Fifth International Conference on Principles of Knowledge Representation and Reasoning (KR’96)

Registration Brochure

Royal Sonesta Hotel
Cambridge, Massachusetts
November 4-8, 1996

Sponsored by
Principles of Knowledge Representation and Reasoning, Inc.

For information, see
http://www.kr.org.kr
Explicit representations of knowledge manipulated by inference algorithms provide an important foundation for much work in artificial intelligence, from planning complex actions and robotics systems, to natural language dialogue systems and expert systems.

The KR conferences have established themselves as the leading forum for timely, in-depth presentation of progress in the theory and principles underlying the representation and computational manipulation of knowledge.

Expanding on that role, KR’96 will be a place for the exchange of news, issues, and results among the entire community of researchers in the principles and practices of knowledge representation and reasoning (KR&R) systems.
From Here to Human-Level AI

John McCarthy
Stanford University, USA

It is not surprising that reaching human-level AI has proved to be difficult and progress has been slow—though there has been definite progress. The slowness and the demand to exploit what has been discovered has led many to mistakenly redefine AI, sometimes in ways that preclude human-level AI—by relegating to humans parts of the task that human level computer programs should do. Taking such redefinitions seriously impedes progress, especially by students.

This talk tries to characterize the tasks that lie between us and human-level AI, emphasizing logical AI and especially emphasizing representation problems of information and of reasoning. Ideas for overcoming these problems, including nonmonotonic reasoning, approximate reasoning and on the intertranslation between various formalisms were considered, and directions for future research will be given.

Complexity and Expressive Power of KR Formalisms

Georg Gottlob
Technische Universität Wien, Austria

The complexity of a large number of knowledge representation formalisms was studied during the last five years. Among others, the following logics or techniques were analyzed: default logic, autoepistemic logic, nonmonotonic modal logics, circumscription, logic programming (including disjunctive LP), abduction, planning, theory revision, and counterfactual reasoning. Complexity results for both the propositional case and the function-free first order case were derived and recursion-theoretic characterizations for the general case were obtained. In addition, relevant results on approximate reasoning and on the intertranslating between various formalisms were shown.

In this talk, a brief overview of these results will be given, and a few key results will be explained in detail. It will be argued that the complexity-analysis, in addition to expressing a quantitative measure of the worst-case behavior, leads to a deeply qualitative understanding of the algorithmic nature of KR reasoning problems. Moreover, by applying methods of descriptive complexity theory (a subfield of finite model theory), we are able to determine the precise expressive power of several KR logics. Latest results will be discussed, and directions for future research will be given.

Invited Talks & Opening Reception

From Here to Human-Level AI

John McCarthy
Stanford University, USA

It is not surprising that reaching human-level AI has proved to be difficult and progress has been slow—though there has been definite progress. The slowness and the demand to exploit what has been discovered has led many to mistakenly redefine AI, sometimes in ways that preclude human-level AI—by relegating to humans parts of the task that human level computer programs should do. Taking such redefinitions seriously impedes progress, especially by students.

This talk tries to characterize the tasks that lie between us and human-level AI, emphasizing logical AI and especially emphasizing representation problems of information and of reasoning. Ideas for overcoming these problems, including nonmonotonic reasoning, approximate concepts, formalized contexts and introspection, will be discussed, and directions for future research will be given.

Complexity and Expressive Power of KR Formalisms

Georg Gottlob
Technische Universität Wien, Austria

The complexity of a large number of knowledge representation formalisms was studied during the last five years. Among others, the following logics or techniques were analyzed: default logic, autoepistemic logic, nonmonotonic modal logics, circumscription, logic programming (including disjunctive LP), abduction, planning, theory revision, and counterfactual reasoning. Complexity results for both the propositional case and the function-free first order case were derived and recursion-theoretic characterizations for the general case were obtained. In addition, relevant results on approximate reasoning and on the intertranslating between various formalisms were shown.

