do for us in a few years and underestimate what it can do in a few decades." - *John Durkin*

… and artificial intelligence is no exception. From a few laboratory experiments demonstrating "general methods of intelligence," followed by several generations of creative diligence, AI has entered a new phase.

It is now commonplace to confront AI issues in virtually every software development project — database applications, hardware and software verification, computer-based games and entertainment, internet agents, information retrieval, knowledge management, and scheduling, to name a few — and *frequently AI has a solution!*

Meanwhile cutting edge research in AI has reached a new level of depth and sophistication through synergistic collaborations with disciplines such as neurology, psychology, linguistics, statistics, physics, and operations research. We have witnessed the creation of a true science of intelligence, and can only begin to dream of the future it will help to create.

As the premier showcase of AI science and technology, the National Conference on Artificial Intelligence will start with exciting workshops and free tutorials from leading researchers. This is an outstanding forum to learn about the state of the art in both new and established areas. The conference will then offer over 60 technical sessions on the best new research and applications across all areas of AI. In addition you have the opportunity to see:

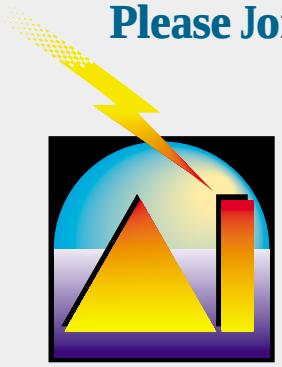
- A dozen invited talks and panels by distinguished scientists on topics ranging from embodied agents to heuristic search
- Robots competing for fame and glory as part of the AI Festival
- And new this year, a special poster session where you can meet and talk with the authors of all presented technical papers.

It's all happening in the "live music capital of the world," Austin, Texas. Austin is located on the Colorado River, at the edge of the Texas Hill Country. The Convention Center is in the heart of downtown, surrounded by restaurants and night clubs. Don't miss out!

- *Henry Kautz and Bruce Porter*
AAAI–2000 Program Cochairs

Photograph courtesy, J. Griffis Smith, Austin Convention and Visitors Bureau.

Please Join Us for IAAI–2000



Tuesday – Wednesday, August 1–2

The Twelfth Annual Conference on Innovative Applications of Artificial Intelligence (IAAI–2000) is the place to be to learn about AI's successes through **deployed real world example applications and emerging AI technologies and applications.**

Case studies of deployed applications, with measurable benefits whose value depends on the use of AI technology, will be presented. In addition, IAAI–2000 augments these case studies with papers and invited talks that address emerging areas of AI technology or applications. IAAI is organized as an independent program within the National Conference, with coordinated schedules to allow attendees to move freely between IAAI and National Conference sessions. IAAI and the National Conference are jointly sponsoring invited talks that fit the theme of both programs.

AI applications developers will benefit from learning about new AI techniques that will enable the next generation of applications. Basic AI research will benefit by learning about challenges of real-world domains and difficulties and successes in applying AI techniques to real business problems. IAAI–2000 will address the full range of AI techniques including knowledge-based systems, language and speech understanding, planning and scheduling, data mining, case-based reasoning, ontologies, neural networks, simulation, and so on. The deployed applications papers are case studies that provide a valuable guide to designing, building, managing, and deploying systems incorporating AI technologies. These applications provide clear evidence of the impact and value that AI technology has in today's world.

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

This year's papers address applications in a wide variety of domains, including the military, biotechnology, medical data mining, civil engineering, financial modeling, manufacturing, and interactive agents.

We invite you to contribute to the dialog between basic and applied AI by joining us for IAAI–2000.

- *Robert Engelmore*, Program Chair
- *Haym Hirsh*, Program Cochair

AAAI–2000 Festivities

AAAI–2000 Opening Reception

The AAAI–2000 opening reception will be held Monday, July 31 from 7:00 – 8:00 PM in the Texas Ballroom of the Hyatt Regency Austin. This event will provide the traditional opportunity for attendees to socialize prior to the beginning of the first day of technical sessions. A variety of hors d'oeuvres and a no-host bar will be available. Admittance to the reception is free to AAAI–2000 registrants. A $15.00 per person fee ($5.00 for children) will be charged for spouses and other nontechnical conference registrants.

AI Festival

The AI Festival will be held Wednesday, August 2 from 6:00–10:00 PM in Exhibit Hall 1 of the Austin Convention Center. This popular event, first held at AAAI-98, gives attendees the opportunity to stroll among numerous exhibits and demonstrations—the Mobile Robot Competition and Exhibition, the Intelligent Systems Demonstrations, the National Botball Tournament and the Student Posters—enlivened by informal supper and conversation. Admittance to the reception is free to AAAI–2000 registrants. A $20.00 per person fee ($5.00 for children) will be charged for spouses and other nontechnical conference registrants.

AAAI Awards

Each year AAAI honors a small group of its members, authors, and students with a variety of awards, presented at the National Conference. Honors include AAAI Fellow, AAAI Distinguished Service Award, AAAI Classic Paper Award, AAAI Effective Expository Writing Award, the AAAI–2000 and IAAI–2000 Outstanding Paper Awards, and the Robot Competition Awards. In addition, the Computing Research Association has chosen AAAI–2000 as the venue to present its Outstanding Undergraduate Awards 2000. For more information about AAAI awards, please see www.aaai.org/Awards/. Consult the onsite program for presentation times.

Photo Courtesy, Louis Fabian Bachrach

Presidential Address

Creativity at the Meta-Level

Bruce G. Buchanan, *University Professor of Computer Science and Professor of Philosophy, Medicine, and Intelligent Systems, University of Pittsburgh*

We know creativity when we see it, but can we automate it?

In his 1998 Presidential Address, Dave Waltz listed creativity as one of three main aspects of intelligence, along with perception and language, but left the topic for another time. In this year's Presidential Address we'll circle the concept of creativity from human and machine perspectives in an attempt to show that computers can be creative—and sometimes are.

Although there may be some merit in the semantic objection that being creative just means being successful in the absence of known procedures, we can overcome the objection by layering a program's problem solving knowledge. One key idea is structuring programs with explicit conceptual frameworks and strategies that can be examined and adjusted by a meta-level program. This is essentially what John McCarthy was saying in his Advice Taker paper and Arthur Samuel was doing in the 1950s. With the benefits of much bigger machines and nearly fifty years of research, it is time for a renewed push to make our programs as creative as McCarthy and Samuel were showing us how to do.

Bruce Buchanan is University Professor of Computer Science at the University of Pittsburgh, with secondary appointments as Professor of Medicine, Philosophy, and Intelligent Systems at Pitt and as Adjunct Professor of Computer Science at Carnegie-Mellon University. He is President, and a Fellow, of the American Association for Artificial Intelligence and is a member of the National Academy of Science Institute of Medicine.

His research interests are in artificial intelligence and the philosophy of science, in particular, machine learning, model building, and data interpretation. He was one of the principals in the development of the Dendral, Meta-Dendral, Mycin, and Protean programs at Stanford, and has continued working in machine learning, medical informatics, and computational biology at the University of Pittsburgh.

AAAI–2000/IAAI–2000 Conference Committee

AAAI–2000 Program Cochairs
Henry A. Kautz, *AT&T Labs–Research*
Bruce Porter, *University of Texas at Austin*

AAAI–2000 Associate Program Cochairs
Rina Dechter, *University of California, Irvine*
Richard Sutton, *AT&T Labs – Research*

AAAI–2000 Assistant Program Chair
Vibhu Mittal, *Just Research &*
Carnegie Mellon University

IAAI–2000 Chair
Robert S. Engelmore, *Stanford University*

IAAI–2000 Cochair
Haym Hirsh, *Rutgers University*

Intelligent Systems Demos Chair
George Ferguson, *University of Rochester*

Mobile Robot Competition Chair
Alan C. Schultz, *Naval Research Laboratory*

Robot Contest Subchair
Lisa Meeden, *Swarthmore College*

Robot Exhibit Subchair
Marc Böhlen, *Carnegie Mellon University*

Robot Challenge Subchair
Tucker Balch, *Carnegie Mellon University*

Student Abstract and Poster Chair
Sven Koenig, *Georgia Institute of Technology*

Robot Building Laboratory and National Botball Tournament Chair
David Miller, *KISS Institute for Practical Robotics*

SIGART/AAAI–2000 Doctoral Consortium Chair
Marie A. Bienkowski, *SRI International*

Tutorial Chair
Michael L. Littman, *Duke University*

Workshop Chair and Cochair
Marie desJardins, *SRI International*
Berthe Y. Choueiry, *University of Nebraska-Lincoln*

Invited Presentations

Decision Making under Uncertainty: Operations Research Meets AI (Again)

Craig Boutilier, *University of Toronto*

Models for sequential decision making under uncertainty (such as Markov decision processes, or MDPs) have been studied in operations research for decades. The recent incorporation of ideas from many areas of AI, including planning, probabilistic modeling, machine learning, and knowledge representation, have made these models much more widely applicable. In this talk, Boutilier will survey recent advances within AI in the use of fully- and partially-observable MDPs as a modeling tool, and the development of computationally-manageable solution methods. He will place special emphasis on algorithms that exploit specific problem structure and approximation techniques.

Why Do We Need a Body Anyway?

Justine Cassell, *MIT Media Lab*

Embodiment is all the rage: humanoid agents, robots with eyelashes. It brings back those glory days of AI when "human-like" was a goal in and of itself. But do bodies serve any use in today's AI? In this talk Cassell will support the use of embodiment in certain domains and demonstrate with a series of implemented systems. But she will argue that unless we understand the "affordances" of the body—for face-to-face conversation, for situating intelligence, for establishing trust and other kinds of interactional glue—then an embodied systems will never be more than just another pretty face.

