



**Special issue:  
Computer Games and  
Entertainment Computing**

**UbiHome**

**Impressions on  
BNAIC 2005**

## Ubiquitous Gaming

*Editor-in-chief*

This is a special issue on computer games. In it, you will find descriptions of the research on three institutes in the Netherlands, doing research in games, i.e., the Institute for Logic, Language and Computation (ILLC) of the University of Amsterdam, the Department of Computer Science of the Utrecht University, and the Institute for Knowledge and Agent Technology (IKAT) of the Universiteit Maastricht. Without claiming to be complete, I think these descriptions give a nice and compelling overview of the current state of computer-games research within our community. Moreover, you will find four reports on computer-games events, i.e., on the games sessions of the JCIS 2005 conference (by Jeroen Donkers), on the 13<sup>th</sup> World Computer Chess Championship (by Yngvi Björnsson), on the 11<sup>th</sup> Advances in Computer Games conference (by Fredrik Niemelä) and on the ICEC 2005 conference (by Jos Uiterwijk).

During my recent visit to Japan I had the opportunity to be guided through the Ubiquitous Home (UbiHome), resulting from a prestigious joint project of the Japanese government and ICT research institutes. Although it may seem questionable if this is what we *want* in our future, it nicely demonstrated at least what will be *possible*. For more information on the UbiHome project, see the link below.



One of the many talking and hearing robots in the UbiHome.

Besides this abundance on material related to games and (entertainment) computing, Karl Tuyls provides us with an impressive impression on the recent BNAIC conference in Brussels. More detailed reports on the BNAIC sessions and on several awards handed out during the BNAIC will be published in the next issue of the Newsletter. For more pictures, impressions, handouts, a download of the presentation of invited speaker David Parkes, and other information, see the BNAIC 2005 link below.

Finally, during the General Assembly meeting of the BNVKI during the BNAIC 2005, the board elected Marie-Francine Moens as new board member. Being a section editor of the BNVKI Newsletter for a long time already, I'm sure she will be a valuable addition to the board, and I congratulate her sincerely with her appointment.

**BNAIC 2005:** <http://como.vub.ac.be/bnaic2005/>

**Ubiquitous Home:** [http://www2.nict.go.jp/jt/a135/eng/research/ubiquitous\\_home.html](http://www2.nict.go.jp/jt/a135/eng/research/ubiquitous_home.html)

## TABLE OF CONTENTS

Ubiquitous Gaming (Editor-in-Chief).....	98
Table of Contents.....	99
BNVKI-Board News (Han La Poutré).....	100
Minutes General Assembly BNVKI .....	100
Games at the Institute for Logic, Language and Computation (Johan van Benthem, Samson Tikitu de Jager, Fenrong Liu, Olivier Roy, Merlijn Sevenster).....	101
Game Research at Utrecht University (Mark Overmars).....	105
Games at IKAT (Sander Bakkes, Guillaume Chaslot, Marc Ponsen, Jahn-Takeshi Saito).....	106
Computer Games in an Olympic City (Jeroen Donkers).....	108
Report on the 13 <sup>th</sup> World Computer Chess Championship (Yngvi Björnsson).....	110
The 11 <sup>th</sup> Advances in Computer Games Conference (Fredrik Niemelä).....	111
ICEC 2005 (Jos Uiterwijk) .....	112
Impressions on BNAIC 2005 (Karl Tuyls) .....	114
More, More Ph.D. Theses (Jaap van den Herik).....	118
Section Knowledge Systems in Law and Computer Science (Marie-Francine Moens).....	120
The 18 <sup>th</sup> Annual Conference on Legal Knowledge and Information Systems.....	120
Announcements.....	121
Marco Dorigo Receives the “Prix Dr A. De Leeuw-Damry-Bourlart” .....	121
Call for Participation: The Machine Learning Mini-Symposium .....	121
Call for Papers: International Conference on Computational Science (ICCS 2006) .....	122
Call for Papers: First International Conference on Scalable Information Systems (INFOSCALE) .....	122
Call for Papers: Special Issue of the International Computer Games Association Journal on Poker .....	123
Conferences, Symposia, Workshops.....	123
Contact Addresses Board Members/ Editors BNVKI Newsletter / How to subscribe?/ Submissions .....	124

The photographs in this issue are by courtesy of Mark Overmars (pp. 105-106), Yngvi Björnsson (p. 110), Jos Uiterwijk (front cover, p. 98 and pp. 112-114), and Geert Jan Bex and Kurt Braeken (pp. 114-118).

Front cover: A robot built in the NICT lab, Kyoto, Japan.

The deadline for the next issue is: **December 2, 2005**.

## BNVKI-Board News

*Han La Poutré*

Many of you have attended this BNAIC in Brussels. It was an exiting BNAIC, taking place in the majestic environment of the impressive Palace of the Academy (“Paleis der Academiën”), being the neighbour of the Royal Palace Brussels. The president of Portugal just visited Belgium, and we could be witness of a colourful parade contributed to him, in front of the Royal Palace. So, we had a BNAIC in style. Again many AI researchers participated in this BNAIC, and the program was very appealing. Having said this, the organisers of this BNAIC can only be praised for their efforts: the organisation was excellent, the program was very interesting, and the food was great. So, I like to thank the organising committee: Bernard Manderick, Ann Nowe, Karl Tuyls, Bart Kuijpers, Katja Verbeeck, Bram Vanschoenwinkel, Maarten Peeters, and Sam Maes. An extensive report about the papers presented at this BNAIC will be included in the next issue of this Newsletter.

Also in October, it was announced that an important Belgium award will be given to an AI researcher. Marco Dorigo (Free University of Brussels) will be awarded the prestigious “Prix Dr A. De Leeuw-Damry-Bourlart” for his contributions to artificial intelligence and robotics. The prize (75,000 euros) will be presented by the Belgian King, at (again) the Palace of the Academy in Brussels, in November. This prestigious prize is awarded only once in five years, for the whole area of applied exact sciences, and is a prize awarded by the Belgian National Science Foundation FNRS. You can find out more about the prize and the work of Marco Dorigo elsewhere in this Newsletter. The BNVKI Board likes to congratulate Marco Dorigo with this prestigious distinction!

During this year’s BNAIC, at the General Assembly, it was decided that the next BNAIC will take place in Namur (Namen) in Belgium. Pierre-Yves Schobbens will be the organiser of it, and the BNAIC coincides with a jubilee of the University of Namur. We already look forward to this 18<sup>th</sup> BNAIC and wish Pierre-Yves success with the organisation of it!

## Minutes General Assembly BNVKI October 18, 2005

Present: From the board: Han La Poutré (chair), Catholijn Jonker, Jos Uiterwijk, Cees Witteveen, Edwin de Jong, Antal van den Bosch (minutes), and 38 members

Notice of Absence: Ben Kröse

0. Opening  
Han La Poutré opens the meeting at 11:57.
1. Minutes  
The contents of last year’s minutes are approved, with no additional remarks.
2. Announcements  
La Poutré mentions that profs. Luc De Raedt and John-Jules Meyer have been named ECCAI Fellows; the BNVKI congratulates them both.
3. Financial report 2004  
Treasurer Cees Witteveen presents the 2004 report, approved by the auditing committee. In advance, estimations predicted a small loss of 600 Euro. However, due to sponsoring from NWO and SIKS and a profit from BNAIC 2004 the year was closed with a 4789 EUR profit.  
  
Witteveen also presents the estimated budget for 2006, which shows a loss due to less predicted sponsoring. The board hopes that the loss can be neutralized by finding new sources of sponsoring.
4. Auditing committee 2005  
Witteveen thanks this year’s auditing committee: Annette ten Teije and Marc Gijssens. The members approve the report. The auditing committee is discharged; the next committee will consist of Joost Vennekens and Anneke Smit, which is also approved by the membership.
5. Progress report 2005 and plans for 2006
  - La Poutré reports on the past year spanning between the current and the previous BNAIC 2004 in Groningen, which was very successful.
  - Arrangements are in progress to have BNAIS, BNVKI’s AI student event, in Nijmegen.
  - Some reduction in the costs of the Newsletter have been achieved by sending it in batches.

- an ISSN number for BNAIC proceedings was introduced in 2004.
  - The financial framework designed for BNAICs, implemented for the first time last year, is now also used at BNAIC 2005, and will also be implemented in 2006. The board is streamlining its content-wise advice to BNAIC organizers, and is working on a BNAIC guidelines document.
  - Website support: the board has decided to leave the choice for conference management systems to organizers of BNAICs, but has created the hub webpage <http://www.bnaic.org>, as well as the new URL for the BNVKI itself: <http://www.bnvki.org>.
  - Currently, the board is discussing, with DECIS, the development of an “industry track” in upcoming BNAICs, starting with BNAIC 2006, with academically-oriented industry talks on academically interesting industry problems.
  - A discussion is raised on the integration of the BNVKI membership and the BNAIC registration. Points of view are exchanged by Lambert Schomaker, Kees Nieuwenhuis, and Jaap van den Herik. Schomaker states his opinion that BNVKI membership should not automatically be included in the BNAIC participation. Nieuwenhuis agrees. Van den Herik sketches the historical reasoning behind the current situation. La Poutré proposes that the board looks into this issue of membership and BNAIC participation.
  - Van den Herik reminds the membership that in 2006 the (B)NVKI will turn 25.
7. Newsletter.
- On the Newsletter, La Poutré mentions that last year a connection with NWO’s I/O magazine was explored. In the upcoming year, a decision has to be made with respect to the format of the BNVKI Newsletter, and at the moment, an exchange of thoughts and ideas about this is appropriate. This BNAIC, members were invited to enter a poll with their preferred format of the Newsletter: printed (7 votes), electronic (22 votes), and 4 votes expressing no preference. An electronic version would save costs, but tends to be ignored more easily. A printed version is more sustaining, but more expensive. Niek Wijngaards suggests to send an electronic version, but also a leaflet summarizing the headlines. This single paper may be

included in the IPN newsletter. The board mentions that PDF versions are archived from one year back. Van den Herik suggests that the board should look at future plan in 5-7 years and possible relations with, e.g., NWO’s I/O Magazine. On proposal of Schomaker, a second poll is held, amongst the members present at the General Assembly, resulting in 12 hands for an electronic version, 12 for printed, and 5 for electronic plus leaflet.

8. BNAIC 2006.  
Pierre-Yves Schobbens proposes to have BNAIC 2006 in Namur, coinciding with the 175th anniversary of the University of Namur. The members agree and thank Schobbens for his excellent proposal.
9. Board members.  
In 2006 four board members step down. The bylaws of the BNVKI allow for one board member to be added, from the current 7 members to the maximal 8. The candidate, Marie-Francine Moens, introduces herself. La Poutré’s proposal to accept Sien Moens in the board is met with appraisal. The board welcomes Sien Moens as the new member.
10. End of meeting.  
La Poutré closes the BNVKI General Assembly at 12:52.

### **Games at the Institute for Logic, Language and Computation**

*Johan van Benthem, Samson Tikitu de Jager,  
Fenrong Liu, Olivier Roy, Merlijn Sevenster  
ILLC, Amsterdam*

Games seem a typical feature of human behaviour. You can try to locate what makes us so special in individual properties like walking upright or thinking straight. But our social interactions in games, many of them of our own making, are just as revealing about our intelligence and staying power. At least, that is the attraction underlying the various strands of research reported here.