In this talk, a brief overview of these results will be given, and a few key results will be explained in detail. It will be argued that the complexity-analysis, in addition to expressing a quantitative measure of the worst-case behavior, leads to a deeply qualitative understanding of the algorithmic nature of KR reasoning problems. Moreover, by applying methods of descriptive complexity theory (a subfield of finite model theory), we are able to determine the precise expressive power of several KR logics. Latest results will be discussed, and directions for future research will be given.

Invited Talks & Opening Reception

From Here to Human-Level AI

John McCarthy
Stanford University, USA

It is not surprising that reaching human-level AI has proved to be difficult and progress has been slow—though there has been definite progress. The slowness and the demand to exploit what has been discovered has led many to mistakenly redefine AI, sometimes in ways that preclude human-level AI—by relegating to humans parts of the task that human level computer programs should do. Taking such redefinitions seriously impedes progress, especially by students.

This talk tries to characterize the tasks that lie between us and human-level AI, emphasizing logical AI and especially emphasizing representation problems of information and of reasoning. Ideas for overcoming these problems, including nonmonotonic reasoning, approximate concepts, formalized contexts and introspection, will be proposed.

Complexity and Expressive Power of KR Formalisms

Georg Gottlob
Technische Universität Wien, Austria

The complexity of a large number of knowledge representation formalisms was studied during the last five years. Among others, the following logics or techniques were analyzed: default logic, autoepistemic logic, nonmonotonic modal logics, circumscription, logic programming (including disjunctive LP), abduction, planning, theory revision, and counterfactual reasoning. Complexity results for both the propositional case and the function-free first order case were derived and recursion-theoretic characterizations for the general case were obtained. In addition, relevant results on approximate reasoning and on the intertranslating between various formalisms were shown.

In this talk, a brief overview of these results will be given, and a few key results will be explained in detail. It will be argued that the complexity-analysis, in addition to expressing a quantitative measure of the worst-case behavior, leads to a deeply qualitative understanding of the algorithmic nature of KR reasoning problems. Moreover, by applying methods of descriptive complexity theory (a subfield of finite model theory), we are able to determine the precise expressive power of several KR logics. Latest results will be discussed, and directions for future research will be given.
**Grand Ballroom A**

9:00 – 10:10  **Plenary Session: Invited Talk**  
   From Here to Human-Level AI  
   John McCarthy

10:10 – 10:30  **Coffee Break**

10:30 – 12:15  **Session 1: Planning**
   Strategic Advice for Hierarchical Planners  
   Karen L. Myers
   Representation Changes in Combinatorial Problems: Pigeonhole Principle Versus Integer Programming Relaxation  
   Yury V. Smirnov and Manuela M. Veloso
   On the Role of Disjunctive Representations and Constraint Propagation in Refinement Planning  
   Subbarao Kambhampati and Xiuping Yang

12:15 – 1:45  **Lunch Break**

1:45 – 3:30  **Session 3: Situation Calculus**
   Natural Actions, Concurrency and Continuous Time in the Situation Calculus  
   Ray Reiter
   Only Knowing in the Situation Calculus  
   Gerhard Lakemeyer
   Modeling Complex Systems in the Situation Calculus: A Case Study Using the Dagstuhl Steam Boiler Problem  
   T. G. Kelley

3:30 – 4:00  **Coffee Break**

4:00 – 5:45  **Panel on Ontologies**  
   Richard P. Fikes, Chair

**Grand Ballroom B**

9:00 – 10:10  **Plenary Session: Invited Talk**  
   From Here to Human-Level AI  
   John McCarthy

10:10 – 10:30  **Coffee Break**

10:30 – 12:15  **Session 2: Belief Revision**
   A Practical Approach to Belief Revision: Reason-based Change  
   M. A. Williams
   Belief Revision: A Critique  
   Nir Friedman and Joseph Y. Halpern
   Modeling Belief Change Using Counterfactuals  
   Tom Costello