Structure, Duality, and Randomization: Common Themes in AI and OR

Carla Pedro Gomes, *Cornell University*

Both the artificial intelligence and the operations research (OR) communities are interested in developing techniques for solving hard combinatorial problems. OR has built heavily on mathematical programming formulations such as integer and linear programming, while AI has developed constraint-based search and inference methods. Recently, we have seen a convergence of ideas, drawing on the individual strengths of these paradigms. Problem structure, duality, and randomization are overarching themes in the study of AI and OR approaches. Gomes will compare and contrast the different views from AI and OR on these topics, highlighting potential synergistic benefits.

Missed Perceptions: AI Versus the Funding Agencies

James Hendler, *University of Maryland & DARPA*

The relationship between the AI community and the funding establishment has often been very strained. In this talk, Hendler examines the reality of this and explores what we, as individuals and as a community, can do to improve our interaction with funding agencies.

Modeling High-Dimensional Data Distributions by Combining Simple Experts

Geoffrey Hinton, *University College London*

It is possible to combine multiple nonlinear probabilistic models of the same data by multiplying the probability distributions together and then renormalizing. This is a very efficient way to model data that simultaneously satisfies many different constraints. Hinton will describe an efficient way to fit a "Product of Experts" to data and show that this produces excellent models.

Design and Analysis of Heuristic Evaluation Functions

Richard E. Korf, *University of California, Los Angeles*

Korf will discuss recent progress in heuristic search, which has lead to optimal solutions to Rubik's Cube and the 5 x 5 Twenty-Four Puzzle, problems with state spaces of size 1019 and 1025, respectively. Korf will also present a new theory that allows us to accurately predict the performance of heuristic search algorithms.

Artificial Intelligence and Mobile Robots: Successes and Challenges

David Kortenkamp, *NASA Johnson Space Center/ Metrica Inc.*

Mobile robots pose a unique challenge to artificial intelligence researchers. In recent years, successes in mapping and navigation have led to new challenges in human-robot interaction, multiple robots, mobile manipulation and learning. Kortenkamp's talk will discuss these successes and challenges within the context of the AAAI–2000 Mobile Robot competition.

AAAI / IAAI–2000 Invited Talk

Human-Level AI's Killer Application: Interactive Computer Games

John E. Laird, *University of Michigan*

Over the last thirty years, there has been little progress in developing AI systems that integrate the varied intellectual capabilities of humans. In this talk, Laird proposes that interactive computer games can provide the unifying application area for research and development of integrated human-level AI.

Machines Reasoning about Machines

J. Strother Moore, *University of Texas at Austin*

Can machines reason about machines? The answer is "yes" and the question is of more than just philosophical interest. Today's microprocessors are extraordinarily complex machines; manufacturers are turning to mechanized reasoning tools to help them analyze sophisticated designs. These tools have their roots in early AI research.

Eye Movements and Spoken Language Comprehension: Bridging the Language-as-Action and Language-as-Product Traditions

Michael K. Tanenhaus,
University of Rochester
Eye movements allow one to monitor real-time language processing in natural situations at a remarkably fine temporal grain. Tanenhaus will present an overview of research using this approach focusing on word recognition in continuous speech and the role that contextually-dependent representations play in reference resolution and syntactic ambiguity resolution.

Unconventional Vision Sensors

Shree K. Nayar,
Columbia University
What can be perceived by a human or computed by a machine from an image is fundamentally restricted by the captured data. Current imaging systems are severely limited in spatial resolution, field of view, and dynamic range. In this talk, Nayar presents new vision sensors that provide unconventional forms of visual information. The first part of the talk focuses on the use of catadioptrics (lenses and mirrors) for capturing unusually large fields of view. Nayar describes several methods for obtaining single viewpoint and multi-viewpoint images. The second part of the talk addresses the problem of acquiring high dynamic range images using a low dynamic range detector. Nayar presents two approaches for extracting the desired extra bits at each pixel; the first one uses multiple images while the second uses just a single image. Several interactive demonstrations of our results will be shown. These results have implications for digital photography, immersive imaging, image based rendering, 3D scene modeling, and advanced interfaces.

The Games Computers (and People) Play

Jonathan Schaeffer,
University of Alberta
The development of high-performance game-playing programs has been one of the major successes of AI research. The results have been outstanding but, with the one notable exception (Deep Blue), they have not been widely disseminated. Schaeffer's talk will discuss the past, present and future of the development of game-playing programs.

The research emphasis in the past has been on high performance for two-player perfect-information games. The research emphasis of the present encompasses multi-player imperfect/nondeterministic information games. And what of the future? There are some surprising changes of direction occurring that will result in games being more of an experimental testbed for mainstream AI research.

Conceptual Indexing: Practical Large-Scale AI for Efficient Information Access

William A. Woods,
Sun Microsystems Laboratories
Finding information is a problem shared by people and intelligent systems. Woods's talk describes an experiment combining both human and machine aspects in a knowledge-based system to help people find information in text. This system is the first to demonstrate a substantial improvement in information retrieval performance by using linguistic and world knowledge. It is also an example of practical subsumption technology on a large scale and with domain-independent knowledge. Results from this experiment are relevant to general problems of knowledge-based reasoning with large-scale knowledge bases.

AAAI–2000 Student Programs

AAAI–2000 Student Abstract Poster Program

The Student Abstract Program is designed to provide a forum in which students can present and discuss their work while still in its early stages, meet peers who have related interests, and introduce themselves to more senior members of the field. Student abstracts, which have been chosen for inclusion in the AAAI–2000 conference *Proceedings*, will display their work at the Student Abstract Poster Session during the AI Festival on Wednesday, August 2, from 6:00–10:00 PM in Exhibit Hall 1 of the Austin Convention Center. All AAAI–2000 registrants are encouraged to visit these presentations.

AAAI/SIGART Doctoral Consortium

The Fifth AAAI/SIGART Doctoral Consortium will be held Sunday and Monday, July 30–31, from 8:30 AM–6:00 PM. The Doctoral Consortium provides an opportunity for a group of Ph.D students to discuss and explore their research interests and career objectives in an interdisciplinary workshop together with a panel of established researchers. The students accepted to participate in this program will also participate in the Student Poster program on Wednesday, August 2, from 6:00–10:00 PM during the AI Festival. All interested AAAI–2000 student registrants are invited to observe the presentations and participate in discussions at the workshop.

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

AAAI–2000 Exhibition

The AAAI–2000 Exhibition will take place on Tuesday, August 1 and Wednesday, August 2, and will comprise a host of events designed to showcase current products, research and applications in artificial intelligence. Admittance is open to all AAAI–2000 registrants. Other interested individuals may visit the exhibits for a nominal onsite fee of $10.00. Student groups are welcome, preferably by prior arrangement. For more information about the exhibition, please visit the AAAI web site or write to ncai@aaai.org.

AAAI–2000 Exhibitors

Exhibitors will be leading suppliers of AI software, as well as AI consultants and publishers displaying the latest in AI books and periodicals. AAAI-99 Exhibitors included:

- AAAI Press
- ACM
- ActivMedia Robotics
- Applied AI Systems
- Franz, Inc.
- Institute for Human & Machine Cognition
- KISS Institute for Practical Robotics
- Kluwer Academic Publishers
- Morgan Kaufmann Publishers
- NASA Ames Research Center
- Naval Research Lab
- *PC AI Magazine*
- Prentice Hall
- Probotics Inc
- Real World Interface, Inc.
- RML Technologies
- Springer Verlag New York, Inc.
- Stottler Henke Associates, Inc
- The MIT Press
- Unmanned Ground Vehicles/ Systems JPO

AAAI–2000 Intelligent Systems Demonstrations

Continuing advances in artificial intelligence research are making it possible to develop intelligent artifacts in a wide range of application areas. The AAAI–2000 Intelligent Systems Demonstrations program showcases state-of-the-art AI implementations and provides AI researchers with an opportunity to show their research in action.

The program is intended to highlight innovative contributions to the science of AI with an emphasis on the benefits to be gained from developing and using implemented systems in AI research. Last year's demonstrations included speech- and gesture-based systems, AI-based simulators, several systems using AI on the internet, and an AI system for playing interactive video games with and against human players. System builders will be on hand to present their work, and audience interaction with the systems is encouraged as much as possible.

Demonstrations are scheduled throughout the AAAI Exhibition as well as being available during the AI Festival. Check the conference program for times and locations.

AAAI–2000 Mobile Robot Competition and Exhibition

The Ninth Annual AAAI Mobile Robot Competition and Exhibition brings together teams from universities and other research laboratories to compete, and also to demonstrate state-of-the-art research in robotics and AI. The goals of the Competition and Exhibition are to:

- Foster the sharing of research ideas and technology
- Allow research groups to showcase their achievements
- Encourage students to enter the fields of robotics and AI
- Increase awareness of the field

The Competition and Exhibition comprises four separate events: the contest, the exhibition, the challenge, and a workshop.

Contest

The contest allows teams to show off their best attempts at solving common tasks in a competitive environment. Teams compete for place awards as well as for technical innovation awards, which reward particularly interesting solutions to problems. There will be two contest events this year, Hors d'oeuvres, and Search and Rescue.

Exhibition

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

Challenge

In the Robot Challenge, a particularly challenging task is defined which is well beyond current capabilities, will require multiple years to solve, and should encourage larger teams and collaborative efforts. The challenge task is defined by a long-term committee of researchers. Currently the task is for a robot to be dropped off at the front door of the conference venue, register itself as a volunteer, perform various tasks as assigned, and talk at a session. The challenge will require integration of many areas of artificial intelligence as well as robotics.

Workshop

The robot events culminate with a workshop where participants describe the research behind their entries.

For more information, consult the aaai web pages or www.aic.nrl.navy.mil/~schultz/aaai2000/

AAAI gratefully acknowledges grants from DARPA, ONR, Naval Research Laboratory, Nils Nilsson, and Ben Wegbreit, which helps support this program.