OK, but it has all been done in game theory! Two Nobel Prizes (Nash, and just now, Aumann), and even Academy Awards for the movie *A Beautiful Mind* (why did not BNVKI think of *that* title for its research area?). And game theory has penetrated broadly into other areas, witness the early popularity of games in the philosophy of language and ethics.

But in some ways the story is only beginning. Modern logic and computer science have just made their own move from just thinking about individual activities of reasoning or computation, to studying interaction between different agents. After all, language is about successful strategies for communication, logic is about dialogue and argumentation, and computation is about networks of agents forming information orchestras for various purposes.

The three contributions that follow here, by ILLC Ph.D. students, show the wealth of new issues that arise in this perspective. Game theory provides global models of games, and strategic equilibrium. But on top of that, logic, linguistics, and computer science then provide a new level of *fine-structure* to the analysis of strategies and information flow. In that way, as you will read in a moment, deeper studies arise of reasoning and information processing by different types of agents, solving games of different kinds of difficulty, and explaining various concrete linguistic practices in terms of different sorts of games that regulate our behaviour.

ILLC is making games an important focus of its research, helped by a recent EU Grant 'GloriClass' that will give us 8 new Ph.D. positions, and help us set up an international Training Centre, devoted to interfaces between logic, computer science, linguistics, mathematics, and computer science. Its current coordinator is Benedikt Loewe (bloewe@science.uva.nl). This initiative will help us expand the work that we have been doing more informally in The Netherlands between congenial groups in many cities (Amsterdam, Groningen, Tilburg, Utrecht) with our Workshops on Logic, Language, and Computation. Check our website <http://www.illc.uva.nl/lgc> for what's going on.

Of course, we are not the only ones in this research area, and we hope to broaden our contacts with major players such as IKAT in AI, and indeed all congenial AI-groups, and also outside of our own 'family': with experimental game theorists and cognitive scientists. Just as games seem typical for human intelligence, they also seem a great metaphor for the world of research: it is our interactions that are the key to success!

#### GAMES AND LOGIC

(Fenrong Liu and Olivier Roy)

Classical Game Theory has been mainly concerned with *ideal* players: players that can do whatever calculation is required to find the optimal strategy, that never make mistakes when the time comes to do the math, that never forget a single detail of what

has to be remembered and that flawlessly undertake what they have found to be the best action. But real life agents are not like that. And by "real life agent", you don't even have to look at your akrasic colleague who does not quit smoking even if he knows it is bad for him. Just start a game of your favorite first-person shooter computer game, say MEDAL OF HONOR. Before starting your heroic adventure in occupied France, you have to set how difficult your mission will be. Depending whether you choose, say, "easy", "medium" or "hard", *your AI-controlled opponents will behave differently*. At "easy", they will adopt a quite dubious strategy and will not learn anything from your previous behavior; you will face an army of stupid automata. At the other end of the spectrum, you should better be prepared for "hard" opponents; they will elaborate sophisticated plans and adapt them to your playing history. In short, real- or virtual-life is replete with *different kinds* of agents. How can we model strategic interactions in such diverse context? Can we formally define optimal strategies for these models, in the same fashion as game theory does for ideal agents?

There exist many approaches to the modeling of strategic and dynamic behavior such as this human/AI intercourse. We at the ILLC study them mostly, but not exclusively, with *dynamic logic*. This non-probabilist formalism includes a bunch of propositions, "p, q, r, ...", that represent facts, a bunch of actions, "a, b, c, ...", plus a few connectives that can be combined with these propositions and actions to form complex terms such as: "K<sub>i</sub> p", "[a] q", "[p!] q", "q <Pref, i> p" which mean, respectively, "agent *i* knows that p", "after an action *a*, q is true", "after an update with *p*, q is true" and "agent *i* prefers q to p". Dynamic logic is especially suited to reasoning about all kind of *changes*: *Factual* changes, e.g., your teammate has taken care of the guard, so you can proceed into the ammunition depot. This would be formalized as [Guard-eliminated!] proceed-to-depot. *Information* changes, e.g., you learn that there is a heavily armed S.S. waiting for you behind the door, so you reconsider your plan of going in, ((K<sub>you</sub> S.S.-behind-the-door!) not you-go-in). Even *preferences* changes can be expressed: e.g., your network opponent General\_Killer has humiliated you too many times, so now you do not only want him to lose, you want him to lose badly and often: [humiliated-by-G-K] G-K-loses-twice <Pref, you> G-K-loses-once. Let us look more carefully at two such examples.

One thing that surely influences dynamic interaction is one's memory capacity. To understand this phenomenon in logic, the natural way to go is to model agents' power of processing knowledge.

Imagine an extremely forgetful agent. Because of his bounded memory, he will update his knowledge and beliefs quite differently from another agent who remembers a lot, and this will result in quite different behavior. For example, a very limited AI-controlled soldier can go in circle indefinitely in a maze, simply because none of his information update results in the recognition of a quite useful thing to know: he has already been there! Key principles of knowledge capabilities can be formulated in dynamic logic. For example, the formula  $\langle K_i [a]p \rightarrow [a]K_i p \rangle$  define players' /Perfect Recall/ in a game-theoretic sense: they know their own moves and also remember their past uncertainties at each stage. At the other end of the spectrum,  $\langle a \rangle p \rightarrow U [a] \langle i \rangle p$  encodes the fact that *i* is *memory-free*. The formula should be read as "if *p* can be the case after action *a* then, always, whenever action *a* happens agent *i* considers *p* possible". Agents of this sort only respond to the last-observed event. In particular, their uncertainty relations can cross between different levels of a game tree: They need not know how many moves have been played. Our current researches are mainly focused on how different types of agents can be described in such logical terms and how they interact with each other.

Another striking influence on dynamic interaction is the degree of sophistication the plan of an agent can reach, the modeling of which not only involves knowledge, but also preferences. Take, for example, a very stupid front line soldier, whose AI-program does not allow to plan more than 1 second ahead. You probably will not have much difficulty beating him: he will use blunt strategies, the weakness of which you will identify in a few seconds. From his point of view, the limitation on his planning capacity will make it almost impossible for him to reach his "preferred" outcome: not being killed by you. How do we model such diversity of planning capabilities? Given that these capabilities have to be bounded, is there some way to specify strategies that are more "rational" than others? For example, can we come up with an update mechanism *a* on strategies such that, for a solution *s* to a given decision problem and any other update mechanism *b*, agent *i* prefers the solution of the problem updated by *a* to the solution updated by *b*, in symbols:  $\langle [a] s_1 \langle \text{Pref}, i \rangle [b] s_2 \rangle$ ? These are the kind of questions we are interested in, and for which we hope to isolate valid dynamic logic principles that encode plausible answers.

**GAMES AND LANGUAGE**  
(Samson Tikitu de Jager)

Games are also used within the ILLC as modelling tools, rather than objects of study in their own right.

One such use is for investigating the development of the properties of human language, for example the arbitrary association of sounds with meanings by convention. We usually take for granted that words have fixed meanings --D-O-G means dog and not cat-- and that different languages use different words for the same meanings, but games can give us an understanding of how this comes about.

Generally speaking, what game theory brings to the question is an explanation of how conventions become adopted without invoking a central authority or a negotiation procedure. If we describe linguistic interactions as simple games in which payoffs depend on communicative success, game theory provides an explanation for the adoption of conventions which maximise those payoffs. The classical concept of Nash equilibrium is one such explanation, however it requires extremely strong assumptions about the reasoning powers of agents. Similar results, under much more reasonable assumptions, can be reached via evolutionary game theory.

Let us take a simple example from the animal kingdom. Vervet monkeys have two alarm cries, which they use to warn that a snake or a leopard is hunting. (If you are a monkey, looking down is a good idea to spot a snake, but leopards like to drop on you from above. So the different cries correspond to different types of alarm behaviour.) The interesting thing is that different groups of monkeys use the cries differently; for one group a grunt means "leopard", while for another it means "snake".

We can explain this with a simple game simulation. The game works like this: monkey S(peaker) sees a predator, and chooses to shriek or grunt. Monkey H(earer) hears the cry, and looks up or down. The game is cooperative, and both monkeys win if S saw a leopard and H looked up, or if S saw a snake and H looked down.

In an evolutionary game theory setting, we let the monkeys learn from their successes and failures, so that they use more often the strategies that succeeded in the past. Over time a group of simulated monkeys will develop a convention: either shriek for leopard and grunt for snake, or vice versa. This is without central authority, without negotiation, without anything except individual monkeys trying to play a simple game as successfully as possible. And yet the result is that shrieks and grunts come to have meaning in just the same sense that words such as "dog" do in human language.

The monkeys example is enormously oversimplified, but it gives a sense of how linguistic conventions (and fixed meanings) can develop spontaneously. More complicated games, particularly with additional competitive elements, can give us insight into more uniquely human uses of language such as misdirection and lying, metaphor and non-literal meaning, and ultimately into the way languages in general come into being, change and develop.

#### GAMES AND COMPUTATION (*Merlijn Sevenster*)

Games come in great variety: From simple puzzles that we solve while waiting for our train to lengthy games ruining a man's reputation. Various as games may be, they all share some notion of outcome. For instance, one wins a crossword puzzle the moment one completes it and surely loses a game of poker if an opponent has a Royal Flush.

But if all games have outcomes that can be competed for, then the following question concerns all games: (\*) does some player have a way of playing, that guarantees him or her an outcome greater than some of the game's outcomes, no matter what the other players do? As an example, think of chess: the question whether white can always win, has generated a lot of research, but is still an open question.

The next question to ask is how *hard* it is to solve the (\*)-question; i.e., how hard is it to decide whether some player can achieve some outcome in a specific game. Analyzing the hardness of questions is *complexity theory's* core business, and it has proven to provide excellent tools for studying the hardness of the (\*)-question. As a matter of fact, the phrase "the hardness" of a game in the literature always refers to the computational hardness of the game's (\*)-question. A complexity theorist's way of determining the hardness of a specific game is by pin-pointing the minimal needs (time, space, non-determinedness, etc.) that are required by a machine on which an algorithm can be run that solves an arbitrary instance of the game.

The computational analysis enables us immediately to compare games, simply by comparing the hardness of their (\*)-question. Interestingly enough, computational complexity also tells us which games are solvable by human means! In complexity theory, namely, it is widely accepted that those problems that can be solved in polynomial time (PTIME) are in principle solvable by humans or humanly built computers. So all games harder than PTIME are usually seen to be not humanly solvable. Exploring the hardness of games is a lively and

exciting field of research and it is surprising to see that very many puzzles are too hard to be humanly solvable under this analysis. For instance, the popular games of Minesweeper and Battleships (Zeeslagje) were shown to be NP-complete, which is bad news for the existence of efficient algorithms solving the puzzle. In fact, the Clay Mathematics Institute will pay one million dollars to anybody who provides an efficient algorithm that solves Minesweeper! To the best of my knowledge, the complexity of Sudoku is unknown at this moment and I would love to learn about any results. (Although I am not in a position to offer a lot of money.)

Minesweeper, Battleships and Sudoku are all one player games. It is a recurrent observation in computational analyses that games with two players have much higher complexity, namely PSPACE. For instance, to decide whether white can win an arbitrary position of Go (in a polynomially bounded number of rounds) is PSPACE-complete (that is, extremely bad news for the existence of an efficient algorithm). The high complexity of two player games is usually due to the fact that one has to calculate whether there exists a move, such that for every move by the opponent, there exists a move, such that for every move by the opponent ... the outcome is higher than some value. Checking this condition resembles model checking a first-order formula with arbitrary alternation between existential and universal quantifiers. For this reason it is not surprising that many completeness results are established by reduction from *Quantified Boolean Formulas*.

