KR-2004 Overview
June 2-5, 2004
http://www.kr.org/KR2004/

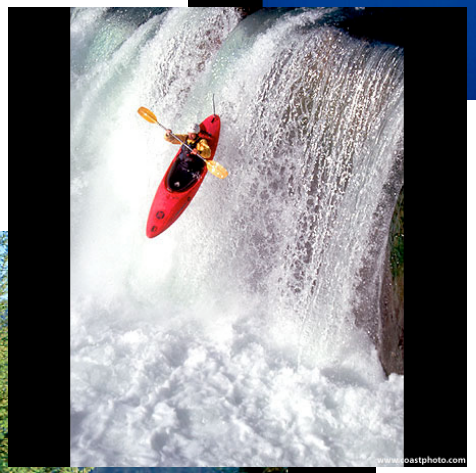
Chris Welty
IBM Research

Photo courtesy Ulrike Sattler

Organization

- Chair
  - Mary-Anne Williams, The University of Technology, Sydney (Decision making under uncertainty & change, robotics)
- Program Chairs
  - Chris Welty, IBM Research (Ontologies, semantic web, hybrid systems)
  - Didier Dubois, CNRS IRIT (Fuzzy logic, default reasoning, belief revision)
- Doctoral Symposium
  - Sheila McIlraith, U. Toronto (semantic web services, planning, reasoning about action/change)
  - Leora Morgenstern, IBM Research (nonmonotonic & common sense reasoning)
- Local Arrangements
  - Jim Delgrande, SFU (nonmonotonic reasoning, belief)

Venue (Whistler Villiage, BC)



Events

- Colocated events
  - ICAPS-04 (Planning & Scheduling)
  - Knowledge Representation in Medicine
  - Description Logics
  - NonMonontonic Reasoning
- First KR Doctoral Symposium
  - 13 Students w/ scholarships
- ICAPS/KR Festival
  - Posters, lots of food, interactions

Invited Speakers

- Peter Patel-Schneider, Bell Labs
  - "What is OWL and why should I care?"
- Izhak Gilboa, Tel-Aviv University
  - "Evidence and Belief"
- Patrick Doherty, University of Linkoping
  - "Advanced research with autonomous unmanned aerial vehicles"

Great Moments in KR

- John McCarthy, Stanford U.
  - Historical remarks on nonmonotonic reasoning especially circumscription
  - "…and then after 1985 I couldn't understand what they were doing anymore…"
- William Woods, Sun Microsystems
  - "Meaning and Links: A semantic odyssey"
  - "… delving into problems that seem to be rediscovered roughly every 10 years …"

1st Ray Reiter Prize

- Sponsored by AIJ
- Awarded to the best paper
- 5 Nominees
- Winner:
  - "Expressive power and succinctness of propositional languages for preference representation" by Sylvie Coste-Marquis, Jerome Lang, Paolo Liberatore, Pierre Marquis

Demographics

- 67 journal-length papers/199 submissions
  - Students: 10%
  - US/Canada: 52%
  - Europe: 42%
  - Asia/Pacific: 15%
  - S. America: 2%
- 152 attendees
- 78 PC members

Common Misconceptions

- KR is only about first-order logic
- KR is too theoretical
- KR is too European
- KR is useless
- KR is boring
- KR hasn’t advanced in 50 years (or 500)

KR-2006

- http://www.kr.org/KR2006/
- June 2-5, 2006. Lake District, UK.
- Colocated with ICAPS-06, DL-06, and NMR-06
- Invited Speakers: Rod Brooks*, Alon Halevy*
- Great Moments Speakers: Pat Hayes*, Aaron Sloman*
- Organizers: Chris Welty, John Mylopoulos, Patrick Doherty, Michael Thielscher, Ian Horrocks, Fangzhen Lin