Robot Server at the 1999 AAAI National Conference Banquet. *© 1999, AAAI.*

Special Exhibit Programs

AAAI–2000 Robot Building Laboratory

The AAAI–2000 Robot Building Laboratory will take place Sunday–Monday, July 30–31. Preregistration is required.

The robot building lab (RBL) is a chance for AI researchers to experiment with hardware. What happens to your favorite AI algorithm when it actually gets embodied? How reliable is the real world compared to a simulation? Why do roboticists always seem to be having a better time at the conference than logic theorists? These are the questions that can best be answered by participating in the RBL.

As in the past, this year's RBL will break the participants into small groups. Each group will be given a robot kit and then will spend the next day and a half creating a robot system to achieve that year's task. The lab will conclude with a friendly competition among the different groups.

The theme for this year's lab will be "multi-agent cooperation." Each robot kit will contain enough parts to create two or more independent robots that will work together (hopefully) to accomplish the task. Participants are encouraged (but not required) to bring a MacOS, Windows 98, or LINUS laptop with them so that there will be multiple programming stations for each group. The results of the lab will be presented as part of the robot exhibition, later in the conference.

The RBL is aimed at educators, students and researchers interested in robotics. A general knowledge of programming will be assumed. No prior robotics experience is required.

AAAI–2000 High School National Botball Tournament

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

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

In this year's tournament, teams either play the black-ball or white-ball side. The challenge is to get the most of your colored ping-pong balls into the tray, winning extra points if the tray ends up on your side of the table. Bonus points are awarded if the robot ends up in the tray as well.

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

Last year's tournament featured Fembot, the robot built by the all-girls team from Oak Grove High School versus Minataurus from Menlo-Atherton High School in a stunning finals match that had the crowds cheering. We expect even more excitement this year.

These robots were completely designed, built, and programmed by students from a kit of over 2000 parts. For more information about the Botball program, please see: www.kipr.org/botball. The Botball contest will be open to AAAI attendees during normal exhibit hours.

Botball at the 1999 AAAI National Conference Banquet. *© 1999, AAAI.*

Tutorial Forum

The 2000 Tutorial Forum features thirteen four-hour tutorials that provide an opportunity for researchers to spend two days freely exploring exciting advances in disciplines outside their normal focus. A special tutorial on Sunday evening, the third annual AAAI Mentoring Tutorial rounds out the program. All AAAI attendees are encouraged to participate in this continuing education program. Each tutorial is taught by experienced scientists and practitioners in AI. AAAI–2000 technical registrants may register for up to four consecutive tutorials for no additional fee. No preregistration is required for the special evening tutorial.

Sunday, July 30, 9:00 AM–1:00 PM

- *SA1:* Probabilistic Robotics
  Sebastian Thrun
- *SA2:* Practical Tools for Knowledge Representation and Nonmonotonic Reasoning
  Ilkka Niemela and Mirek Truszczynski
- *SA3:* New Frontiers in Statistical Natural Language Processing
  Christopher Manning

Sunday, July 30, 2:00–6:00 PM

- *SP1:* Foundations of Electronic Markets
  Tuomas Sandholm
- *SP2:* Approximation Techniques for Automated Reasoning
  Rina Dechter and Irina Rish
- *SP3:* Text Mining
  Ronen Feldman
- *SP4:* Solving and Programming with Soft Constraints: Theory and Implementation
  Philippe Codognet and Francesca Rossi

Sunday, July 30, 7:00–8:30 PM

- *SP5:* AAAI Mentoring Tutorial: Advising Graduate Students. *Manuela M. Veloso*

Monday, July 31, 9:00 AM–1:00 PM

- *MA1:* Vision-Based Interaction and Control. *Greg Hager*
- *MA2:* Recent Advances in AI Planning: A Unified View. *Subbarao Kambhampati*
- *MA3:* Text Summarization
  Dragomir R. Radev

Monday, July 31, 2:00–6:00 PM

- *MP1:* Empirical Methods for Artificial Intelligence and Computer Science
  Paul Cohen, Ian Gent and Toby Walsh
- *MP2:* Conceptual Modeling and Ontological Analysis. *Nicola Guarino and Chris Welty*
- *MP3:* User Modeling and Adaptive Interfaces. *Haym Hirsh and Pat Langley*

Special Tutorial

AAAI is pleased to present a plenary tutorial on Sunday evening, July 30. This tutorial is open to all AAAI–2000 technical registrants. No preregistration is required.

Mentoring Tutorial: Advising Graduate Students (SP5)

Manuela M. Veloso, *Carnegie Mellon University*
Sunday, July 30, 7:00 – 8:30 PM

In this tutorial, Veloso will discuss the role of the faculty advisor throughout a graduate student's Ph.D program. She will address issues that arise incrementally during the program, namely: how to interact with the incoming students; how to help balance research and the program requirements (such as course work, qualifying exams, and teaching assistantships); how to find a challenging but feasible thesis topic; how to choose a thesis committee; how to get the student's research known to the large AI community; how to support the student through finishing a thesis and finding a job. Veloso will build upon her experience as a graduate student and faculty for eight years at Carnegie Mellon.

Tutorial participants are encouraged to send specific questions or issues before the tutorial to Manuela Veloso, at mmv@ai.mit.edu

Manuela M. Veloso is an associate professor of computer science at Carnegie Mellon University. She received her Ph.D in computer science from Carnegie Mellon University in 1992. She received a B.S. degree in electrical engineering in 1980 and an M.Sc. in electrical and computer engineering in 1984 from the Instituto Superior Tecnico in Lisbon.

Veloso's long-term research goal is the effective construction of teams of intelligent agents where cognition, perception, and action are combined to address planning, execution, and learning tasks, in particular in uncertain, dynamic, and adversarial environments. Veloso has developed teams of robotic soccer agents in three different leagues that have been RoboCup world champions several times: simulation (1998,1999), CMU-built small-wheeled robots (1997,1998), and Sony four-legged robots (1998).

Manuela Veloso was awarded an NSF Career Award in 1995 and the Allen Newell Medal for Excellence in Research in 1997.

Approximation Techniques for Automated Reasoning (SP2)

Irina Rish and Rina Dechter
Sunday, July 30, 2:00 – 6:00 PM

Automated reasoning tasks such as constraint satisfaction, probabilistic inference, decision-making and planning are generally hard (NP-hard). A way to cope with this complexity is to use approximation techniques that trade solution accuracy for computational efficiency. This tutorial will focus on approximate reasoning in graphical frameworks such as constraint and belief networks where the complexity of reasoning is often associated with a high level of interactions (correlations) among the variables. Therefore, a popular approach is to bound the level of interactions by using local approximations. Well-known examples in constraint satisfaction and optimization include local search algorithms such as GSAT, and local constraint propagation such as arc-, path-, and *i*-consistency. Recent success of local propagation techniques such as Pearl's poly-tree algorithm in probabilistic decoding demonstrated a great potential of local approximations for probabilistic inference and decision-making.

We provide an overview of state-of-the-art local approximation techniques focusing on the mini-bucket approach, a general local approximation scheme for constrained optimization and inference. This scheme is based on bucket-elimination, a dynamic-programming algorithmic framework that accommodates a variety of inference techniques such as directional resolution for propositional satisfiability, adaptive consistency for constraint satisfaction, variable-elimination algorithms for probabilistic inference, and many others. The mini-bucket scheme uses an adjustable bound on the size of dependencies recorded by bucket-elimination, thus allowing a flexible trade-off between accuracy and efficiency. We discuss the effectiveness of the mini-bucket scheme for different problem classes and present the results for practical domains such as medical diagnosis and probabilistic decoding.

The tutorial concludes with an overview of several other approximation techniques (such as Markov Chain Monte Carlo methods and variational approximations), discussing potential combinations of "orthogonal" approximation approaches.

The tutorial is aimed at the general AI audience, and in particular at people interested in automated reasoning in constraint and belief networks. Familiarity with basic concepts of graph theory, combinatorial optimization, probability theory, and computational complexity is desirable.

Irina Rish is a research staff member at IBM T.J. Watson Research Center, Hawthorne, NY. She received her Ph.D in Computer Science from the University of California, Irvine in 1999. Prior to that she earned M.S. in applied mathematics from the Moscow Oil and Gas Institute (Moscow, Russia). Her research interests include probabilistic reasoning in Bayesian networks, constraint satisfaction and optimization, machine learning and data mining, empirical analysis of algorithms, and practical applications including performance management in distributed systems and e-business.

Rina Dechter is a professor of computer science at the University of California, Irvine. She received her Ph.D in computer science at UCLA in 1985. Before coming to UC-Irvine she spent two years on the faculty of the computer science department at the Technion, Haifa, Israel. Her research centers on computational aspects of automated reasoning and knowledge representation, including constraint processing, probabilistic reasoning, planning and distributed computation. Dechter is a Fellow of the American Association for Artificial Intelligence. She has published over fifty research articles, and is now serving on the editorial boards of *Artificial Intelligence, Journal of Artificial Intelligence Research, Constraints Journal*, and the *Encyclopedia of AI*. She is the program chair of Constraint Programming 2000 (CP2000) and the future program cochair of AAAI-2002.

Conceptual Modeling and Ontological Analysis (MP2)

Nicola Guarino and Chris Welty
Monday, July 31, 2:00 – 6:00 PM

Ontologies have reached a certain level of popularity in computer science, and are becoming important parts or foundations of many real-world systems. While this is in general a positive trend, inexperienced modelers with little ontological training tend to repeat the same mistakes that have been made, discussed, and often resolved in the philosophy and practice of ontology over the centuries. This tutorial is intended for researchers and practitioners who are interested in designing ontologies to support business process modeling, enterprise integration, database modeling, software engineering, natural language systems, knowledge management, knowledge-based systems, etc. Participants will walk away with a "tool bag" full of well thought out solutions to common modeling problems that stem from Philosophy and are grounded in practice, and will have been exposed to some of the latest research about basic ontological distinctions.