Having some understanding of two player games, it is interesting to ask what are the computational effects of other properties of games. E.g., are games with imperfect information harder than games with perfect information? And what about chance? At face value, *playing* a game with imperfect information is harder than playing a game with perfect information. But this does not tell us, of course, if deciding whether some player has a winning strategy in a game with imperfect information is computationally harder than deciding the same problem in a game with perfect information. And the other way around, how relevant is the computational analysis from a cognitive point of view? And moreover, if one game is harder than another, complexitywise, do real people experience more difficulty playing the former than the latter? These questions have aroused the interest of researchers from cognitive science, game theory and complexity theory; and considering the multi-disciplinary character of the ILLC it is hardly surprising that researchers from the ILLC are involved.



## Game Research at Utrecht University

Mark Overmars  
Utrecht University

At Utrecht University in the Netherlands a large number of activities are under way to make Utrecht a focus point of academic game education and research in the Netherlands.

The Department of Computer Science at Utrecht University offers a master program *Game and Media Technology* for computer science students. They also offer a minor in the same field within the bachelor curriculum. In the master program the focus lies on technical aspects of games, like computer graphics, 3D modeling, motion and manipulation, geometric algorithms, virtual worlds, and agent technology, but there are also courses on game design and human computer interaction. There is a close collaboration with the liberal arts faculty and the Utrecht School of the Arts. Together they have formed the *Utrecht Platform for Game Education and Research* (UPGEAR, see [www.upgear.nl](http://www.upgear.nl)).

At the research side, the department has formulated as one of its three research themes *The Digital World*. This theme consists of four research groups: *Games and Virtual Worlds*, headed by prof. Mark Overmars, *Geometry and Multimedia*, headed by dr. Remco Veltkamp, *Intelligent Systems*, headed by prof. John-Jules Meyer, and *Cognition and Communication*, headed by dr. Herre van Oostendorp. Research for games and simulation is one of the prime focuses of the theme. Together with TNO we are currently setting up a research center on *Advanced Gaming and Simulation* (AGS, see [www.gameresearch.nl](http://www.gameresearch.nl)). This center will bring together about 45 researcher in this field. The main research domains of the center will be:

**I. Modeling the world.** This theme involves all that is required to create and visualize realistic models of the world. The challenges are to create digital models of real-world objects, both natural objects and man-made objects. Typical techniques to be investigated are reverse engineering and automatic scene generation from geographic information systems.

**II. Virtual characters.** This theme deals with the modeling of the characters that will inhabit the virtual worlds. Virtual characters can be either software driven autonomous agents or avatars driven by instrumented humans. Challenges are the true-to-life modeling of the human body, posture and physical movements. Agents must show

convincing cognitive behavior and autonomously sense their environment, respond and plan their actions.

**III. Simulating the world.** This theme studies the (physical) simulation of the virtual world. It includes real-time simulation of the dynamics of moving objects but also the simulation of changes in clouds, flames, and liquids. Besides the visual aspects it is also important to simulate other sensory data, like sound, temperature, and tactile experience.

**IV. Interacting with the world.** This theme studies the high-level interaction between the user and the world, including navigation, manipulation, and multi-sensory interfaces. The study of next generation interfaces includes torso mounted tactile displays and head mounted visual displays for multimodal feedback, brainwave driven devices and body instrumentation for intuitive control, automatic sensing of natural user behavior and cognitive user interaction models. Further, we want to create experiences that go beyond the physics of the simulation (cross-modal sensations and perceptual illusions).



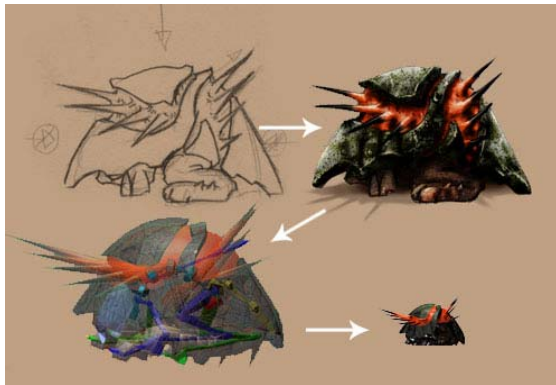
**V. Affective appraisal.** The term affective appraisal in the context of gaming and simulation refers to the influence that a simulated environment has on the mood and level of responsiveness of the subject experiencing the simulation. We want to investigate the main factors contributing to the involvement and emotional reactions that are evoked by a virtual environment, and to the effectiveness of simulations and enjoyment of serious gaming.

**VI. Adaptive game play.** This theme deals with the high-level behavior of the simulated environment in response to user behavior. The environment should automatically adapt to the capabilities and reactions of the user and to the learning experience required. This poses for example challenges in deducing intentions, goals and emotions from the actions of

the user, balancing local autonomy of the elements that interact with the user and the global goal of the system, and context and expectation management.



**VII. Learning with simulated worlds.** This theme studies how to use virtual environments and games for learning and training purposes most effectively. Training scenarios, including multiple participants and cooperating teams, are extremely complex. This complexity not only entails the building and management of training scenarios, but also how to monitor scenario progress, when and how to make interventions and freeze scenarios, and when and how to provide additional instruction and feedback.



**VIII. The X-factor.** This theme involves the artistic design aspects and user experience factors (challenge, fantasy and curiosity). These make an application fun, enjoyable, rewarding and motivating, but are poorly understood. Knowledge from the areas of cinematography, drama and story understanding will be used to better understand the emotional effects of narratives, pace, identification and involvement with characters that occur in games. Theoretical and empirical studies of the effects of emotional and cognitive interest are

crucial in creating the right experience of users and learners in games and educational software.

For more information, please contact prof dr Mark Overmars, Utrecht University, Faculty of Science (markov@cs.uu.nl).

## Games at IKAT

Sander Bakkes, Guillaume Chaslot, Marc Ponsen,  
Jahn-Takeshi Saito

*IKAT, Universiteit Maastricht*

At the Institute for Knowledge and Agent Technology (IKAT) at the Universiteit Maastricht several researchers are working in the domain of computer games. This group is headed by Prof.dr. Jaap van den Herik and coordinated by Dr. Jos Uiterwijk. Globally this research can be divided along two lines, i.e., “traditional” board games, like Chess, Lines of Action, and notably Go, and “commercial” games, like NEVERWINTER NIGHTS and WARGUS.

Regarding traditional board games, there has been much research being done by Ph.D. researchers and senior researchers on subjects like the development of intelligent-search techniques, the application of machine-learning methods, and the use of opponent modelling. In the last few years this resulted in four successful Ph.D. defenses, i.e., by Jeroen Donkers (*Nosce Hostem: Searching with opponent models*; December 5, 2003), Levente Kocsis (*Learning Search Decisions*; December 11, 2003), Mark Winands (*Informed Search in Complex Games*; December 1, 2004), and Erik van der Werf (*AI Techniques for the Game of Go*; January 27, 2005). The latter project was the forerunner of the current NWO-funded project Go for Go (see below).

In the field of commercial games Pieter Spronck has done a lot of research (see, e.g., the *BNVKI Newsletter* 22(3), 52-54), culminating in his Ph.D. defense (*Adaptive Game AI*; May 20, 2005). This work is being continued by two Ph.D. students in the ROLEC and TIELT projects (see below).

Besides a lot of continuing research by senior researchers at IKAT, such as work on opponent modelling and Awari-like games (especially Bao) by Jeroen Donkers, research on adaptive game AI by Pieter Spronck and on intelligent-search techniques by Jos Uiterwijk, the main emphasis is on the three on-going Ph.D. projects. They are described below by the researchers themselves.

## GO FOR GO

(Guillaume Chaslot, Jahn-Takeshi Saito)

With advanced human players or even grand masters succumbing to computer opponents in combinatorial games such as Checkers, Draughts, Othello, and most famously Chess, or in games of partial information such as Bridge, Go remains among the few obvious challenges to AI in classical game playing. Go is therefore at the center of attention in an old man versus machine challenge. Recent careful estimates by computer Go experts (e.g., Erik van der Werf, see *ICGA Journal*, 28(1), 37-39) suggest that the game will remain a hard problem for the next twenty years.

Launched only in September of this year, the NWO funded Go for Go project at Maastricht University is devoted to the research of computer Go. The project under guidance of Prof.dr. Jaap van den Herik and senior researcher Dr. Jos Uiterwijk is largely carried out by two full time Ph.D. students. The mission of the Go for Go project is very straight forward: To contribute to solving the problem of computer Go.

On the competitive side the ultimate vision is a computer Go program able to contest the best software opponents available. On the research branch the challenge lies in devising new methods enabling a competitive program. Currently, most computer Go programs rely on fairly similar AI techniques in search, pattern matching and feature detection.

The hardness of the Go program lines in a combination of two aspects. These are on the one hand the huge search space, which is much larger than that of Chess, and on the other hand the lack of a computationally cheap evaluation function. The latter is a structural problem arising from the life-and-death evaluation problem inherently derived from the Go rules.

In improving Go programs, two scenarios seem possible. Firstly, Go programs could be strengthened by further refining existing paradigms, most importantly in move selection for search-tree pruning. Secondly, it is imaginable that a breakthrough technique could boost the level of play of Go programs. Recent developments indicate no revolutionary breakthrough but have brought forward encouraging refinements in search, such as the Monte Carlo heuristic.

The Go for Go research group identifies Monte Carlo methods as a sustainable innovation which might one day become a standard paradigm

implemented partially in most computer Go programs. The method has already inspired much research over the past two years and could further guide development in the existing frame of global search techniques. Monte Carlo Go is a search heuristic, inspired by Monte Carlo modeling techniques. The basic idea is to evaluate a game board position  $p$  by playing  $n$  random games from  $p$  to the end and then accumulating the results of these random games, e.g., by calculating the mean score of all  $n$  games. This accumulated value constitutes the heuristic value for  $p$ . Similarly, local search mechanisms such as proof-number search variations seem promising for local search situations in the Go domain, possibly in combination with Monte Carlo methods.

The Go for Go project divides up global and local Go phenomena. These two partially overlapping fields of research allow to apply similar methods (e.g., in search or pattern matching) on different problems in Go. The project's long term strategy is to first analyze and develop search methods and then turn towards applying machine learning techniques for feature detection in order to improve current evaluation functions. Newly devised methods will be integrated into a Go program under development. The present version of this program plays only on 9×9 Go boards and is called MANGO. It can be played on the KGS Go server.

## ROLEC

(Sander Bakkes)

Most commercial computer games contain computer-controlled agents that oppose the human player. We define "game AI" as the decision-making capabilities of these agents. In general the game AI is of low quality: it suffers from inherent weaknesses and cannot adapt to the tactics of the human player. The game AI can be improved by adding learning capabilities that allow the agent to change its tactics in response to gameplay experiences. If this learning takes place while the game is played, it is called "online learning".