12:15 – 1:45  **Lunch Break**

1:45 – 3:30  **Session 4: Description Logics: Expressivity & Complexity**
   TBox and ABox Reasoning in Expressive Description Logics  
   Giuseppe De Giacomo and Maurizio Lenzerini
   Number Restrictions on Complex Roles in Description Logics: A Preliminary Report  
   Franz Baader and Ulrike Sattler
   Asking Queries about Frames  
   Alexander Borgida and Deborah L. McGuinness

3:30 – 4:00  **Coffee Break**

4:00 – 5:45  **Reports on Related Conferences, Workshops, and Symposia**  
   Ronald P. Loui, Chair
Grand Ballroom B

9:00 – 10:10 Session 6: Description Logics: Reasoning Techniques
Finite Model Reasoning in Description Logics
Diego Calvanese
A SAT-based Decision Procedure for ALC
Fausto Giunchiglia and Roberto Sebastiani

10:10 – 10:30 Coffee Break

10:30 – 12:15 Session 8: Nonmonotonic Reasoning
Value Minimization in Circumscription
Chitta Baral, Alfredo Gabaldon, and Alessandro Provetti

Biconsequence Relations for Nonmonotonic Reasoning
Alexander Bochman

Is There a Logic of Provability for Nonmonotonic Reasoning?
Gianni Amati and Fiora Pirri

12:15 – 1:45 Lunch Break

1:45 – 3:30 Session 10: Ramification
Determining Ramifications in the Situation Calculus
Enrico Giunchiglia

Embracing Occlusion in Specifying the Indirect Effects of Actions
Joakim Gustafsson and Patrick Doherty

Assessments of Ramification Methods that Use Static Domain Constraints
Erik Sandewall

6:00 – 10:00 KR’96 Conference Banquet
New England Aquarium
Grand Ballroom A

9:00 – 10:10  Session 11: Deductive Systems
Implementing Modal and Relevance Logics in a Logical Framework
David Basin, Sean Matthews, and Luca Viganò

“Statistical” First Order Conditionals
Ronen I. Brafman

10:10 – 10:30  Coffee Break

10:30 – 12:15  Session 13: Spatial Representation & Reasoning
Semantical Foundations of Spatial Logics
Oliver Lemon and Ian Pratt

A Pointless Theory of Space Based on Strong Connection and Congruence
Stefano Borgo, Nicola Guarino, andClaudio Masolo

Representing Spatial Vagueness: A Mereological Approach
Anthony G. Cohn and Nicholas Mark Gotts

12:15 – 1:45  Lunch Break

1:45 – 3:30  Session 15: Decision Theory
Using Notions of Utility Independence in Qualitative Decision Theory
Fabien Bacchus and Adam J. Grove

On Stable Social Laws and Qualitative Equilibrium for Risk-Averse Agents
Moshe Tenenboim

Multiple Perspective Reasoning
Tze-Yun Leong

3:30 – 4:00  Coffee Break

4:00 – 5:45  Plenary Session: Panel
Implementations and Research: Discussions at the Boundary
Robert MacGregor, Chair

Grand Ballroom B

9:00 – 10:10  Session 12: Inheritance
Inheriting Well-formed Formulae in a Formula-Augmented Semantic Network
Leora Morgenstern

Partial Orders of Sorts and Inheritances (or Placing Inheritance in Context)
Nirad Sharma

10:10 – 10:30  Coffee Break

10:30 – 12:15  Session 14: Preference Logic
Preferential Multi-agent Nonmonotonic Logics
Ana Maria Monteiro and Jacques Wainer

A Representation Theorem for Preferential Logics
Pierre Siegel and Lionel Forget

Representation Independence of Nonmonotonic Inference Relations
Manfred Jaeger

12:15 – 1:45  Lunch Break

1:45 – 3:30  Session 16: Nonmonotonic Logics & Logic Programming
An Argumentation-theoretic Approach to Reasoning with Specificity
Phan Minh Dung and Tran Cao Son