The tutorial will cover background material on conceptual modeling, knowledge structuring, and ontology in general. The core of the tutorial will be a discussion of the basic formal tools for ontological analysis, including theories of parts and wholes, identity, dependence, taxonomy, and predication. Each of these tools will be presented from a theoretical and practical perspective, using examples from philosophy and actual implemented systems. We will conclude with some interesting examples of other common, yet difficult, modeling problems that arise from the financial, electronic commerce, and web-based information retrieval domains.

No special prerequisite is necessary besides a basic understanding of first order logic.

Nicola Guarino is a senior research scientist at the Institute for Systems Theory and Biomedical Engineering of the Italian National Research Council (LADSEB-CNR). For about ten years now he has been actively promoting the study of the ontological foundations of knowledge representation and knowledge engineering with an interdisciplinary approach centered on logic, philosophy, and linguistics. He was chairman of the First International Conference on Formal Ontology in Information Systems (FOIS'98), and program committee member of many workshops and conferences in the field. He is associate editor of the *International Journal of Human and Computer Studies*, has edited three journal special issues on ontology-related topics, and has published more than thirty papers in international journals, books and conferences. His research activities regard ontology design, conceptual modeling, knowledge sharing and integration, logical modeling of physical objects, and ontology-driven information retrieval.

Chris Welty is an assistant professor at Vassar College, currently on sabbatical at LADSEB-CNR, and has consulted in the real world at large and small companies including GE, AT&T, and IBM. He holds a Ph.D in computer science from Rensselaer Polytechnic Institute. He is editor in chief of *Intelligence Magazine*, steering committee chair of the Automated Software Engineering Conferences, and the treasurer of KR.org. His research interests include ontology and ontological analysis, ontologies for information, for digital libraries, and for software understanding, and in general in improving information retrieval by representing knowledge.

Empirical Methods for Artificial Intelligence and Computer Science (MP1)

Paul Cohen, Ian Gent and Toby Walsh
Monday, July 31, 2:00 – 6:00 PM

The focus of this tutorial is empirical methods in the research and development of novel computer techniques. Attendees will learn the basic principles of empirical studies, and methods for exploratory data analysis, experiment design, hypothesis testing, and modeling. Empirical methods are becoming important in computing, both for developing new techniques and for judging them. This is especially true in artificial intelligence, where progress can very often only be judged empirically. The tutorial will cover the entire lifecycle of empirical studies, including the exploratory phase which is usually not reported, and the phase in which a research question (why you are running the study in the first place) is turned into an experiment design. While this is not a crash course in statistical methods, we will introduce hypothesis testing and computer intensive statistical methods —- a new family of tools particularly appropriate for AI research. Finally we will address questions that arise when trying to publish empirical work. Throughout, we will use examples from our own research: positive examples of good practice, and negative examples to demonstrate what not to do! The tutorial will be suitable to a general AI audience, as very little background knowledge is assumed and the empirical methods discussed are generally useful.

Paul Cohen is a professor of computer Science at the University of Massachusetts, where he works on planning, simulation, and learning. Cohen's *Empirical Methods for Artificial Intelligence*, (The MIT Press) is a textbook on experiment design, data analysis, statistical modeling, and other empirical tools. Cohen is a Fellow of the American Association for Artificial Intelligence.

Ian Gent is a lecturer in computer science at the University of St. Andrews. His research has mainly been in combinatorial search in AI, in domains such as satisfiability and constraint satisfaction. He has done much empirical work, both with Toby Walsh and as part of the APES research group, www.apes.cs.strath.ac.uk.

Toby Walsh has a Ph.D and M.Sc from the Department of AI (Edinburgh), and an MA in theoretical physics and mathematics from St. John's College (Cambridge). He is currently an EPSRC Advanced Research Fellow at the Department of Computer Science (York). He has previously held postdoctoral posts at the Department of AI (Edinburgh), INRIA (Nancy), DIST (Genova), IRST (Trento), and the Department of Computer Science (Strathclyde).

Foundations of Electronic Markets (SP1)

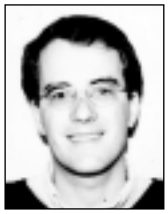
Tuomas Sandholm
Sunday, July 30, 2:00 – 6:00 PM

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

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

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

New Frontiers in Statistical Natural Language Processing (SA3)



Christopher Manning
Sunday, July 30, 9:00 AM – 1:00 PM

Statistical natural language processing revolves around numerical methods for understanding and generating human language. Such methods can automatically and robustly learn knowledge of language from large quantities of text. Much of this work was originally directed at traditional computational linguistic tasks, such as part of speech tagging, parsing, and sense disambiguation. But the vast amount of information available online is driving the development of robust large-scale techniques of broader interest, addressing more semantic tasks of learning, understanding, and reformulating information.

The tutorial will begin by presenting the most widely used and successful techniques in statistical natural language processing, emphasizing connections with techniques used elsewhere in artificial intelligence, information retrieval, and machine learning. The second part will sample important recent research, emphasizing topics in the acquisition and recognition of structure and knowledge in text, including learning from unlabeled data, lexical acquisition, parsing, word clustering and classification, and models that connect syntax to semantics.

The tutorial is aimed at practitioners and researchers who are interested in developing projects using statistical natural language processing techniques, or who work in the area but are interested in a broader view of new techniques and current work. A prior understanding of basic concepts in machine learning, probability, and natural language processing (of the sort typically gained from an AI course) will be highly beneficial for appreciating the tutorial.

Christopher Manning is an assistant professor of computer science and linguistics at Stanford University. Previously, he held faculty positions at Carnegie Mellon University and the University of Sydney. His research interests include statistical models of language, information extraction, and computational lexicography. He is coauthor of *Foundations of Statistical Natural Language Processing* (The MIT Press, 1999).

Practical Tools for Knowledge Representation and Nonmonotonic Reasoning (SA2)

Ilkka Niemela and Mirek Truszczynski
Sunday, July 30, 9:00 AM – 1:00 PM

A fundamental motivation behind the study of nonmonotonic logics has been an expectation that nonmonotonic reasoning will result in computationally feasible general purpose knowledge representation tools. The emergence in recent years of several automated reasoning systems based on nonmonotonic logics is a vindication of this view.

In this tutorial we review the state of the art of practical nonmonotonic reasoning tools and discuss their potential applications. In particular, we focus on a computational paradigm of answer set programming that is rooted in default logic and its special case, logic programming with negation. The crucial idea of answer set programming is to encode application problems so that their solutions be fully described by different answer sets (extensions, stable models, etc., depending on the nonmonotonic formalism used) of the corresponding program.

We will discuss theoretical foundations of answer set programming such as the stable model semantics and the well-founded semantics of logic programs, as well as algorithms to compute stable models. We will discuss implemented systems and their performance, and demonstrate their use. We will focus the tutorial on issues of modeling application problems as answer set programs and consider, in particular, planning, reasoning about action, product configuration, constraint satisfaction, satisfiability, standard AI puzzles and combinatorial optimization.

Prerequisites include a basic understanding of issues in knowledge representation

and some familiarity with declarative programming.

Ilkka Niemela is a senior fellow of the Academy of Finland and directs a logic research group at Helsinki University of Technology. He is an author of over seventy technical papers and his recent research has focused on implementation techniques and application methodology for nonmonotonic reasoning systems.

Mirek Truszczynski is a professor of computer science at the University of Kentucky. He is a coauthor of *Nonmonotonic Logics: Context-Dependent Reasoning* and over ninety publications in the areas of knowledge representation, nonmonotonic reasoning and logic programming. His recent work centered on issues of implementations and applicability of nonmonotonic reasoning systems.

Probabilistic Robotics (SA1)

Sebastian Thrun
Sunday, July 30, 9:00 AM – 1:00 PM
How can we build truly autonomous robots, capable of carrying out complex tasks in dynamic environments? Probabilistic robotics comprises a family of algorithms that are well grounded in statistical theory. By bringing Bayesian statistics into robotics, a range of problems find new and surprisingly obvious solutions, many of which have been shown to scale much better to hard robotics problems. The roots of probabilistic robotics can be traced back to the 1960s. In recent years, it has become a highly active research area within AI. Examples of fielded applications include two museum tour-guide robots, one of which led thousands of people through a Smithsonian museum in Washington, D.C. Current research focuses on efficient any-time approximations, multi-agent systems, the integration of high-level reasoning and low-level control, and practical algorithms that can cope with very large and highly dynamic environments.

This tutorial will survey the major algorithms along with their underlying mathematical theories. In-depth discussions of specific algorithms (such as particle filters, EM, POMDPs) concerned with mobile robot navigation will accompany the basic material. A particular emphasis will be placed on robotic systems deployed in the real world.

The instructor hopes to draw participants from all areas of AI. Prior knowledge of basic statistics or robotics is beneficial but not required.

Sebastian Thrun is an assistant professor at Carnegie Mellon University, with research interests in AI and robotics. Thrun has written one book, edited two others, and coauthored over a hundred refereed/invited scientific articles. He was the general chair of CONALD'98 and continues to serve on the editorial boards of several scientific journals. Thrun has frequently given invited talks at major conferences. He has received numerous awards, most recently an NSF Career and an AAAI outstanding paper award. Currently, he is writing a book on probabilistic robotics.

Recent Advances in AI Planning: A Unified View (MA2)

Subbarao Kambhampati
Monday, July 31, 9:00 AM – 1:00 PM
Although planning is one of the oldest research areas of AI, recent years have brought many dramatic advances in both its theory and practice. On the theory side, we now understand the deep connections between AI planning, constraint satisfaction, logic and operations research. On the practical side, we have effective ways of capturing and using domain-specific control knowledge, and have planners that are capable of synthesizing plans with hundred or more actions in minutes. These, in short, are exciting times for AI planning research.