The ROLEC project (Rapid Online Learning for Entertainment Computing) addresses the problem of designing a method that allows computer-controlled agents in commercial computer games to become more intelligent by online learning from earlier experiences. This method will consist of a combination of machine learning (in particular evolutionary algorithms, case-based reasoning, and reinforcement learning), opponent modelling, classification, and feature-extraction techniques. A data store will be used to store and retrieve the

experiences. We address the following three research questions:

1. How to design a rapidly accessible data store that contains gameplay experiences and allows a relevant mapping of gameplay situations to the stored experiences?
2. To what extent can a data store of gameplay experiences be used to allow agents to act intelligently in new gameplay situations?
3. To what extent can a data store of gameplay experiences be used to allow agents, while retaining entertainment value, (1) to scale their challenge level to the experience level of the human player, and (2) to adapt to new tactics expressed by the human player?

Principal researchers of the ROLEC project are: Dr.ir. Pieter Spronck (postdoc), Drs.ing. Sander Bakkes (Ph.D. Student) and Prof.dr. Jaap van den Herik (Ph.D. Advisor). The ROLEC project started January 1, 2005, and will continue for four years.

#### **TIELT** (*Marc Ponsen*)

Marc Ponsen is a first year Ph.D. Student at Maastricht University. Last year he worked as a Ph.D. student in the United States at Lehigh University. His work last year at Lehigh University focused on integrating an AI middleware tool called TIELT (see <http://nrlsat.ittd.com>) with an open-source computer gaming engine called STRATAGUS (see <http://stratagus.sourceforge.net/>). This project is still ongoing.

TIELT, the Testbed for Integrating and Evaluating Learning Techniques, is a project initiated by the Naval Research Laboratory in Washington DC. David Aha (head of the Intelligent Decision Aids Group) leads the project and is assisted by Matthew Molineaux (software engineer). Several luminous research groups are participating with the project. TIELT aims at encouraging the study of machine-learning (ML) research in cognitive systems on knowledge-intensive problems. For instance, TIELT can be used as a benchmark tool to evaluate learning performance of decision systems in (gaming) simulators. The TIELT architecture is built upon the wish that decision systems should be applicable in multiple simulators without the additional integration effort.

STRATAGUS is an open-source gaming engine for building real-time strategy (RTS) games. STRATAGUS was selected to be integrated with TIELT for several reasons: first, it is open-source and therefore cheap to acquire. Secondly, the properties of RTS games (partial observability, real-time decision making, multi-agent environments, large action and state space) make STRATAGUS a challenging domain for AI research.

Currently, the TIELT-STRATAGUS integration allows ML researchers to control the game AI in STRATAGUS in both single- and multiplayer games. This integration was used for experiments in single-player games. The integrated decision system has complete control over the high-level AI (e.g., order an army to attack without specifying any mission details) in STRATAGUS games through a set of TIELT actions that interface with the game engine's API. It also receives feedback from the game engine through a set of TIELT sensors.

Marc is currently working on improving the control a TIELT-integrated decision system has over the AI by adding more game actions. For example, we will also allow TIELT to interface with the low-level AI (e.g., allow primitive control of individual units instead of high-level control of armies). Besides this, Marc aims at designing and evaluating new decision systems with TIELT. His main research interests include on-line learning, reinforcement learning, case-based reasoning, collaborative decision systems, and methods for automatically learning domain knowledge.

## **Computer Games in an Olympic City**

### **Joined Conference on Information Systems, JCIS 2005**

#### **8<sup>th</sup> International Conference on Computer Science and Informatics**

#### **Invited Sessions on Games Theory I & II**

*Salt Lake City, Utah, Friday, July 22, 2005*

*Jeroen Donkers  
IKAT, Universiteit Maastricht*

The venue of the 2001 Olympic Winter Games, Salt Lake City, acted as the host city of the Joined Conference on Information Systems 2005. It was an inspiring environment for the 2005 edition of the traditional computer game sessions at JCIS, which were again organized by Professor Ken Chen. This time there were two sessions each of four presentations. The accent of the sessions appeared to be on Asian board games: in the first session there

were talks on Chinese chess and on Japanese chess, (next to two more general talks), and the second session was completely dedicated to Go.

The first session started with a presentation by Alessandro Cincotti of a paper titled *The Rebirth of Solved Games* (T. Nakamura, A. Cincotti, and H. Iida). The research question the authors posed was: “how can solved games be made interesting to play again?” Interesting means in this context that the outcome of the game should be uncertain as long as possible and there should be fairness in terms of winning percentage and game-theoretic value. As an example, the authors studied the games Tic-Tac-Toe and small-board Hex. Optimal strategies for both games are known, so interesting play is not possible anymore. The solution of the authors was to introduce a new rule to the games: the first move of both players is performed simultaneously. Of course, special precautions have to be taken to deal with conflicting moves. The authors propose two ways to deal with this. The experimental results showed that factors like game length and draw ratio changed for both games in the desired direction.

The second talk was titled *Study on Loop problems in Opening Databases Chinese Chess Programs* (J.C. Chen, S.J. Yen, and S.C. Hsu) and was presented by Jr-Chang Chen. The authors described a problem with the tree-structured opening database for Chinese Chess: how to deal with positions that occur more than once, due to loops? The solution proposed was to restructure the tree-structure such that loops are moved to the leaves of the tree. In this way, minimaxing on the tree is not hindered by loops anymore.

The session continued by a second talk on opening databases, this time for Shogi. The talk titled *Master-like Opening Strategy in Computer Shogi* (J. Nagashima, T. Hashimoto, H. Iida) was presented by Jun Nagashima. The authors compared traditional frequency-based ways of tuning an opening book with an own method. The book was constructed from expert’s game records. Tuning took place by self-playing games and result-driven updates: the weights of moves played by a winner were increased, those played by a loser were decreased. The amount of change decreased over time. Moreover during play, at any position an out-of-book move would be played with a given probability. The book performed well against the own program and against a strong other one. Consequently, a large book is now being build and tuned for the 15<sup>th</sup> world championship computer Shogi.

The last talk in the first session was titled *Tree Search in Two-Player Games: using bounded*

*common interest to prune* and presented by the author, Jeroen Donkers. The main question was: “how can opponent-modeling be extended so that it includes knowledge symmetry?” The proposed answer is to switch from zerosum games to nonzerosum games during heuristic search. A problem is however that those games can have many equilibria that might differ largely. The author introduced ‘bounded common interest’ that both allows pruning in an alphabeta-like way and that limits the differences between the equilibria. The latter aspect diminishes the risk of selecting a non-optimal equilibrium.

The second session was completely dedicated to computer Go. The session started with a presentation by Ken Chen of the paper titled *Soft and Hard Connectivity in Go*. As the title suggests, the author distinguishes two types of connectivity: hard connectivity exists if the opponent cannot prevent a player from connecting to a group, soft connectivity exists if the opponent could prevent connection, but only against high costs. The author shows a heuristic based on influence theory to detect soft connectivity. To detect the shortest hard-connectivity paths, the author proposed to apply proof-number search variants such as Pn+.

The second and the third presentation were both given by Bruno Bouzy. He started with the presentation of his own paper *History and Territory Heuristic in Monte-Carlo Go*. In this paper the author presents the two heuristics each in two forms: internal and external. Internal means that the heuristic is used inside the monte-carlo simulations. External means that the data for the heuristic is collected during the monte-carlo simulation, but used in the following pre-selection stage in which moves are selected for the next monte-carlo round. The territory heuristic uses the average occupation (black / white) for every intersection at the end of the simulations. It produces a measure of urgency for moves to play next. The history heuristic uses the outcome of the monte-carlo simulations (bad or good move) to change the urgency of moves to select next. The external territory and external history heuristic appeared to perform best.

Bruno Bouzy continued with the presentation of Tristan Cazenave’s paper *The Separation Game*. This presentation fitted well to the first Go paper since a separation is related to the concept of soft and hard connectivity. A separation exists if a player can prevent the opponent from connecting two groups. It appears that separation exists if there is 8-connectivity. So, searching for separation is searching for 8-connectivity. The author explains how generalized threat search (GTS) is used to find the important separations. Experimental results

show that the method increases the search efficiency significantly.

The second session was closed by the presentation *The strategies for Simple One-Point Ko Situation of Computer Go* (S.J. Huang, S.S. Lin, and S.J. Yen) given by Shi-Jie Huang. After explaining the basics of ko-fight in Go, including ko-threats, the author show a method to transform the ko-fight in a simpler game by using the values of ko itself, the ko-threats and other interesting moves. This simplified game can then be solved by a minimax procedure.

The two computer-game sessions gave an interesting and inspiring insight in work-in-progress in this area. The closing dinner with the participants and the friendly venue of Salt Lake City added to the wonderful experience. We thank Ken Chen for again organizing this event.

## Report on the 13<sup>th</sup> World Computer Chess Championship

Reykjavik, Iceland

*Yngvi Björnsson*  
*Reykjavik, Iceland*

Over the decades computer chess has played a prominent role in AI research. In the quest for the Holy Grail, a computerized human-like intelligence, the early pioneers of artificial intelligence research set out with the intermediate research goal to build a chess program capable of matching the strongest humans. This was to take no more than ten years. This, however, turned out to be a far more challenging and elusive goal than initially planned, and only over half a century later had the state-of-the-art of chess programs reached the point where they were able to compete at a grandmaster level. The research has for main part focused on sophisticated methods for exploring large search spaces, and several ideas initially developed for computer chess have later found their way into other subfields of AI that rely on extensive search, such as heuristic-search and planning. The world computer chess championships have over the years provided an important venue for researchers and others to meet, exchange ideas, and compete in a friendly setting. This has without a doubt greatly accelerated progress in the field and will hopefully continue to do so for many years to come.

This year's championship, the *13th World Computer Chess Championship*, was held in Reykjavik, Iceland, August 13<sup>th</sup> - 21<sup>st</sup>, under the auspices of the International Computer Games

Association (ICGA). The championship was hosted by Reykjavik University. There were 12 chess programs participating, coming from six countries: Belgium, France, Israel, The Netherlands, Germany, and USA. The tournament started on the evening of Saturday August 13<sup>th</sup> with a players meeting, followed by an opening ceremony. The tournament was officially opened by the guest of honor, ex-president of FIDE and international grandmaster Fridrik Olafsson. The first round started the following day. The championship was played as an 11-round tournament according to a round-robin schedule where each participant plays against all the others.

One of the most spectacular world championship matches in the history of chess was held in Reykjavik in 1972 – the now legendary Fischer-Spassky world championship. The 13<sup>th</sup> World Computer Chess Championship will also be remembered as a spectacular event within the circles of computer chess aficionados. It was clear from the very beginning that the playing field was very strong this year, not at least because the field of amateur programs seemed quite formidable. This was indeed immediately witnessed by several upsets in the early rounds. In the end, when the dust had settled, the final standings were unexpected. Not only was there a new first-time world champion, the amateur program ZAPPA by Anthony Cozzie from the USA, but the 2<sup>nd</sup> place program, FRUIT by Fabien Letouzey from France, was also an amateur program. The several-time world-champion program SHREDDER only managed to finish in a shared 3<sup>rd</sup> place, and the defending world champion JUNIOR had to settle for the 6<sup>th</sup> place. The program ZAPPA won very convincingly, losing only half a point in the entire tournament (ironically against the last place finisher).



The amateur program ZAPPA by Anthony Cozzie was the unexpected winner.