Default Reasoning System DeReS
Paweł Cholewinski, Victor W. Marek, and Mirosław Truszczyński

Super Logic Programs
Stefan Brass, Jurgen Dix, and Teodor C. Przymusinski

3:30 – 4:00  Coffee Break

4:00 – 5:45  Plenary Session: Panel
Implementations and Research: Discussions at the Boundary
Robert MacGregor, Chair
Grand Ballroom A

9:00 – 10:10  Plenary Session: Invited Talk
Complexity and Expressive Power of KR Formalisms
Georg Gottlob

10:10 – 10:30  Coffee Break

10:30 – 12:15  Session 17: Robotics
Representing Sensing Actions: The Middle Ground Revisited
Keith Golden and Daniel Weld

A New Algorithm for Generative Planning
Matthew L. Ginsberg

Moving a Robot: The KR&R Approach at Work
Giuseppe De Giacomo, Luca Iocchi, Daniele Nardi, and Riccardo Rosati

12:15 – 1:45  Lunch Break

1:45 – 3:30  Session 19: Actions & Events
The PMA Revisited
Andreas Herzig

Causality and the Qualification Problem
Michael Thielscher

Reasoning about Discontinuities in the Event Calculus
Rob Miller and Murray Shanahan

Grand Ballroom B

9:00 – 10:10  Plenary Session: Invited Talk
Complexity and Expressive Power of KR Formalisms
Georg Gottlob

10:10 – 10:30  Coffee Break

10:30 – 12:15  Session 18: Complexity Measures
Tractable Subclasses of the Point-Interval Algebra: A Complete Classification
Peter Jonsson, Thomas Drakensgren, and Christer Bäckstrom

Comparing Space Efficiency of Propositional Knowledge Representation Formalisms
Marco Cadoli, Francesco M. Donini, Paolo Liberatore, and Marco Schaerf

Encoding Plans in Propositional Logic
Henry Kautz, David McAllester, and Bart Selman

12:15 – 1:45  Lunch Break

1:45 – 2:55  Session 20: Recognition & Diagnosis
Scaling up Goal Recognition
Neal Lesh and Oren Etzioni

Computing Approximate Diagnoses by Using Approximate Entailment
Annette ten Teije and Frank van Harmelen
Registration & General Information

Preregistration is recommended. The registration fee includes the cost of the conference proceedings and the opening reception on November 4, 1996.

Fee Schedule
(all fees are in US dollars):

Early (Postmarked by September 30, 1996)
- Regular $400
- Student $200
- Banquet $ 60

Late (Postmarked after September 30, 1996)
- Regular $450
- Student $240
- Banquet $ 60

Banquet
The KR’96 Banquet will be held from 6:00–10:00 on Wednesday evening, November 6 at the New England Aquarium. This event is optional and reservations should be made at the time of registration, accompanied by the additional fee. The aquarium is located on the historic Boston waterfront near Faneuil Hall's famous marketplace. Transportation from the Royal Sonesta to the aquarium is included in the fee. A cocktail reception will be followed by dinner. Attendees will then have an opportunity to view the exhibits in the Main Exhibition Hall of the aquarium, which will be closed to the public. A jazz quartet will provide the evening’s entertainment.

Payment
Please fill out the registration form and mail it with your fee to:
KR–96, c/o AAAI
445 Burgess Drive
Menlo Park, CA 94025
Checks (drawn on US bank) or international money orders should be made out to AAAI. VISA, MasterCard and American Express are also accepted. Please note: All refund requests must be in writing and postmarked by October 15, 1996. No refunds will be granted after this date. Please pick up your complete registration packet in the foyer of The Grand Ballroom at the Royal Sonesta.