This tutorial will provide a comprehensive overview of the field, placing both the traditional ideas and the recent advances in a unified perspective, and delineating their application potential. While our initial emphasis will be on planning algorithms for deterministic domains, we will also discuss the extensions of these algorithms to domains with metric and temporal constraints, partially observable states as well as stochastic dynamics.

The tutorial should be accessible to anyone with basic computer science and AI background. Preliminary material for the tutorial will be available on the internet at rakaposhi.eas.asu.edu/planning-tutorial.

Subbarao Kambhampati is a professor of computer science and engineering at Arizona State University, where he directs the YOCHAN research group (rakaposhi.eas.asu.edu/yochan.html). After formative education at Peddapuram, he received his B.A. in electrical engineering from Indian Institute of Technology, Madras, and M.S. and Ph.D degrees in computer science from University of Maryland, College Park. He has published over eighty technical articles on planning, learning, CSP and related areas of AI. He was a 1994 NSF Young Investigator and a 1996 AAAI invited speaker. He has taught courses and has published several tutorial articles on AI planning, and is cochairing the 2000 AI Planning and Scheduling conference.

Solving and Programming with Soft Constraints: Theory and Implementation (SP4)

Philippe Codognet and Francesca Rossi
Sunday, July 30, 2:00 – 6:00 PM
Constraints have been successfully used in many application areas for about two decades. However, in the last few years, the need for a more general and flexible formalism has progressively grown. In fact, classical constraints are not able to model naturally features like fuzziness, uncertainty, optimization, probability, and partial satisfaction, which indeed occur very often in real life.

For this reason, a lot of effort has been recently devoted to extending the classical notion of constraint, whose truth value is computed in a Boolean (true/false) algebra, to be able to model such features. Soft constraints are meant to satisfy this need, and this is done by associating to each constraint (or to each tuple of values for the variables in a constraint) an element from a set, to be interpreted as a cost, or a level of preference, or a probability, or other. Soft constraint systems have been already used with success in many application areas, like scheduling, timetabling, and software specification.

Our tutorial will describe the current state-of-the-art in the area of soft constraints, by reviewing the existing frameworks and pointing out the relations among them. Then, it will focus on one of the most general frameworks for soft constraints (based on semirings) and, for such a framework, it will present its properties and local propagation algorithms. Finally, it will describe and show the usefulness of a programming language, called clp(fd,S), where soft constraints can be naturally used and are efficiently implemented.

The target audience for this tutorial consists of those AI researchers who are interested in constraints and want to be updated on the latest developments, like soft constraints. Apart from some basic knowledge of logic programming, there are no prerequisites.

Philippe Codognet is currently full professor at the University of Paris 6, France, after nine years as a researcher at INRIA (French Research Center for Computer Science). He has been working in the domain of constraint programming for about ten years, in particular in the field of constraint logic programming, (constraint solving algorithms, implementation of constraint-based languages, and concurrent constraint languages). Several conference and journal papers describe his research.

Francesca Rossi is currently an associate professor at the University of Padova, Italy. She has always been working in the area of constraint solving and programming, but in the past she has also been interested in concurrent models of computations, logic programming and graph rewriting. In the last five years her interests have focussed mainly on solving and programming with soft constraints. In this area she has published several conference and journal papers.

Text Mining (SP3)

Ronen Feldman
Sunday, July 30, 2:00 – 6:00 PM
The information age has made it easy to store large amounts of data. The proliferation of documents available on the world wide web, on corporate intranets, on news wires, and elsewhere is overwhelming. However, while the amount of data available to us is constantly increasing, our ability to absorb and process this information remains constant. Search engines only exacerbate the problem by making more and more documents available in a matter of a few key strokes. Text mining is a new and exciting research area that tries to solve the information overload problem by using techniques from data mining, machine learning, natural language processing, information retrieval, and knowledge management. Text mining involves the preprocessing of document collections (text categorization, term extraction), the storage of the intermediate representations, the techniques to analyze these intermediate representations (distribution analysis, clustering, trend analysis, association rules, etc.) and visualization of the results. In this tutorial we will present the general theory of text mining and will demonstrate several systems that use these principles to enable interactive exploration of large textual collections. We will present a general architecture for text mining and will outline the algorithms and data structures behind the systems. Special emphasis will be given to efficient algorithms for very large document collections, tools for visualizing such document collections, the use of intelligent agents to perform text mining on the internet, and the use of information extraction to better capture the major themes of the documents. The tutorial will cover the state of the art in this rapidly growing area of research. Several real world applications of text mining will be presented.

The tutorial is suitable to the general audience. No special knowledge in needed as the tutorial is self-contained. It should be of interest to practitioners from Data Mining, natural language processing, information retrieval, knowledge management, and general AI audience interested in this research area.

Ronen Feldman is a senior lecturer at the Mathematics and Computer Science Department of Bar-Ilan University in Israel, and Director of the Data Mining Laboratory. He received his B.Sc. in mathematics, physics, and computer science from the Hebrew University, M.Sc. in computer science from Bar-Ilan University, and his Ph.D in computer science from Cornell University in NY. He is the founder and president of Instinct Software, a startup company specializing in development of text mining tools and applications.

Text Summarization (MA3)

Dragomir R. Radev
Monday, July 31, 9:00 AM – 1:00 PM
Text summarization is concerned with the extraction of the most salient information from a text document. We will present a tutorial on the existing and emerging techniques for producing automated summaries of text. Such techniques are based on research in linguistics, statistics, and artificial intelligence.

The tutorial is targeted to researchers and graduate students in natural language processing and information retrieval although most students, developers, business managers, and funders will certainly learn a great deal from it.

We will spend the first half of the tutorial introducing classic techniques for summarization. We will start off by giving a brief introduction to the linguistic and statistical techniques that are needed to build summarization systems. We will then show how manual summarization and abstracting have influenced research in automated summarization. Later, we will focus on traditional techniques such as sentence extraction methods and trainable summarization. We will also put summarization in the context of related research areas such as information extraction and text and passage classification.

The second half of the tutorial will describe the most promising research topics that are likely to lead to good Ph.D dissertations. We will describe the particular challenges posed by multidocument and multilingual summarization. We will present recent research on language models for summarization as well as techniques for producing various genres of summaries such as user-specific and query-based summaries. We will conclude the tutorial with an overview of existing off-the-shelf and commercial summarization systems.

A general background in information retrieval and/or natural language processing is desirable. Basic familiarity with computer science and artificial intelligence is required.

Dragomir R. Radev is an assistant professor in the School of Information at the University of Michigan. Prior to that, he

was a research staff member at the IBM T. J. Watson Research Center and an adjunct assistant professor at Columbia University. His research interests are in natural language processing and information retrieval. He was the cochair of a AAAI Spring Symposium and of an ANLP/NAACL workshop on text summarization.

User Modeling and Adaptive Interfaces (MP3)

Haym Hirsh and Pat Langley
Monday, July 31, 2:00 – 6:00 PM
This tutorial will explain the notion of adaptive user interfaces, consider the tasks for which they are appropriate, describe the design issues that arise in making them effective, and examine the basic approaches to inferring user models from interaction traces. We will illustrate these ideas with sample applications from a variety of sources, including systems that help users filter and sort electronic mail, present news stories, fill out repetitive forms, recommend books, and select routes. In closing, we will consider approaches to evaluating adaptive interfaces experimentally and examine some aspects that make them challenging.

The presentation will assume familiarity with basic concepts from human-computer interaction, artificial intelligence, and machine learning. However, it should not require expertise in any one of these areas.

Haym Hirsh is an associate professor of computer science at Rutgers University. He has published more than forty books and refereed journal and conference papers in machine learning, information access, and adaptive interfaces, and was a recipient of the Rutgers Computer Science Graduate Student Society Best Teacher award. He is cochair of IAAI–2000.

Pat Langley heads the Adaptive Systems Group at the DaimlerChrysler Research and Technology Center and directs the Institute for the Study of Learning and Expertise. He has published over a hundred papers and five books on machine learning and discovery, with recent research focusing on adaptive user interfaces, and he is the program chair for ICML-2000.

Vision-Based Interaction and Control (MA1)

Gregory Hager
Monday, July 31, 9:00 AM – 1:00 PM
The last decade has seen an explosion of results in the area of dynamic vision, vision-based interaction, and vision-based control. This is in part due to steady advances in computing technology, but equally as important have been several advances in our understanding of dynamic vision and its application.

This tutorial will acquaint participants with the fundamentals of dynamic vision and vision-based control, as well as discussing the practical aspects of implementing vision and control algorithms on commodity hardware. Basic ideas and algorithms will be illustrated in the context of several applications including: vision-based driving, vision-based navigation, robotic hand-eye coordination, and human-computer interaction. The tutorial will also include pointers to software packages that might facilitate the development of vision-based interaction or control systems. A basic understanding of computer vision and robotics is desirable, although not essential.

Gregory D. Hager is a professor of computer science at the Johns Hopkins University. His research interests include dynamic vision and control, human-computer interaction, and software systems. He is the author of more than a hundred professional articles and books, and is the developer of XVision, a widely used software package for real-time vision.

Pennybacher Bridge. *Courtesy, J. Griffis Smith, Austin Convention and Visitors Bureau.*

AAAI–2000 Workshop Program

Participation in the workshop program is by invitation only. Registration is included in the AAAI–2000 technical registration fee. All workshop participants must register for the AAAI–2000 technical program.