The final standings are shown in the table below:

13 <sup>th</sup> World Computer Chess Championship				
Program	Authors	Total	SB	Place
ZAPPA	Anthony Cozzie	10.5		1
FRUIT	Fabien Letouzey	8.5		2
DEEP SJENG	Gian-Carol Pascutto	7.5	30.5	3-4
SHREDDER	Stefan Meyer-Kahlen	7.5	30.5	3-4
CRAFTY	Robert Hyatt	6.5	26	5
JUNIOR	Amir Ban / Shay Bushinsky	6.5	22.75	6
DIEP	Vincent Diepenveen	5.5		7
JONNY	Johannes Zwanzger	4.5		8
THE BARON	Richard Pijl	4		9
ISICHESS	Gerd Isenberg	2.5		10
THE CRAZY BISHOP	Rémi Coulom	2		11
FUTÉ	Jean-Louis Boussin	0.5		12

For the last decade commercial computer-chess programs have dominated the world championship scene. In particular, the chess programs SHREDDER and JUNIOR have taken turns winning the world championship title ever since 1996. This world championship marks and end to that era. The strong performance of amateur programs will hopefully act as an inspiration for newcomers to the computer chess community. Also, the fact that the 2<sup>nd</sup> place winner FRUIT is an open-source chess engine is of an additional value to the chess community, just as the program CRAFTY has been for so many years. These strong open-source chess programs will hopefully encourage an atmosphere of free exchanges of ideas that characterized the early years of computer chess.

In addition to the main tournament, two other chess tournament events were held as a part of the championship: the 2005 World Speed Chess Computer Championship and an unofficial Fisher Random Chess (FRC) tournament. In the speed chess tournament the program SHREDDER successfully defended its title in an exciting tournament. Its only loss came in the first round when Stefan, the program's author, inadvertently moved the wrong rook on behalf of his program, thus forfeiting the game.

2005 World Speed Chess Tournament Table										
Program	1	2	3	4	5	6	7	8	Tot	Place
1 JONNY	X	0	0	0	1	.5	0	0	1.5	7/8
2 DIEP	1	X	1	0	0	0	.5	0	2.5	5/6
3 DEEPSJENG	1	0	X	0	.5	0	0	0	1.5	7/8
4 SHREDDER	1	1	1	X	0	1	1	1	6	1

5	FRUIT	0	1	.5	1	X	1	0	1	4.5	3/4
6	CRAFTY	.5	1	1	0	0	X	0	0	2.5	5/6
7	JUNIOR	1	.5	1	0	1	1	X	0	4.5	3/4
8	ZAPPA	1	1	1	0	0	1	1	X	5	2

In the FRC chess tournament the programs SHREDDER and JONNY by Johannes Zwanzger Germany shared the first place. (Johannes also won a casual speed chess tournament where the authors of the chess programs played against each other).

Fisher Random Chess Event								
	Program	1	2	3	4	5	Total	Place
1	DEEP SJENG	x	1	0	0	1	2	3 / 4
2	FRUIT	0	x	0	1	1	2	3 / 4
3	JONNY	1	1	x	0	.5	2.5	1 / 2
4	SHREDDER	1	0	1	x	.5	2.5	1 / 2
5	THE BARON	0	0	.5	.5	x	1	5

Overall this world championship was very interesting and the level of play excellent, resulting in many exciting and hard-fought battles. The games from the tournament can be found on the official tournament website (<http://www.ru.is/wccc05>) as well as pictures and additional information about the event.

Finally, this has been a truly exciting year for the chess world; it has witness new first-time world champions in both the human and computer chess: TOPOLOV and ZAPPA, respectively.

## The 11<sup>th</sup> Advances in Computer Games Conference

Taipei, Taiwan

*Fredrik Niemelä  
Stockholm, Sweden*

The 11<sup>th</sup> Advances in Computer Games conference was held in Taipei, Taiwan on September 6 to 8, 2005. This was the first time that the event took place in Asia, organised by the Institute of Information Science, Academia Sinica and Chang Jung Christian University in close cooperation with the ICGA and the Institute for Knowledge and Agent Technology (IKAT). The conference, organised at the same time and location as the 10th Computer Olympiad, was held for three days. The presentations were scheduled in the morning and

afternoon, enabling the computer tournaments to be played in the evening. The programme consisted of 20 presentations and three invited lectures.

The Programme chairs, Prof. Shun-Chin Hsu and Prof. Jaap van den Herik, had invited Prof. Tony Marsland, Prof. Hiroyuki Iida and Dr. Feng-hsiung Hsu to give the invited lectures. Tony Marsland kicked off the first day with an inspiring lecture entitled *Trials and Tribulations of a Programmer*. The second day started with Hiroyuki Iida talking about *Towards Dynamics of Intelligence in the Field of Games*. Finally the first speaker of the third day was Feng-hsiung Hsu, who talked about *Hardware-Related Research at Microsoft Research Asia*.

The other presentations dealt with many different games; Amazons, Checkers, Chess, Chinese Chess, Four-player Chess, Go, Heap games, K-in-a-row, King race, Lines of Action, Mastermind with a lie, Phantom Go, Poker, Pool and Shogi. The presentations were of high quality and, now and then, inspired very interesting debates. Regardless of this, thanks to the session chairs, we stayed more or less on time. New for this year was a special session for Robotic Pool and Snooker initiated by Prof Michael Greenspan, who motivated why we should welcome Pool to our community in his talk *An Event-based Pool Physics Simulator*.

As usual, exchange of ideas between the participants were plentiful and very useful. The proceedings of the conference will be published by Springer-Verlag in the Lecture Notes in Computer Science series. More information can be found at the conference website at <http://www.iis.sinica.edu.tw/Conference/ICGA2005/>.

## ICEC 2005

September 19-21, 2005, Sanda, Japan

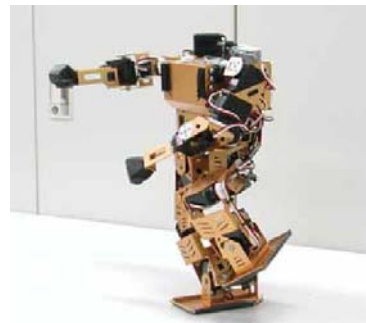
*Jos Uiterwijk,  
IKAT, Universiteit Maastricht*

The International Conference on Entertainment Computing saw its fourth edition. After ICEC 2002 in Makuhari, Japan (actually a workshop) followed ICEC conferences in Carnegie-Mellon University in 2003 and Eindhoven University in 2004. This year the conference moved back to Japan, to the Kwansei Gakuin University in Kobe, Sanda. The conference provided a broad program with four keynote lectures and many parallel tracks, totalling 51 presentations, 9 demonstrations, and 12 posters. They covered many topics, including interactive digital storytelling, graphics, advanced interaction design, social impact and evaluation, seamless /

seamless interface, body and face modeling, robotics, music and sound, mixed reality and mobile entertainment, education, virtual reality and simulation, and theory. Below I describe the four keynote lectures.

Ryohei Nakatsu, Kwansei Gakuin University, Japan  
*A New Framework for Entertainment Computing: from Passive to Active Experience*

Prof. Nakatsu introduced and discussed a new framework for entertainment computing. Based on already existing models and concepts the different links and relationships between enjoyment, flow, presence, and different forms of experiences were shown and their contributions to the new framework reviewed. He addressed the more fundamental and theoretical issues regarding entertainment utilizing existing theories in information processing, enjoyment and flow theory. The main missing feature of game characters is physicality. That is why robots are so appealing. He gave several nice demonstrations of the physical possibilities of present-day robots. He concluded his talk by giving some already possible and probably important guidelines for the design of new entertainment systems.



Nakatsu's dancing robot demonstrating Tai-Chi.

Tetsuji Baba, Namco Limited, Japan  
*The Existing State and Trend of Japanese Game Industry & Game Technology*

Prof. Baba elaborated on the existing state and trend of the Japanese game industry, especially regarding consumer games, such as console games, online games and mobile phone games. He also addressed some problems to be solved by game producers, such as the lack of new types of games and the increasing development time and cost of games. Then he addressed the topic of the Japanese game technology and how it should contribute in inspiring the market of consumer games. At his wishlist were a more natural expression of images and motion (real-time), better interfaces (with 5 senses: sight, hearing, touch, smell, and taste), and artistic impressions of images. Prof. Baba then showed various examples of Namco's game technologies using image recognition technology, fluid dynamics and other technologies.



Roy Ascott, University of Plymouth, UK  
*Syncretic Reality and the Technoetic Universe*  
I reproduce the abstract provided by Prof. Ascott.



Prof. Ascott mediating in his own way.

“The convergence of silicon-dry computational systems and wet biological processes provides new media for all creative fields. The human mind and telematic systems are interacting to produce a new sense of self and planetary consciousness. Immaterial connectedness defines both quantum reality and the spiritual domain. The biotonic information network of the body can be seen to parallel the telematic flows of electrons and photons across the planet. From this ontological horizon, certain questions arise: Are we developing a syncretic reality that merges mixed reality technology, altered states of consciousness, and conflicting models of reality governed by metaphors of biology, quantum physics, language and social habit? Is our drive to create wilder and deeper and faster networks an evolutionary impulse to engage more fully with universal mind? Does the telematic field of cyberception attempt to mirror or even augment our awareness of the field of consciousness? Are there teleological promptings and purposive impulses in our own DNA? Is our interest in the hybridization of forms related to an emergent hybridization of space? Are online gaming and other instruments of digital entertainment merely ephemeral distractions or might they contribute to processes of world-building and planetary consciousness that political strategies cannot reach? These questions are compounded by what we do not know about dark matter and dark energy, the location of mind, the nature of qualia, purpose in evolutionary processes; the complexity of energy fields. Syncretism, well recognised historically as an attempt to reconcile and analogise disparate religious beliefs and cultural practices – seeking likeness within unlike things – may now serve us in understanding the multi-layered world views, both material and metaphysical, that are emerging from our

engagement with pervasive computational technologies and post-biological systems.” I could not have said it better! But to be honest, this talk, as evident from its abstract, had a very high philosophical and spiritual character. All in all, it did pose more questions than it answered, but that is of course also the challenge of science.

Stephane Natkin, CNAM, France  
*From Games and to Digital Entertainments and Media in the XXI Century*

Prof. Natkin started by describing the development of communication networks in the last century: telephone, radio, television, with its consequences, both from an individual point of view as a worldwide point of view. The growth of the internet at the end of the last century suggests a new communication revolution relying on interactive media. To understand this evolution he considered the increasingly complex relationships between the real world and the virtual world, in multiplayer games and more generally in entertainment applications. From a technical point of view new concepts and devices are changing the scene. Think about mobile and ubiquitous computing, tangible interfaces, smart devices, and so on. The next generation media will rely on the cross media uniform platform. The principle is rather simple: the user may interact with the same interactive virtual world using all of the possible devices. The media interface will be automatically adapted to the device. The most advanced feature of the uniform platform is the ability to mix broadcast passive media and active media into a unified medium. Prof. Natkin continued showing several examples and demonstrations of this evolution and analyzing its impact both from the point of view of media and video games. He stated that, as a consequence, in the next ten years the video games world may change significantly in its content, its technology and its economy.

Besides the scientific content the organisation provided us with several cultural and culinary activities, including an interactive media concert and a Noh play (Noh is an ancient Japanese form of theatrical performance).



Traditional Noh performance.

## The 2<sup>nd</sup> International Workshop on Ubiquitous Home

The two days after the conference participants could attend a workshop in Kyoto. The first day was at NICT (National Institute of Information and Communications Technology). The day started with a keynote lecture.