Registration Hours
Monday, Nov. 4:
6:30 – 8:00 PM
Tuesday & Thursday, Nov. 5 & 7:
8:00 AM – 6:00 PM
Wednesday & Friday, Nov. 6 & 8:
8:00 AM – 3:00 PM

Accommodations
For your convenience, KR’96 has reserved a block of rooms at the Royal Sonesta Hotel. The rate is $129.00 per night for a single or double room. KR’96 attendees must contact the Royal Sonesta Hotel directly. Please identify yourself as an KR’96 registrant to qualify for the reduced rate.

Royal Sonesta Hotel
5 Cambridge Parkway
Cambridge, MA 02142-1299
Phone: (617) 491-3600
Fax: (617) 661-5956

Air Transportation & Car Rental
Get there for less on United Airlines, the official carrier for KR’96. Save 5% on lowest applicable fares, some restrictions apply. Save 10% on lowest unrestricted coach class fares with 7 day advance purchase. Travel between November 2–14, 1996. Alamo Rent A Car is also offering special rates starting as low as $26/day or $115/week, with unlimited free mileage and bonus frequent flyer miles on United.

For lowest available fares on any airline, call Conventions in America, our official travel agency, at 1–800–929-4242 and ask for Group #428. You will also receive free flight insurance of $100,000 and become eligible to win free travel worldwide in their bimonthly drawings. Outside the US and Canada, call 619–678-3600 / fax 619–678-3699 / Internet FYLCIA@balboa.com. If you call United direct at 1–800–521-4041, ask for Tour Code #556NT. Alamo Rent A Car is also offering special rates starting as low as $26/day or $115/week, with unlimited free mileage and bonus frequent flyer miles on United.

Save 5% on lowest applicable fares, some restrictions apply. Save 10% on lowest unrestricted coach class fares with 7 day advance purchase. Travel between November 2–14, 1996. Alamo Rent A Car is also offering special rates starting as low as $26/day or $115/week, with unlimited free mileage and bonus frequent flyer miles on United.

Ground Transportation
This information is the best available at time of printing. Fares and routes change frequently. Please check by telephoning the appropriate numbers below for the most up-to-date information.

Arrival by Air
Logan International Airport is approximately five miles from the Royal Sonesta. Taxi fare to the hotel is approximately $15.00, regardless of the number of passengers. Public transportation to Cambridge is available; although an inexpensive alternative, it is quite cumbersome with luggage and not recommended.

Arrival by Train
You will arrive in Boston at South Station. Taxi service and public transportation are available.

Arrival by Car
The Royal Sonesta is located at 5 Cambridge Parkway in Cambridge, three miles from Logan International Airport. Follow signs to Sumner Tunnel/Boston (Route 1A South) to Route 93 North; stay in center lane and follow signs for Cambridge/Somerville; bear right and follow Somerville/O’Brien Highway signs; and take left (Edwin Land Boulevard) at traffic lights after the Museum of Science. The hotel will be on your left, directly across from the Cambridge-Side Galleria.

From the Massachusetts Turnpike (I–90) Eastbound: Take exit 18 following signs to Allston/Cambridge; stay in right lane following signs to Cambridge/Somerville; cross over River Street Bridge (Cambridge Street) and take a right at traffic light onto Memorial Drive (Route #3); and follow Memorial Drive East (Route #3 South) until you reach signs for Government Center/Kendall Square being sure to stay in extreme right lane along river since Memorial Drive then turns into Edwin Land Boulevard. The hotel will be on your right directly across from the Cambridge Side Galleria.

For lowest available fares on any airline, call Conventions in America, our official travel agency, at 1–800–929-4242 and ask for Group #428. You will also receive free flight insurance of $100,000 and become eligible to win free travel worldwide in their bi-monthly drawings. Outside the US and Canada, call 619–678-3600 / fax 619–678-3699 / Internet FYLCIA@balboa.com. If you call United direct at 1–800–521-4041, ask for Tour Code #556NT. Alamo Rent A Car is also offering special rates starting as low as $26/day or $115/week, with unlimited free mileage and bonus frequent flyer miles on United.