Preliminary Schedule

Agent-Oriented Information Systems (W1)
Yves Lespérance (lesperance@cs.yorku.ca), Gerd Wagner (gw@inf.fu-berlin.de) and Eric Yu (yu@fis.utoronto.ca)
Sunday, July 30

Artificial Intelligence and Enterprise Resource Planning / Customer Response Management Systems (W2)
Daniel O'Leary (oleary@rcf.usc.edu)
Monday, July 31

Artificial Intelligence and Music: Towards Formal Models for Composition, Performance, and Analysis (W3)
William Birmingham (wpb@eecs.umich. edu), Roger Dannenberg (roger.dannenberg@cs.cmu.edu) and Gerhard Widmer (gerhard@ai.univie.ac.at)
Monday, July 31

Artificial Intelligence for Web Search (W4)
Kurt Bollacker (kurt@was.archive.org)
Sunday, July 30 (may expand to Monday, July 31)

Constraints and AI Planning (W5)
Alexander Nareyek (alex@ai-center.com)
Sunday, July 30

Constraint Databases for AI (W6)
Marc Gyssens (gyssens@charlie.luc.ac.be) and Peter Revesz (revesz@cse.unl.edu)
Monday, July 31

Integration of AI and OR Techniques for Combinatorial Optimization (W7)
James M. Crawford (jc@i2.com) and J. Paul Walser (walser@i2.com)
Sunday, July 30

Intelligent Lessons Learned Systems (W8)
David Aha (aha@aic.nrl.navy.mil) and Rosina Weber (weber@aic.nrl.navy.mil)
Monday, July 31

SARA • 2000

The Symposium on Abstraction, Reformulation, and Approximation is collocated with AAAI–2000.

The symposium will be held 26–29 July at Horseshoe Bay Resort and Conference Center, Horseshoe Bay, Texas. For more information, visit their web site:sara2000.unl.edu

Knowledge-Based Electronic Markets (W9)
Tim Finin (finin@cs.umbc.edu) and Benjamin Grosof (grosof@us.ibm.com)
Monday, July 31 (may expand to Sunday, July 30)

Learning from Imbalanced Data Sets (W10)
Nathalie Japkowicz (nat@cs.dal.ca)
Monday, July 31

Learning Grounded Representations (W11)
Paul Cohen (cohen@cs.umass.edu) and Tim Oates (oates@cs.umass.edu)
Monday, July 31

Learning Statistical Models from Relational Data (W12)
Lise Getoor (getoor@cs.stanford.edu) and David Jensen (jensen@cs.umass.edu)
Monday, July 31

Leveraging Probability and Uncertainty in Computation (W13)
Carla Gomes (gomes@cs.cornell.edu) and Holger Hoos (hoos@cs.ubc.ca)
Monday, July 31

Mobile Robotic Competition and Exhibition Workshop (W14)
Alan Schultz (schultz@aic.nrl.navy.mil)
Thursday, August 3

Modeling Problems in Constraint Programming (W15)
Jean-Charles Regin (regin@ilog.fr) and Wim Nuijten (nuijten@ilog.fr)
Monday, July 31

New Research Problems for Machine Learning (W16)
Mirek Kubat (mkubat@cacs.usl.edu) and Tom Mitchell (tom.mitchell@cs.cmu.edu)
Sunday, July 30

Parallel and Distributed Search for Reasoning (W17)
Joerg Denzinger (denzinge@informatik.uni.kl.de)
Sunday, July 30

Representational Issues for Real-World Planning Systems (W18)
Yolanda Gil (gil@isi.edu) and Karen Myers (myers@ai.sri.com)
Monday, July 31

Spatial and Temporal Granularity (W19)
Claudio Bettini (bettini@dsi.unimi.it) and Angelo Montanari (montana@dimi.uniud.it)
Sunday, July 30

Spatial and Temporal Reasoning for Collaborating Mobile Agents (W20)
Frank Anger (fanger@nsf.gov) and Hans Guesgen (hans@cs.auckland.ac.nz)
Sunday, July 30

General Information

AAAI–2000 Hotels

AAAI has reserved a block of rooms in Austin properties at reduced conference rates. Conference attendees must contact the hotel directly and identify themselves as AAAI–2000 registrants to qualify for the reduced rates. Please note the cut-off date for reservations and the reservation method and information under each hotel. Hotel rooms are priced as singles (1 person, 1 bed), doubles (2 persons, 2 beds), triples (3 persons, 2 beds), or quads (4 persons, 2 beds). Rooms will be assigned on a first-come first-served basis. All rooms are subject to state, local, and occupancy taxes (13% at press time).

Hyatt Regency Austin On Town Lake

(Headquarters Hotel)
208 Barton Springs Road
Austin, TX 78704
Reservations: 800-233-1234
Fax: 512-480-2069
Single: $117.00
Double: $127.00
Triple: $167.00
Quad: $192.00
Check-in time: 3:00 PM
Check-out time: 12:00 noon
Distance to center: 5 blocks (approximately 1.5 miles)
Cut-off date for reservations: June 27, 2000

All reservation requests must be guaranteed with credit card or check payment. Credit for full payment of room is to be established prior to or at registration. Any change to a reservation after check-in, including early departure, is subject to a $25.00 early departure fee. Reservations must be cancelled by 4:00 PM on the day prior to arrival to avoid a cancellation penalty. Failure to check in as scheduled will result in a penalty of one night's room and tax and release of remaining dates on reservation.

Four Seasons Hotel on Town Lake

98 San Jacinto Boulevard
Austin, TX 78701
Reservations: 512-478-4500
Fax: 512-477-0704
Single: $145.00
Double: $165.00
Check-in time: 3:00 PM
Check-out time: 1:00 PM
Distance to center: 1 block
Cut-off date for reservations: June 30, 2000

All reservation requests must be accompanied by a deposit equal to one night's stay including tax, or guaranteed with a major credit card. Checks, money orders, and credit cards are acceptable forms of deposit funds. The hotel will not hold any reservations unless guaranteed by one of the above methods. All deposits for individual room reservations are fully refundable if a room is cancelled seventy-two (72) hours or more prior to the arrival date.

Radisson Hotel on Town Lake

111 East Cesar Chavez
Austin, TX 78701
Reservations: 1-800-333-3333
Fax: 512-478-3227
Single: $111.00
Double: $111.00
Check-in time: 3:00 PM
Check-out time: 12:00 noon
Distance to center: 2 blocks
Cut-off date for reservations: July 30, 2000

All reservation requests must be accompanied by a deposit equal to one night's stay including tax, or guaranteed with a major credit card. Checks, money orders, and credit cards are acceptable forms of deposit

Registration Fees

The AAAI–2000/IAAI–2000 program registration includes admission to all technical sessions, invited talks, the Exhibition Program, the Intelligent Systems Demos, the Robot Competition and Exhibition, the Student Abstract and Poster Session, the Tutorial Forum, the Workshop Program (by invitation only), the opening reception, the AI Festival, and a copy of the AAAI–2000/IAAI–2000 Conference *Proceedings*. Onsite registration will be located on the first level of the Austin Convention Center, 500 East Cesar Chavez (1st Street), Austin, Texas 78701.

Early Registration

(Postmarked by June 1)

AAAI Members		*Nonmembers*	
Regular $415	Students $120	Regular $500	Students $185

Late Registration

(Postmarked by June 30)

AAAI Members		*Nonmembers*	
Regular $470	Students $145	Regular $550	Students $210

Onsite Registration

(Postmarked after June 30 or onsite)

AAAI Members		*Nonmembers*	
Regular $520	Students $170	Regular $605	Students $235

Robot Building Lab (RBL-2000)

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

Payment Information

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

Refund Requests

The deadline for refund requests is July 8, 2000. All refund requests must be made in writing. A $75.00 processing fee will be assessed for all refunds.

Registration Hours

Registration hours will be Sunday and Monday, July 30–31, 7:30 AM–6:00 PM; Tuesday and Wednesday, August 1–2, 8:00 AM–6:00 PM; and Thursday, August 3, 8:30 AM–12:00 PM. All attendees must pick up their registration packets for admittance to programs.

AAAI–99 Robot Server. © 1999, AAAI.

Photograph courtesy, J. Griffis Smith, Austin Convention and Visitors Bureau.

funds. The hotel will not hold any reservations unless guaranteed by one of the above methods. All reservation cancellations must be received by 6:00 PM on the day of arrival to avoid room night charges.

Student Housing

AAAI–2000 has reserved a block of dormitory rooms at St. Edwards University. Accommodations are double and single rooms with community showers and restrooms on each floor. A large TV lounge is also on each floor. Laundry facilities are available on the ground floor of the halls. Bed linens, pillows and towels are included with the room. The rooms in the residence halls do not have phones in them. However, a message board is provided in the hall office. Breakfast is available each morning and is included in the cost of the room. St. Edwards University is located within one and a half miles of downtown Austin on South Congress Avenue. The Austin Capitol Metro bus line runs every 15 minutes from the Congress Avenue entrance to within two blocks of the Austin Convention Center.

Double room rate per person and night is $27.00, and single room rate per person and night is $45.00. All rooms are air-conditioned. Reservations must be made by July 1, 2000. A reservation form is included in this brochure. Housing registration will not be confirmed without payment. The University accepts personal checks drawn in U.S. dollars on U.S. banks, money orders, MasterCard, Visa and American Express. Written cancellation, fax or email notice must be received prior to July 1, 2000. One night's payment is nonrefundable if cancellation notice is received after July 1, 2000.

Reservations should be sent to:

St. Edwards University
Summer Conference Registration,
CM 1044
3001 South Congress Avenue
Austin, Texas 78704
Email: susana@admin.stedwards.edu
Fax: 512-462-7777

Phone reservations will not be accepted.