Nobuhiko Nishio, NICT

### *Designing Future Life through Ubiquitous Computing*

Prof. Nishio welcomed the participants and gave an introduction to the NICT research. Their ubiquitous Home project (or ubiHome for short) is a follow-up to the famous Japanese TRON project from the eighties and nineties designing the future home, based on many computing devices and connections. The ubiHome project improves on this using new standards, wireless communication and new insights.

The keynote lecture was followed by a paper session containing five talks, all related to the ubiquitous Home project. Words like future home, ubiHome, etc. were of course abundant. One clearly lacking subject was ethical subjects and the question if we really need or want all this. It seems that the motto is not “we’ll design what you need”, but “you’ll need what we design”. Prof. Natkin added that in his opinion the research is dangerous, clearly lacking a sociological model. He suggested to read Asimov’s fifty year old robot books. The paper session was followed by a visit to the ubiHome, which is abundantly equipped with cameras, microphones, TV and computer screens, pressure sensors, ID recognition devices etc. Several applications were demonstrated.

Being flooded with information there was a welcome and enjoyable variation by going to a Zen-Buddhist temple and experiencing a 2-hours Zen meditation.



A Zen-Buddhist monk demonstrating how to meditate.

The second day was at Kyoto University. Here we started again with a paper session consisting of 5 papers, all more or less related to ubiquitous entertainment. In the afternoon there was a video lecture by Prof. Seigow Matsuoka on Japanese Culture, in particular on Noh play. This was followed by a keynote lecture by prof. Roy Ascott extending his earlier lecture at ICEC 2005. The scientific part was closed by a panel discussion, concerning issues as how the future society will look alike, being a networked, ubiquitous society. How will people guard their identity and which role will games and entertainment computing play?

The workshop on ubiquitous home proved to be a valuable and enjoyable companion for the ICEC conference. Thanks to all the organisers!

Concludingly it seems that, after the hype of the “e”-word, the coming years will see the “u”-word spreading around the world.

## Impressions on BNAIC 2005

*Karl Tuyls*  
*IKAT, The Netherlands*

This year’s local organization, a cooperation between the Vrije Universiteit Brussel and Hasselt University, successfully applied for a marvellous historical location as a conference venue for the BNAIC 2005, i.e. The Royal Flemish Academy of Belgium for Sciences and Arts. The academy dates back to 1823 when it was built by architects Charles Van der Straeten and Tilman-François Suys. It is located near the famous Brussels Warande parc, the Royal Palace and the Parliament, symbolizing its central role in Belgium today. More information on its rich history can be found at the website of the academy: <http://www.kvab.be>.



The Royal Flemish Academy of Belgium for Sciences and Arts.

## SUNDAY 16TH OF OCTOBER

Good evening Brussels! BNAIC started with a pre-registration on the evening of 16th of October, in a typical Brussels pub, called *La Becasse*. A small room was reserved where participants could register, meet each other in a very jovial atmosphere and exchange ideas with friends and colleagues of their local research community, while drinking the famous Belgian lambic.



The pre-registration took place in Café La Becasse.

Pretty soon many people arrived and the hall got crowded with enthusiastic attendees, promising BNAIC 2005 to become a very successful conference with a qualitative exciting program. The entire evening saw more than 60 participants registering and discussing new ideas with their peers in this wonderful atmosphere.

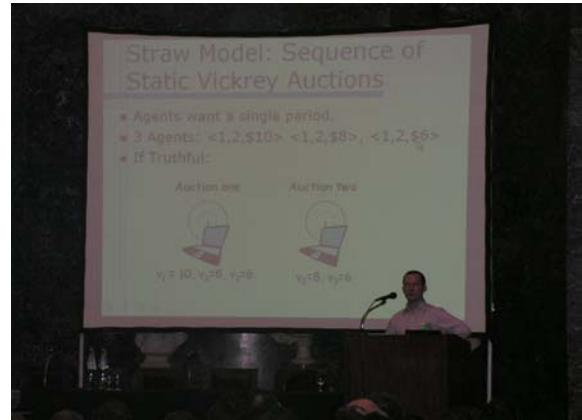
## MONDAY 17TH – TUESDAY 18TH OF OCTOBER

On Monday morning the conference was officially opened by the organizers and the BNVKI in the magnificent *Troonzaal*, after which it was time for the first invited speaker, David Parkes. Parkes is an associate professor at the prestigious Harvard university in Boston, USA. David is one of the key players in the field of computational economics, more specifically in the area of computational mechanism design, electronic commerce, game-theory, auction theory and multi-agent systems.



The opening ceremony.

His talk was titled: *Computational Mechanism Design, An AI Agenda* and set out a research agenda and current state of the art in this field. David clearly motivated why Mechanism Design is of great interest to the AI research community. More precisely, he motivated that the challenge of Mechanism Design is of interest for the design of multi-agent systems, which he illustrated by the famous Vickrey-Clarke-Groves mechanism. Furthermore he outlined the open challenges of current state of the art in mechanism design, including capturing the dynamics of the population of agents involved, its centralized nature, providing agents with learning capabilities and describing boundedly rational agents. The inspiring identification of these research issues in computational mechanism design, will most certainly be of great interest to many of the present scientists to continue research related to or in the core of this exciting young area.



David Parkes during his invited lecture.

After the wonderful talk of David Parkes, the trend was set for a high quality, interactive conference program in almost all of the major themes in Artificial Intelligence research today. The program consisted of 92 contributions, containing 38 regular papers, 50 compressed contributions and 4 demonstrations, which were carefully selected by the program committee. All contributions were divided over 18 (parallel) paper sessions, 2 poster sessions and 1 demonstration session. More specifically, contributions covered topics in: Evolutionary Computation, Knowledge Representation, Cognitive Modelling, Multi-Agent Systems, Ontologies, Machine Learning, Logic, Search, Data Mining, Language, Bayesian modelling and AI Applications. The two-day program was divided over 4 conference rooms: Troonzaal, Marmereen zaal (lunches and poster sessions), Stevinzaal and Rubens auditorium. The pictures below give some impressions on the

stimulating atmosphere created by these these wonderful conference rooms.



Poster and lunch sessions in the Marmeren zaal.

Striking new trends in this BNAIC edition were the increased number of B-papers or compressed contributions, which were submitted and made it to the conference program, and the great number of research papers in the area of multi-agent systems. Five out of eighteen sessions were specifically dedicated to Multi-agent research and at least four others (Language, Cognitive Modelling, Logic in AI and Bayesian Modelling) were very closely related to agents research. This trend reflects on the one hand the currently enormously growing international interest in multi-agent research and on the other hand the important and fundamental role, carried out by the Dutch and Belgian research community in this relatively young field.



The Stevin room.

The first conference day was ended by a very nice refreshing walk through the historical city center of Brussels, guided by Bram Vanschoenwinkel, a Ph.D. student of the computational modeling lab of the Vrije Universiteit Brussel. While most people discussed research issues of a most promising first conference day, Bram regularly halted and introduced the conference participants to the most impressive historical locations of the city center.



Guided tour through Brussels.

Bram's walk ended after a little more than an hour close to the conference dinner location, *La Manufacture*. This was an excellent appetizer, thanks Bram!

After a well deserved short night of rest for most conference participants, the second day also welcomed a large number of attendees. This day started with well crowded sessions on Logic in AI, Data Mining and Multi-Agent Systems. The conference program was ended by an impressive invited talk by Luc Steels on the origins of language research, titled: *Semiotic Dynamics and the Recruitment Theory of Language Origins*. Steels is a professor of computer science at the Vrije Universiteit Brussel and director of the Sony Computer Science Laboratory – Paris.



Invited speaker Luc Steels.

In his talk he started to outline the current state of the art in research on the origins of language. More precisely, he gave an overview on what is recently called *Semiotic Dynamics*. Steels defined this area as the scientific field exploring how the relations between language, concepts expressed by language, and the objects language is about to evolve in large populations of agents. As an example Luc explained that social tagging sites or other types of community software systems, in which millions of people participate, show this kind of semiotic dynamics. After this, he summarised the debate on the origins of language and illustrated how the recruitment of particular mechanisms makes a difference for building a better communication system.

For Bernard Manderick and Jaap van den Herik this was a quite busy conference day as they both were chairman of respectively the best paper award committee and the best demonstration award committee. Besides selecting senior scientists for their committees, this involved organizing a small deliberation on this second conference day and of course attending all nominated contributions on Monday and Tuesday (and making sure that their committee members did).

This year three awards were handed out, i.e. the Best Paper Award sponsored by Decis Lab, the best demonstration award sponsored by SKBS, and the Best M.Sc. Thesis in AI in the Netherlands offered by KION.

The Best Paper Award, announced by Kees Nieuwenhuis, went to: *Generalization to Unseen Cases* by Teemu Roos, Peter Grünwald, Petri Myllymäki and Henry Tirri. Unfortunately, none of the authors were still present during the closing ceremony of the conference to accept felicitations and their certificate. Therefore, we would like to congratulate them once more in this article! In their paper the authors analyzed classification errors on unseen cases. They derived a data-dependent bound on the difference between off-training-set and standard generalization error in their work. The authors demonstrated this bound on UCI data-sets, implying nontrivial generalization guarantees in many practical cases. Moreover they showed that certain claims made in the No Free Lunch literature are too pessimistic.



Kees Nieuwenhuis (Decis-lab) announcing the Best Paper Award.

The Best Demo, announced by Jaap van den Herik, was awarded to Gerald de Jong for his wonderful demonstration titled: *Fluidiom: The Evolution of Locomotion*. Fluidiom is an open source web-based platform for experimenting with the evolution of locomotion in the domain of 3D muscular bodies. Among other things Gerald demonstrated live building of geometrical structures, or bodies, and the evolution of locomotion (running, hopping, crawling), which he explained in detail. This exciting demonstration can still be admired at Gerald's webpage: <http://today.java.net/pub/au/215>



Gerald de Jong receives the Best Demo Award.

Finally, the best M.Sc. thesis in AI in the Netherlands was awarded to Olaf Booij of the University of Amsterdam, for his thesis *Temporal Pattern Classification using Spiking Neural Networks*. This young promising scientist was also given a very nice gift by Luc Steels containing three of his well known books from three decades of AI research.

I would like to congratulate all awarded scientists once more and hope they can continue their highly valued work in the future!



Olaf Booij went home with the Best M.Sc. Thesis Award.

Finally the conference was closed by Han la Poutré, chairman of the BNVKI, who thanked the attendees, contributors and local organizers. A Belgian beer reception was the perfect closing of a very fruitful high quality BNAIC conference! Hope to see you all next year!



Flowers for the organising committee.

### More, More Ph.D. Theses

*Jaap van den Herik  
IKAT, Maastricht*

Recently the Minister of Education, Culture, and Science, Mrs. Maria van der Hoeven voiced as her opinion that the Netherlands should aim at an increase of the production of Ph.D. theses. In relation to other European countries, such as Germany, France, and England our production seems to be inferior to their production. Of course, we are talking on numbers and not on quality, but still the message is given and the University Authorities should do something with these observations.