* provisional

Photo courtesy Ian Horrocks

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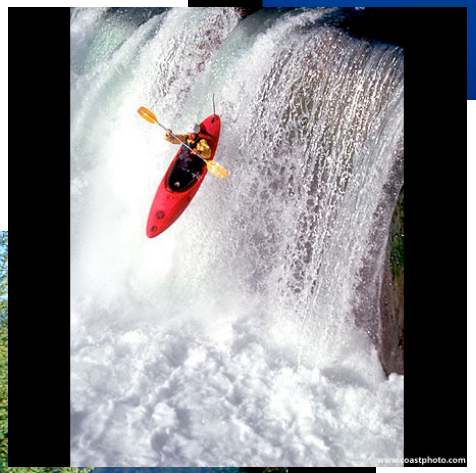

Some Technical Thrusts

- Traditional
  - Complexity results
  - Decidability, expressivity, etc. results for new language fragments
  - Reasoning with uncertainty, inconsistency
  - Planning
  - Spatial, temporal, belief
- Logical formalizations of vagueness, uncertainty
- Ontologies
- Interoperability
  - probabilistic NMR
  - ASP and DL
  - DL and Datalog(or)
  - Logic and uncertainty
  - Probabalistic and Fuzzy reasoning
  - First order fragments, modal fragments
  - Propositional encodings
- Two deep papers on Project Halo
  - Evaluation framework
  - SRI/Boeing/UT Austin approach

Ray Reiter Best Paper

- Expressive power and succinctness of propositional languages for preference representation
- Sylvie Coste-Marquis, CRIL - Univ. d'Artois, Lens, France, coste@cril.univ-artois.fr
- Jerome Lang, IRIT/Univ. Paul Sabatier, Toulouse, France, lang@irit.fr
- Paolo Liberatore, DIS - Univ. La Sapienza, Roma, paolo@liberatore.org
- Pierre Marquis, CRIL - Univ. d'Artois, Lens, marquis@cril.univ-artois.fr

Problem Statement

- Expressing & reasoning about user preferences
  - E.g. Prefer blue on yellow to black on white
- Applications
  - decision-theoretic planning
  - combinatorial auctions
  - Game playing
  - group decision making (including resource sharing and vote)
  - Agent coordination (including cooperation, negotiation, and communication)
  - User interfaces
- Naively, expressing preferences requires exponential space
  - Propositional languages attempt to encode preferences more succinctly (ie polynomial space)
  - Compare and contrast these languages according to several metrics

Comparison

- Metrics
  - Expressivity
    - Complete vs. partial
  - Succinctness
    - Existence of poly-sized encoding from other language
- Languages
  - Penalties
    - Weighting individual preferences (ie what is most important)
  - Hamming distance
    - Notion of partial satisfaction
  - Prioritized goals
    - Complete/partial order of goals
  - Conditional logics
    - Express conditions between preferences
  - Ceteris paribus
    - Indicate general concerns or indifference

Expressiveness

- Penalties
  - Only complete orderings
- Hamming distance
  - Only complete orderings
- Prioritized goals
  - Partial orderings
- Conditional logics
  - Complete orderings
- Ceteris paribus
  - Partial orderings

Succinctness of Translations

from \ to	*Rpen*	*RH*	*Rbo prio*	*Rlexi prio*	*Rdisc prio*	*RS cond*	*RZ cond*	*Rcp*
Rpen	yes	yes	no2	?	w-no	no2	no2	no2
RH	no-c	yes	no2	no-c	w-no/no-c	no2	no2	?
Rbo prio	yes	yes	yes	yes	yes	no2	yes	yes
Rlexi prio	yes	yes	no2	yes	w-no	no2	no2	no2
Rdisc prio	no1	no1	no1	no1	yes	no2	no1	no2
RS cond	no1	no1	no1	no1	?	yes	no1	?
RZ cond	yes	yes	yes	yes	yes	no2	yes	yes
Rcp	no1	no1	no1	no1	w-no	no2	no1	yes

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