Air Transportation and Car Rental

Austin, Texas—Get there for less! Discounted fares have been negotiated for this event. Call Conventions in America at 800-929-4242 and ask for Group #428. You will receive 5%–10% off the lowest applicable fares on American Airlines and Continental Airlines, or the guaranteed lowest available fare on any carrier. Take an additional 5% off if you purchase at least 60 days prior to departure. Travel between July 25 and August 8, 2000. All attendees booking through CIA will receive free flight insurance of $100,000. Due to changes in the airline industry, CIA has instated a transaction fee of $10.00.

Alamo Rent A Car is also offering special rates as low as $34.00 per day or $149 per week with unlimited mileage. Call Conventions in America at 800-929-4242, ask for Group #428. Reservation hours: Monday–Friday 6:30 AM–5:00 PM Pacific Time. Outside US and Canada, call 619-232-4298/Fax 619-232-6497. E-mail address flycia@stellaraccess.com. If you call direct: American 800-433-1790, ask for index #12396; Continental 800-468-7022, ask for Ref #NBK6NX ZSMM; Alamo 800-732-3232, ID #409268 GR.

Ground Transportation

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

Taxi

Taxis are available at Austin Bergstrom International Airport. The approximate fare from the airport to downtown Austin and the Hyatt Regency is $15.00.

Bus

Greyhound Bus—For information on fares

and scheduling, call 1-800-231-2222. The Greyhound terminal is approximately 4 miles from downtown.

City Transit System

The local transit company is Capital Metro. The fare is $.50 cents one way. There is also a free service called the Dillo (provided by Capital Metro) in the downtown area. Capital Metro can be contacted at 512-474-1200.

Train

Amtrak—For information on fares and scheduling, call 1-800-872-7245. The Amtrak terminal is approximately one mile from the Convention Center.

Parking

The Hyatt Regency Austin provides a complimentary covered parking garage. The Austin Convention Center provides parking for $5.00 per day (with 3 in or out passes). There is also a lot at 4th and Red River Street for $5.00 per day (machine-operated).

Disclaimer

In offering American Airlines, Alamo Rent A Car, Continental Airlines, Conventions in America, Hyatt Regency Austin, and all other service providers (hereinafter referred to as "Supplier(s)" for the National Conference on Artificial Intelligence and the Innovative Applications Conference), AAAI acts only in the capacity of agent for the Suppliers which are the providers of the service. Because AAAI has no control over the personnel, equipment or operations or providers of accommodations or other services included as part of the AAAI–2000 / IAAI–2000 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.

Austin Visitor Information

The Austin Convention & Visitors Bureau welcomes you to Austin! They are located one block from the Convention Center and are open seven days a week. Information on Austin and other locations in Texas is available, and souvenirs are for sale. Internet access is also available for a small fee.

Official Visitor Center

201 E. 2nd Street
Austin, Texas 78701
Telephone: 512-474-5171 or 800-926-2282
Open daily: 8 AM–6 PM for tickets; 8 AM–7 PM for information
URL: www.austin360.com/acvb/

Austin Attractions

Austin offers excitement—from the local live music scene to the technological innovation sweeping the city. Austin is the perfect setting for AAAI–2000! The variety of attractions in Austin is sure to please people of all interests. Here is a small sample:

East Sixth Street—By day, visit "Old Pecan Street's" many landmarks along this National Register District, which houses a wide variety of restaurants and shops. By night, experience the festive atmosphere and bustling street life with live music and shows.

Congress Avenue Bats—Austin's Congress Avenue Bridge is the summer home to over 1.5 million Mexican free-tail bats. Their nightly exodus is among the most spectacular wildlife viewing opportunities in America. Bats are in residence from Mid-March to late October and typically emerge just before dusk.

Texas Governor's Mansion—This stately Greek Revival mansion has been home to every Texas governor since 1856. Tours weekdays 10:00 AM–12:00 PM; Individuals should call to check for daily status of tours. 1010 Colorado Street: 512-463-5516 (24-hour recording with updated information).

Lyndon B. Johnson Presidential Library and Museum—The LBJ Library and Museum is the most visited of the ten presidential libraries. The museum houses two major operations: the Library, with forty-five million historical documents used by scholars, and the Museum, which provides year round public viewing of historical exhibits from the Johnson administration. Hours are Monday–Sunday, 9 AM–5 PM. 2313 Red River. For information call 512-916-5136.

Texas State Capitol—After two years and $180 million in renovation costs, the Capitol is open to public tours. Hour-long free guided tours are offered every fifteen minutes (weekdays 8:30 AM–4:15 PM and weekends from 9:30 AM–4:15 PM) by the Capitol Information and Guide Service. After your tour, stroll through one of the most historic landscapes in the state—the gardens, statues and memorials dotting the twenty-six acre complex. 11th and Congress. For information, call 512-463-0063.

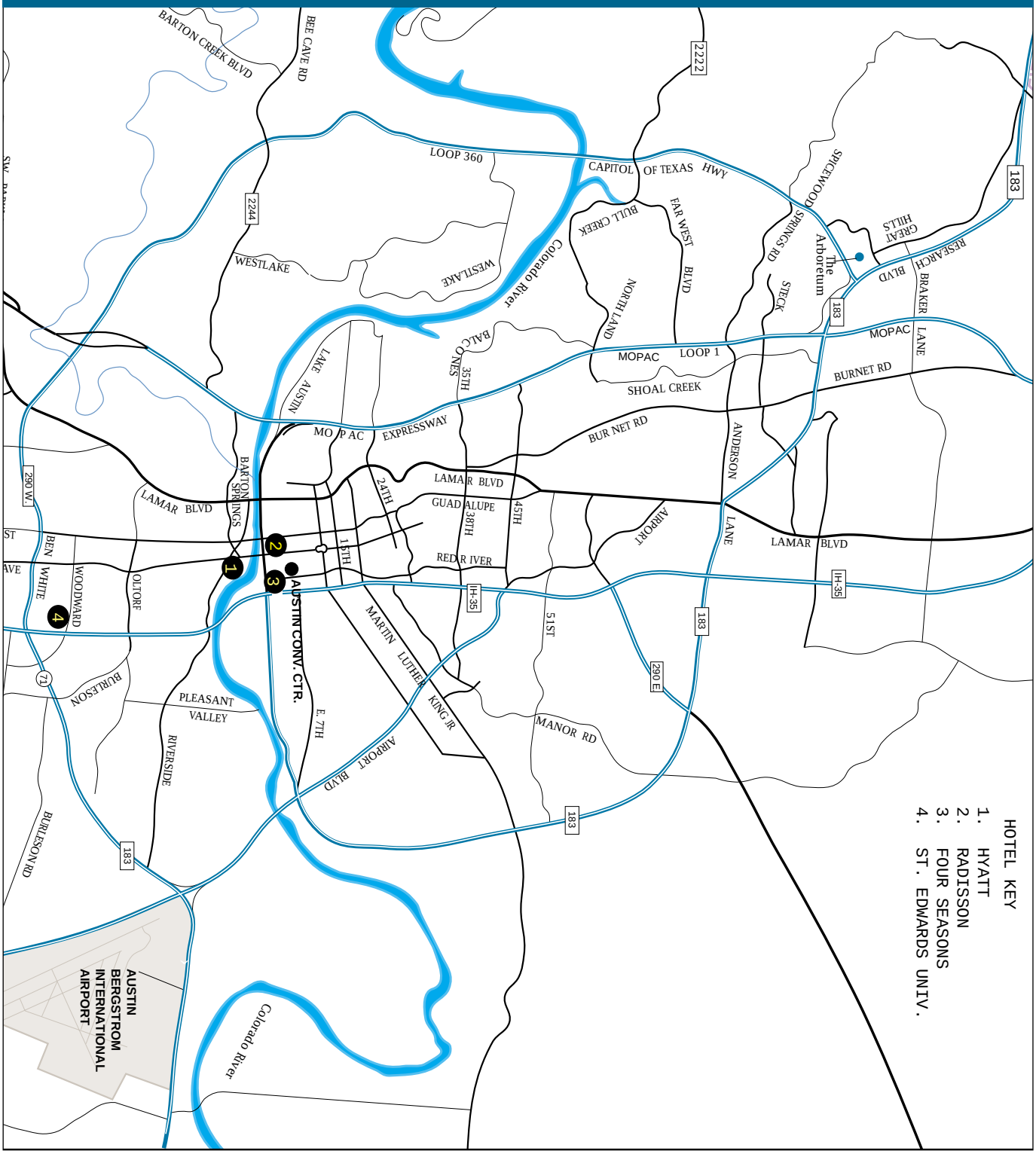
Lady Bird Johnson Wildflower Center—A forty-two acre native plant botanical garden, this spectacular facility features North America's largest rooftop rainwater collection system. Highlights include a visitors gallery, observation tower, cafe, gift store, nature trails, terraces, arbors, and display gardens. 4801 La Crosse Avenue. For information and hours call, 512-292-4200.