Let us go back for a while in time and look at the recent developments. Some years ago the *crème de la crème*, i.e., the Vice-Chancellors, the Rectors, and the Provoosts (or whatever name they may have) were assembled in Bologna and harmoniously agreed upon the treaty of Bologna. This means that they abandoned the difference in education in the European countries. For instance, the Netherlands should give up the titles Drs. (doctorandus), Ir. (ingenieur), and Mr. (meester). Other countries should refrain from baccalaureate, licentiaat, 2<sup>nd</sup> licentiaat, etc. We should transfer all these titles into a new system of Bachelor/Master titles. Of course, there was a diversification in Master of Science, Master of Arts, Master of Linguistics, and Master of Philosophy. The Dutch organization NUFFIC saw one of its tasks completely disappear, but they should be pleased since their aim was from the beginning to fight for “harmonization of titles”.

In general, the discussion was as follows: Bachelor would take three years, and Master would take one or two years (depending on all kind of “historical” rules). So far, so good. The continuous discussion on this battlefield of titles was solved. Many expected academic peace in the world of education in favour of student exchange and “Europeanisation”. First, all master educations were expected to give access to Ph.D. studies. Later on, we learned that the introduction of the research master was more tailored to such a Ph.D. continuation.

For an accurate observer, it was clear that the battlefield of valuation of education shifted from M.Sc. to Ph.D. Up to 2004/2005 we had only one doctor’s title in the Netherlands, namely Dr. XXX. However, the vocational training decided to introduce their own Doctoral Programme, leading to a D.P. title (also called doctor, but denoted as D.P. XXX or XXX D.P.). So, at least in the Netherlands we have two different doctor titles. What about France and Germany? In Germany, the matter is much more difficult, but what the two countries have in common is the differentiation into a promotion to Doctor and an habilitation’s defence. The latter is the defence of a thesis which results in the recognition that the defender is qualified to take up a position as professor. However, the possession of an habilitation does not automatically imply that you will be appointed as a professor in the (near) future. It is a sign that you are eligible.

In the Netherlands, we do not have habilitation’s theses. So, where are our Ph.D. theses to be positioned? Some would like to argue that the quality is between the (German/French) Ph.D. thesis and the (German/French) habilitation’s thesis. I do not know what the truth is in this case. But I know

that in some neighbouring countries it is easier to obtain a Ph.D. title than in the Netherlands. All in all, we keep our standards and that is good.

So, our Minister is now calling for more Ph.D. theses. Does this imply that we should lower our standards? In my opinion, no certainly not. We should only put more emphasis on the Ph.D. phase. The result will then be more Ph.D. students and more theses.

The current list of announcements is an excellent sign that our candidates have already understood the message and are working to diminish the gap with our neighbours. For the right accumulation we have included some Ph.D. defenses in September which we had missed in the previous issue. In the next issue we will provide an annual overview and comparison with the years before (over more than ten years). For now, we would like to congratulate all newborn doctors and their supervisors with their successes. The Minister can be proud on you. Thank you, and best wishes for your future career.

**Wanda van Ast** (September 8, 2005). *Diagnostic Reference Frames for Epileptic Seizures*. Academisch Medisch Centrum, Amsterdam. Promotores: Prof.dr.ir. A. Hasman (AMC), Prof.dr. W.O. Renier (Universitair Medisch Centrum St. Radboud Nijmegen). Assistant Promotor: Dr.ir. J.L. Talmon (UM).

**Egon L. van den Broek** (September 21, 2005). *Human-centered Content-based Image Retrieval*. Radboud Universiteit Nijmegen. Promotor: Prof.dr. Ch.M.M. de Weert. Assistant Promotores: Dr. L.G. Vuurpijl, Dr. Th.E. Schouten.

**Onno Zoeter** (October 6, 2005). *Monitoring non-linear and switching dynamical systems*. Radboud Universiteit Nijmegen. Promotor: Prof.dr. C.C.A.M. Gielen. Assistant Promotor: Dr. T. Heskes.

**Borys Omelayenko** (October 12, 2005). *Web-Service Configuration on the Semantic Web; Exploring how semantics meets pragmatics*. Vrije Universiteit Amsterdam. Promotores: Prof.dr. A.Th. Schreiber, Prof.dr. J.M. Akkermans.

**Joris Graaumans** (October 17, 2005). *Usability of XML Query Languages*. Universiteit Utrecht. Promotor: Prof.dr.ir. G.J. van der Steen. Assistant promotor: Dr. H. van Oostendorp.

**Csaba Boer** (October 21, 2005). *Distributed Simulation in Industry*. Erasmus Universiteit Rotterdam. Promotores: Prof.dr. A. de Bruin, Prof.dr.ir. A. Verbraeck (Delft University/ University of Maryland).

**Peter H.M. Jacobs** (November 15, 2005). *The DSOL Simulation Suite*. Technische Universiteit Delft. Promotores: Prof.dr. H.G. Sol, Prof.dr.ir. A. Verbraeck.

**Johan van Wamelen** (November 16, 2005). *Organisatie van de informatievoorziening bij publieke organisaties in een netwerkmaatschappij*. Technische Universiteit Delft. Promotor: prof.dr. H.G. Sol.

**Katrin Franke** (November 18, 2005). *De invloed van fysische en biomechanische processen op het inktspoor*. Rijksuniversiteit Groningen. Promotor: Prof.dr. L. Schomaker.

**Iris Hendrickx** (November 21, 2005). *Explorations of the k-Nearest Neighbour Algorithm*. Universiteit van Tilburg. Promotores: Prof.dr. W.P.M. Daelemans, Prof.dr. H.C. Bunt. Assistant promotor: Dr. A.P.J. van den Bosch.

**Daniëlle Sent** (November 21, 2005). *Test-selection Strategies for Probabilistic Networks*. Universiteit Utrecht. Promotor: Prof.dr.ir. L.C. van der Gaag.

**Tibor Bosse** (November 23, 2005). *Analysis of the Dynamics of Cognitive Processes*. Vrije Universiteit Amsterdam. Promotores: Prof.dr. J. Treur, Prof.dr. C.M. Jonker (RUN).

**Fred Hamburg** (November 24, 2005). *Een Computermodel voor het Ondersteunen van Euthanasiebeslissingen*. Universiteit Leiden. Promotores: Prof.dr. H.J. van den Herik, Prof.dr. H.M. Dupuis, Prof.dr. E.O. Postma (UM).

**Michel van Dartel** (December 1, 2005). *Situated Representation*. Universiteit Maastricht. Promotores: Prof.dr. E.O. Postma, Prof.dr. H.J. van den Herik.

**Martin Reynaert** (December 2, 2005). *Text Induced Spelling Correction*. Universiteit van Tilburg. Promotores: Prof.dr. W.P.M. Daelemans, Prof.dr. H.C. Bunt. Assistant promotor: Dr. A.P.J. van den Bosch.

**Cristina Coteanu** (December 20, 2005). *Cyber Consumer Law. State of the Art and Perspectives*. Universiteit Leiden. Promotores: Prof.dr. H.J. van den Herik, Prof.dr. G. Howells (University of Lancaster). Reviewer: Prof.dr. E. Hondius (Universiteit Utrecht).

**SECTION KNOWLEDGE  
SYSTEMS IN LAW  
AND COMPUTER SCIENCE**

**Section Editor  
Marie-Francine Moens**

**The 18<sup>th</sup> Annual Conference on Legal  
Knowledge and Information Systems**

December 8-10, 2005  
VUB Brussels, Belgium

JURIX is a forum for research on information technology as applied to the law, and in particular on the development and application of artificial intelligence in the legal domain. Since 1988, JURIX has organized annual international conferences on current research in the field.

**AT THE CROSSROADS OF ARTIFICIAL  
INTELLIGENCE AND E-GOVERNMENT**

The 18th International JURIX Conference on Legal Knowledge Systems will focus on two major themes and their integration: Artificial Intelligence and E-Government. Currently, several artificial intelligence technologies are growing increasingly mature, including computational modeling of reasoning, natural language processing, information retrieval, information extraction in multimedia, machine learning, electronic agents, reasoning with uncertainty. Their integration in and adaptation to legal knowledge and information systems is studied by many research groups worldwide. Parallel to this development, e-government applications are gradually gaining ground among local, national, European and international institutions. This conference will focus on the integration of artificial intelligence and e-government and will address both fundamental research questions still to be solved and practical applications.

**LIST OF ACCEPTED PAPERS**

Some Foundational Linguistic Elements for QA systems: An application to e-government Services  
*Farida Aouladomar*, IRIT, France

Theory and Practice in AI and Law: A Response to Branting  
*Katie Atkinson and Trevor Bench-Capon*, Department of Computer Science, University of Liverpool, UK

Mixing Legal and Non-legal Norms  
*Alexander Boer, Tom van Engers and Radboud Winkels*, Leibniz Center for Law, Universiteit van Amsterdam, The Netherlands

An Ontological Approach for the Management of Rights Data Dictionaries  
*Roberto Garcia and Jaime Delgado*, Universitat Pompeu Fabra (UPF), Departament de tecnologia, Spain

Regulations Expressed As Logical Models (REALM)  
*Christopher Giblin, Alice Y. Liu, Samuel Müller, Birgit Pfizmann and Xin Zhou*, IBM Zurich Research Lab, Switzerland, and IBM China Research Lab, China

Normative Modifications in Defeasible Logic  
*G. Governatori, M. Palmirani, R. Riveret, A. Rotolo and G. Sartor*, School of ITEE, The University of Queensland, Australia, and CIRSIFID, University of Bologna, Italy

Assumption Based Coreference Resolution for Crime Scenario Modelling  
*Jeroen Keppens and Burkhard Schafer*, Dept. of Computer Science, King's College London, UK, and School of Law, The University of Edinburgh, UK

Dynamics of Rule Revision and Strategy Revision in Legislative Games  
*Moshe Looks, Ronald P. Loui and Barry Z. Cynamon*, Dept. of Computer Science, Washington University in St. Louis, USA, and School of Business, University of Chicago, USA

Automatic Translation from Textual Representations of Laws to Formal Models through UML  
*Pietro Mercatali, Francesco Romano, Luciano Boschi and Emilio Spinicci*, ITTIG-CNR, Italy, and Dipartimento di Sistemi e Informatica, Università degli Studi di Firenze, Italy

Using Legal Definitions to Increase the Accessibility of Legal Documents  
*Laurens Mommers and Wim Voermans*, Department of State and Administrative Law, Leiden University, The Netherlands

A Question Answer System for Legal Information Retrieval  
*Paulo Quaresma and Irene Pimenta Rodrigues*, Departamento de Informática, Universidade de Évora, Portugal

Validating an Automated Evaluation Procedure for Ontology Triples in the Privacy Domain



Peter Spyns and Giles Hogben, Vrije Universiteit Brussel – STAR Lab, Belgium, and European Commission Joint Research Centre – IPSC, Ispra, Italy

The Legal Concepts and the Layman's Terms – Bridging the Gap through Ontology-Based Reasoning about Liability

Ronny van Laarschot, Wouter van Steenbergen, Heiner Stuckenschmidt, Arno R. Lodder and Frank van Harmelen, Department of Artificial Intelligence, Vrije Universiteit Amsterdam, The Netherlands, and Computer/Law Institute, Vrije Universiteit Amsterdam, The Netherlands

#### LIST OF ACCEPTED WORKSHOPS

Free EU Information on the Web: The Future beyond the new EUR-Lex

Erich Schweighofer, Arbeitsgruppe Rechtsinformatik, Universität Wien Vienna, Austria; Antony Antoine, Instituut voor Europese Studies (INES), VUB Vrije Universiteit Brussel, Brussels, Belgium

On Online Dispute Resolution

Ronald Leenes, TILT, Universiteit Tilburg, The Netherlands; John Zeleznikow, Computer Science Department, Victoria University, Australia

The JURIX 2005 conference is organized by the Vrije Universiteit Brussels – STAR Lab, Belgium in collaboration with the Katholieke Universiteit Leuven – ICRI, Belgium.