Save 5% on lowest applicable fares, some restrictions apply. Save 10% on lowest unrestricted coach class fares with 7 day advance purchase. Travel between November 2–14, 1996. Alamo Rent A Car is also offering special rates starting as low as $26/day or $115/week, with unlimited free mileage and bonus frequent flyer miles on United.

Ground Transportation
This information is the best available at time of printing. Fares and routes change frequently. Please check by telephoning the appropriate numbers below for the most up-to-date information.

Arrival by Air
Logan International Airport is approximately five miles from the Royal Sonesta. Taxi fare to the hotel is approximately $15.00, regardless of the number of passengers. Public transportation to Cambridge is available; although an inexpensive alternative, it is quite cumbersome with luggage and not recommended.

Arrival by Train
You will arrive in Boston at South Station. Taxi service and public transportation are available.

Arrival by Car
The Royal Sonesta is located at 5 Cambridge Parkway in Cambridge, three miles from Logan International Airport. Follow signs to Sumner Tunnel/Boston (Route 1A South) to Route 93 North; stay in center lane and follow signs for Cambridge/Somerville; bear right and follow Somerville/O’Brien Highway signs; and take left (Edwin Land Boulevard) at traffic lights after the Museum of Science. The hotel will be on your left, directly across from the Cambridge-Side Galleria.

From the Massachusetts Turnpike (I–90) Eastbound: Take exit 18 following signs to Allston/Cambridge; stay in right lane following signs to Cambridge/Somerville; cross over River Street Bridge (Cambridge Street) and take a right at traffic light onto Memorial Drive (Route #3); and follow Memorial Drive East (Route #3 South) until you reach signs for Government Center/Kendall Square being sure to stay in extreme right lane along river since Memorial Drive then turns into Edwin Land Boulevard. The hotel will be on your right directly across from the Cambridge Side Galleria.
Registration Form–KR ‘96

Please print or type. (This form is also available at http://www.kr.org/kr96.html)

First name __________________ Last name ____________________

Affiliation _________________________________________________________

Address ____________________________________________________________

City __________________________ State ____________________________

Zip or postal code __________________ Country ________________________

Daytime telephone ____________________ Net address __________________

Fee
(Please check appropriate amounts)

☐ Early (Postmarked by September 30, 1996)
☐ Regular: $400 ☐ Student: $200 ☐ Banquet: $ 60
(Students must send legible proof of full-time student status.)

☐ Late (Postmarked after September 30, 1996)
☐ Regular: $450 ☐ Student: $240 ☐ Banquet: $ 60
(Students must send legible proof of full-time student status.)

TOTAL FEE (Please enter correct amount.) _____________________________

Method of Payment
(please circle one)

☐ CHECK ☐ MASTERCARD ☐ VISA ☐ AMERICAN EXPRESS ☐ MONEY ORDER

Credit card number __________________________ Expiration date __________

Name (as it appears on card) __________________________

Signature _________________________________________________________

Please mail completed form with your payment to

KR’96 • c/o AAAI • 445 Burgess Drive • Menlo Park, CA 94025
or fax with credit card information to 415/321-4457.

Please Note: Requests for refunds must be received in writing by 15 October 1996.

No refunds will be granted after that date. A $25.00 processing fee will be levied on all refunds granted.

For Office Use Only

Check Number ___________________ Amount _______________ Received ___________

Disclaimer

In offering the Royal Sonesta Hotel, American Airlines, Alamo Rent-A-Car (hereinafter referred to as “Supplier”) and all other service providers for the KR’96 Conference, KR’96 acts only in the capacity of agent for the Supplier which is the provider of hotel rooms and transportation. Because KR’96 has no control over the personnel, equipment or operations of providers of accommodations or other services included as part of the conference program, KR’96 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 KR’96.