Texas State Capitol. *Photographs courtesy, J. Griffis Smith, Austin Convention and Visitors Bureau.*

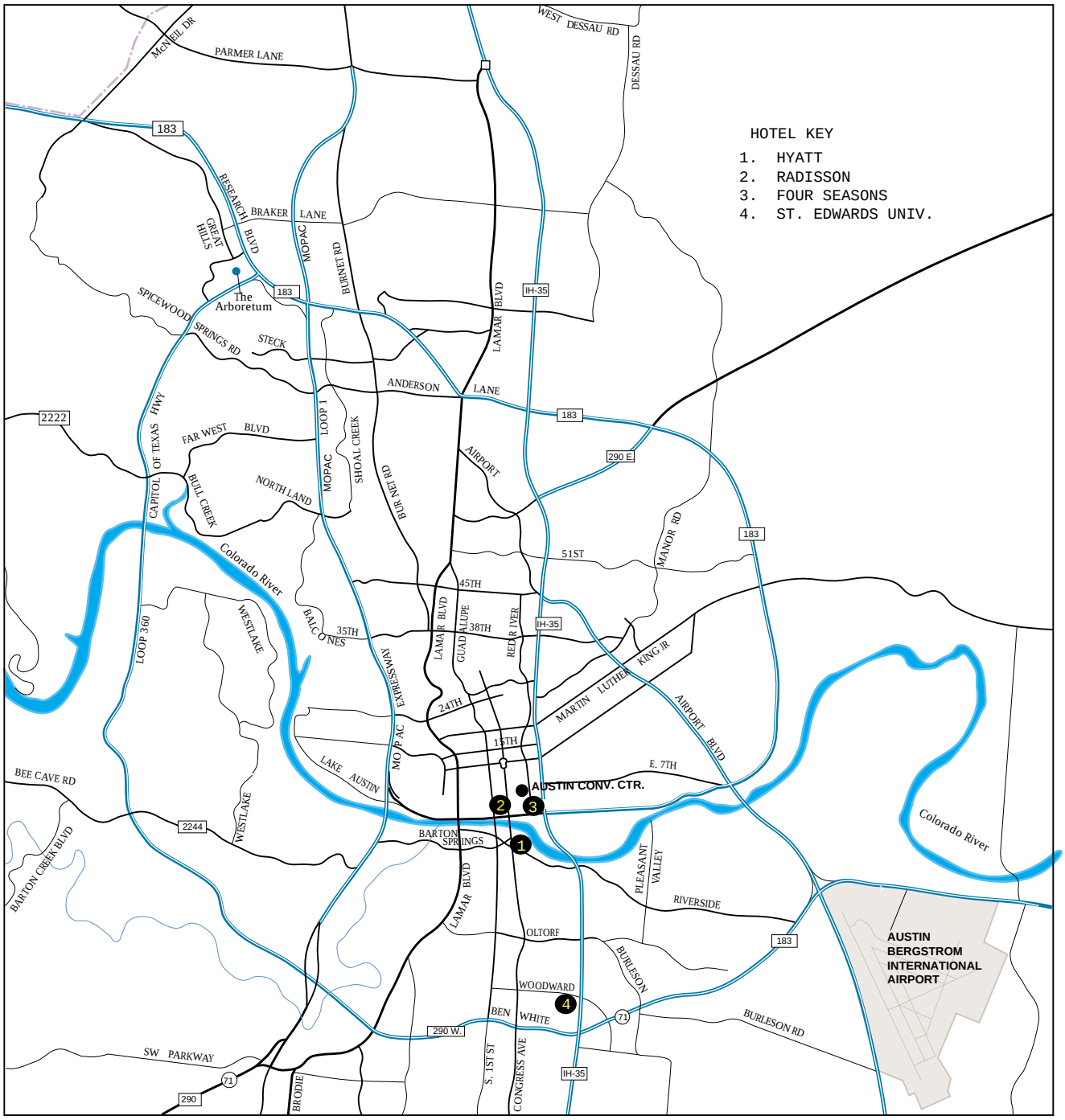
Conference at a Glance

MORNING	AFTERNOON	EVENING
Sunday, July 30		
Registration Tutorial Forum Workshops AAAI/SIGART Doctoral Consortium Robot Building Laboratory	Registration Tutorial Forum Workshops AAAI/SIGART Doctoral Consortium Robot Building Laboratory	Mentoring Tutorial
Monday, July 31		
Registration Tutorial Forum Workshops AAAI/SIGART Doctoral Consortium Robot Building Laboratory	Registration Tutorial Forum Workshops AAAI/SIGART Doctoral Consortium Robot Building Laboratory	Opening Reception
Tuesday, August 1		
Registration AAAI–2000 Technical Program IAAI–2000 Technical Program Presidential Address and Invited Talks Exhibition / IS Demos / Botball Robot Competition and Exhibition	Registration AAAI–2000 Technical Program IAAI–2000 Technical Program Invited Presentations Exhibition / IS Demos / Botball Robot Competition and Exhibition	Technical Poster Session
Wednesday, August 2		
Registration AAAI–2000 Technical Program IAAI–2000 Technical Program Invited Presentations Exhibition / IS Demos / Botball Robot Competition and Exhibition	Registration AAAI–2000 Technical Program IAAI–2000 Technical Program Invited Presentations Exhibition / IS Demos / Botball Robot Competition and Exhibition	AI Festival Student Poster Session
Thursday, August 3		
Registration AAAI–2000 Technical Program Invited Presentations Robot Workshop		

Downtown Austin Map



Austin Area Map



AAAI–2000 / IAAI–2000 Technical Sessions Preregistration Form

Name _____ Company/Univ. _____

☐ Home ☐ Work

Address _____ Dept./MS _____

City _____ State _____ Zip _____

Country _____ Daytime Telephone & Fax _____

Membership No. _____ E-mail Address _____

Circle fees that apply. Students must submit registration receipt or letter from faculty advisor	AAAI Member	AAAI Student Member	Nonmember	Nonmember Student	TOTAL
Early Registration *(Postmarked by June 1)*	$415	$120	$500	$185	_____
Late Registration *(Postmarked by June 30)*	$470	$145	$550	$210	_____
Onsite Registration *(Postmarked after June 30 or onsite)*	$520	$170	$605	$235	_____
Tutorial Forum *Included in Technical Registration Fee above.) Circle all courses you plan to attend. Limit 4 consecutive tutorials*	7/30 AM 7/30 PM 7/31 AM 7/31 PM	SA1 SA2 SA3 SP1 SP2 SP3 MA1 MA2 MA3 MP1 MP2 MP3		SP4	
Robot Building Lab (RBL)	Regular $150.00	Students $75.00			_____
Opening Reception *Included in technical registration*	Spouse or guest @ $15.00 per person; child @ $5.00 Total number of extra persons: _____				_____
AI Festival *Included in technical registration*	Spouse or guest @ $20.00 per person; child @ $5.00 Total number of extra persons: _____				_____
AAAI Membership / Journals *(totals continued from reverse)*					_____
Workshops *(Included in technical registration.) (By invitation only.)*	Workshop Number: _____ Do not register for workshops unless you have been invited to participate by the workshop organizer.				

Method of Payment

Check One: ☐ MasterCard ☐ Visa ☐ American Express ☐ Check payable to AAAI–2000 and drawn on a US Bank

Credit Card Number: _____

Expiration Date: _____

Name on Card _____

Total Enclosed $ _____

Signature Authorization _____

All refund requests must be made in writing by July 8, 2000. A $75.00 processing fee will be assessed for all refunds granted. Registrations postmarked after June 30 are subject to onsite rates.

Onsite registration will be on the first level of the Austin Convention Center, 500 East Cesar Chavez (1st Street), Austin, Texas 78701. Send with payment to AAAI–2000/IAAI–2000, 445 Burgess Drive, Menlo Park, CA 94025-3442, 650-328-3123, Fax 650-321-4457.

AAAI Membership Application / Renewal Form

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

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

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

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

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

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

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

Application Type

☐ New Application

☐ Change of Address

☐ Renewal

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

☐ Do not include me in the online *Membership Directory*

☐ Do not release my name to outside groups

I am interested in the following subgroup

☐ AI in Medicine ☐ AI and the Law

☐ AI in Manufacturing ☐ AI in Business

Journals *(Offer limited to individuals only).*

☐ Send me the 2000 *AI Journal*.
I enclose an additional $120.00.

☐ Send me the 2000 *AI in Medicine*.
I enclose an additional $77.00.

☐ Send me the 2000 *Autonomous Agents and Multiagent Systems*. I enclose an additional $50.00.

☐ Send me the 2000 *Data Mining and Knowledge Discovery*.
I enclose an additional $50.00.

☐ Send me the 2000 *Machine Learning*.
I enclose an additional $175.00.

Membership Categories

Please circle desired term and amount

Individual US / Canadian Member

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

Individual Foreign Member

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

Institution / Library—US / Canadian

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

Institution / Library—Foreign

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

Full-Time US/Canadian Student

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

Full-Time Foreign Student

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

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

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

Amount

_____

(Enter here and on reverse)

Student Housing Registration Form

St. Edwards University ■ Austin, Texas
Seventeenth National Conference on Artificial Intelligence (AAAI–2000)
July 30 – August 3, 2000

Please complete and return no later than July 1, 2000.

Please Print

Name: _____

Sex: ☐ M ☐ F

Mailing Address: _____

City: _____ **State:** _____

Zip: _____ **Country:** _____

Telephone: _____ **Email Address:** _____

Arrival Date: _____ **Arrival Time:** _____ ☐ AM ☐ PM

Departure Date: _____ **Departure Time:** _____ ☐ AM ☐ PM

Housing Preferred

Breakfast is included in the cost of the room.

_____ Nights in single room at $45.00/per person per night $ _____

_____ Nights in double room at $27.00/per person per night $ _____

Name of person sharing room: _____

☐ Please assign a roommate for me (If the University is unable to assign a roommate, you will be billed for a single room.)

TOTAL HOUSING DUE $ _____

Please complete payment information. Housing registration will not be confirmed without payment.

Check/Money Order for the amount of $ _____ enclosed.

Credit Card Authorization

Check One: ☐ MasterCard ☐ Visa ☐ American Express

Credit Card Number: _____

Expiration Date: _____ Amount $ _____

Name on Card _____

Signature Authorization _____

Written cancellation, fax or email notice must be received prior to July 1, 2000. One night's payment is nonrefundable if cancellation notice is received after July 1, 2000. Please notify St. Edwards University if you have any disabilities or dietary requirements that will make your stay on campus more comfortable.

Please return completed housing registration form to:

St. Edwards University ■ Summer Conference Registration, CM 1044
3001 S. Congress Avenue, Austin, Texas 78704
Fax: 512-462-7777 ■ E-mail: susana@admin.stedwards.edu

PLEASE RETURN THIS FORM BY JULY 1, 2000