For the detailed program:

<http://www.starlab.vub.ac.be/events/JURIX05>

#### CONFERENCE CHAIR

Peter Spyns, Vrije Universiteit Brussels

#### PROGRAM CHAIR

Marie-Francine Moens, Katholieke Universiteit Leuven

## ANNOUNCEMENTS

### Marco Dorigo Receives the “Prix Dr A. De Leeuw-Damry-Bourlart”

Professor Marco Dorigo, co-director of the artificial intelligence lab of the Free University of Brussels, Belgium, and one of the founders of the swarm intelligence and swarm robotics research fields, will be awarded next November 2005 the prestigious “Prix Dr A. De Leeuw-Damry-Bourlart” for his contributions to artificial intelligence and robotics.

The prize, 75,000 EUR worth, will be presented to Professor Dorigo by the King of Belgium during a ceremony that will take place on November 22nd, 2005, at the Palais des Académies in Brussels.

## Call for Participation Machine Learning Mini-Symposium

Tilburg University, November 21, 2005

The ILK Research group and the Language and Information Sciences Department of the Faculty of Arts of Tilburg University kindly invite you to participate in a Machine Learning Mini-Symposium, organized on the occasion of the Ph.D. thesis defense of Iris Hendrickx, regarding her thesis entitled *Local classification and global estimation: Explorations of the k-nearest neighbor algorithm*.

Symposium speakers are William Cohen (CALD, CMU), Hendrik Blockeel (CS, Leuven), and Maarten van Someren (SWI, UvA).

More information, including abstracts of the talks, can be found on the symposium webpage: <http://ilk.uvt.nl/mlsymposium/>.

#### PROGRAM

Monday, November 21, 2005

Room YZ4, Building Y

9.30 - 10.30 William Cohen (Center for Automated Learning and Discovery, School of Computer Science, Carnegie Mellon University, Pittsburgh PA) *Sequential learning methods for partitioning problems*

10.30 - 10.50 coffee break

10.50 - 11.40 Hendrik Blockeel (Department of Computer Science, K.U. Leuven, Belgium) *Experiment databases: A novel methodology for experimental research*

11.40 - 12.30 Maarten van Someren (Department of Social Sciences Informatics, University of Amsterdam, Netherlands) *Bias-variance analysis: What is it and why is it useful?*

12.30 - 13.30 walking lunch

14.00 - 15.00 Ph.D. defense Iris Hendrickx *Local classification and global estimation: Explorations of the k-nearest neighbor algorithm*

Thesis defense location: Aula, Building A

#### REGISTRATION

Attendance is free of charge. Please register with Piroska Lendvai (P.Lendvai@uvt.nl). Inquiries: Piroska Lendvai, tel +31.(0)13.466.8260

#### TRAVEL

For travelling directions to Tilburg University, see <http://www.tilburguniversity.nl/university/route/description/>. The mini-symposium is held in room YZ4, on the ground floor of building Y, except for the Ph.D. thesis defense which is in the Aula, in building A. See the campus map at <http://www.tilburguniversity.nl/university/route/uvtmap2.html>.

#### INFORMATION

Symposium: <http://ilk.uvt.nl/mlsymposium/>  
ILK: <http://ilk.uvt.nl/>  
Inquiries: Pirooska Lendvai, [P.Lendvai@uvt.nl](mailto:P.Lendvai@uvt.nl),  
+31.(0)13.466.8260

### Call for Papers International Conference on Computational Science (ICCS 2006)

*May 28-31, 2006  
Reading, UK*

You are invited to submit a paper with unpublished original work and/or a proposal to organise a workshop at ICCS 2006. ICCS 2006 is the sixth in the series of highly successful conferences.

The theme for ICCS, "Advancing Science through Computation", marks the continued progress in computational science theory and practice, leading to greatly improved applications in science. This conference will be a unique event focusing on recent developments in novel methods and modelling of complex systems for diverse areas of science, on scalable scientific algorithms, advanced software tools, computational grids, advanced numerical methods, and on novel application areas where the above novel models, algorithms and tools can be efficiently applied such as physical systems, computational and systems biology, environmental systems, finance, and others. We look forward to welcoming you to this exciting event!

#### PROCEEDINGS

The ICCS 2006 Proceedings will be published in Springer's Lecture Notes in Computer Science (LNCS) series.

#### IMPORTANT DATES

Proposals for Workshops: November 1, 2005  
Full papers submission: December 2, 2005  
Notification of acceptance: January 31, 2006  
Camera ready papers: February 10, 2006  
Early registration: March 30, 2006

#### CONTACT

[iccs2006@reading.ac.uk](mailto:iccs2006@reading.ac.uk)  
Please, see <http://www.iccs-meeting.org/iccs2006/>  
for more information.

### Call for Papers First International Conference on Scalable Information Systems (INFOSCALE)

*May 30 – Jun 1, 2006  
Hong Kong*

As the data volumes continue to increase and the ways of information dispersion across the globe continue to diversify, new scalable methods and structures are needed for efficiently processing those distributed and autonomous data. Grid computing, P2P technology, distributed information retrieval technology, and networking technology all must be merged to address the scalability concern. This forum focuses on this key merged domain and looks for new integrated solutions for this diversifying world of information.

#### CONFERENCE SCOPE

Parallel Information Retrieval; Scalable Distributed Information Retrieval; Scalable Grid Information Systems; P2P Systems; Scalable Mobile/Sensor DB Systems; Index Compression Methods; Architectures for Scalability; Networking for Scalable Information Systems; Scalable Information System Applications (medicine, biology, military, etc.); Evaluation Metrics for Scalability; VLDB; Data Mining; Information Security

#### IMPORTANT DEADLINES (TENTATIVE)

Paper submission: Oct 1, 2005  
Notification: Dec 31, 2005  
Final version: Feb 15, 2006

Publications: Original and previously unpublished technical papers are solicited for presentation at the conference and publication in the proceedings. The proceedings will be published by IEEE Press and available online through IEEE Xplore. Selected papers will be published in journal special issues.

#### INFORMATION

Dr. Jinli Cao  
Computer Science & Computer Engineering  
Department, La Trobe University, Bundoora,  
Melbourne, Australia  
Phone: +61 3 9479 3035  
Fax: +61 3 94793060  
Email: [j.cao@latrobe.edu.au](mailto:j.cao@latrobe.edu.au)  
Homepage: <http://www.latrobe.edu.au/cs/staff/>  
<http://www.infoscale.org/>

## Call for Papers Special Issue of the International Computer Games Association Journal on Poker

Papers are invited for a special issue of the International Computer Games Association Journal on Poker.

Poker is attracting increasing research activity, along with the rise in the popularity of the game across the world in recent years. This interest builds on work that can be traced back to at least 1944 when Von Neumann and Morgenstern used Poker in their seminal work on game theory.

Papers, investigating the many facets of Poker, are invited for this special issue. The scope of the issue will include (but not be limited to): Human competitive automated players; Search techniques in Poker; Automated detection of collusion in Poker; Opponent modeling; Machine Learning applied to Poker; Game theoretic optimal solutions; Analysis of the different variants of Poker; Theoretical results and/or analysis from Poker variants; Tournament Strategies; Performance metrics (other than money).

### IMPORTANT DATES

30th March 2006: Deadline for submission  
30th June 2006: Decisions returned to authors  
30th September 2006: Camera Ready Papers Due

### SUBMISSION INFORMATION

Author Guidelines are available from the journals web site:  
<http://www.cs.unimaas.nl/icga/journal/contrib.php>

Contributions should be no longer than 4000 words, in line with normal ICGA guidelines.

Completed manuscripts should be e-mailed to one of the editors (see below). At this stage, we would prefer PDF files.

Expressions of interest would be appreciated, so that we have some idea of the number of papers we might receive.

### GUEST EDITORS' CONTACT DETAILS

Jonathan Schaeffer, The University of Alberta  
E-mail: [jonathan@cs.ualberta.ca](mailto:jonathan@cs.ualberta.ca)

Graham Kendall, The University of Nottingham  
E-mail: [gxk@cs.nott.ac.uk](mailto:gxk@cs.nott.ac.uk)

### OTHER INFORMATION

The International Computer Games Association Journal (<http://www.icga.org>) has an ISI impact factor of 0.757 (as at 16th Aug 2005).  
Email: [cis05@comp.hkbu.edu.hk](mailto:cis05@comp.hkbu.edu.hk)

## CONFERENCES, SYMPOSIA WORKSHOPS

Below, the reader finds a list of conferences, symposia and workshops, and websites or addresses for further information.

### NOVEMBER 21, 2005

Machine Learning Mini Symposium, Tilburg University.  
<http://ilk.uvt.nl/mlsymposium/>

### NOVEMBER 14-18, 2005

4th Mexican International Conference on Artificial Intelligence (MICA I 2005). Monterrey, Mexico.  
<http://www.MICA I.org/2005>

### NOVEMBER 23-25, 2005

2005 International Conference on Cyberworlds. Nanyang Executive Centre, Singapore.  
<http://www.ntu.edu.sg/sce/cw2005>

### DECEMBER 7-8, 2005

The Third European Workshop on Multi-Agent Systems (EUMAS2005), Brussels, Belgium.  
<http://como.vub.ac.be/eumas2005/>

### DECEMBER 8-10, 2005

The 18<sup>th</sup> Annual Conference on legal Knowledge and Information Systems (JURIX 2005), Brussels, Belgium.  
Information: [Marie-France.Moens@law.kuleuven.be](mailto:Marie-France.Moens@law.kuleuven.be)

### DECEMBER 15-19, 2005

2005 International Conference on computational Intelligence and Security (CIS2005), Xi'an, China.  
<http://www.comp.hkbu.edu.hk/cis05>

### MAY 22-26, 2006

15<sup>th</sup> World Wide Web Conference (WWW2006)  
Edinburgh, Scotland  
<http://www2006.org>

### MAY 28-31, 2006

International Conference on Computational Science (ICCS 2006), Reading, UK  
<http://www.iccs-meeting.org/iccs2006/>

### MAY 30-JUNE 1, 2006

First International Conference on Scalable Information Systems (INFOSCALE), Hong Kong  
<http://www.infoscale.org/>

### OCTOBER 9-10, 2006

BNAIC'2006, University of Namur, Belgium.

**ADDRESSES  
BOARD MEMBERS BNVKI**

Prof.dr.ir. J.A. La Poutré (chair)  
Centrum voor Wiskunde en Informatica  
P.O. Box 94079  
1090 GB Amsterdam  
Tel.: + 31 20 592 9333. E-mail: Han.La.Poutre@cwi.nl

Dr. A. van den Bosch (secretary)  
Universiteit van Tilburg, Faculteit der Letteren  
Taal en Informatica, Postbus 90153, 5000 LE Tilburg  
Tel.: + 31 13 4663117. E-mail: Antal.vdnBosch@uvt.nl

Dr. C. Witteveen (treasurer)  
TU Delft, ITS  
P.O. Box 5031, 2600 GA Delft  
Tel.: + 31 15 2782521. Email: c.witteveen@its.tudelft.nl

Prof.dr. M. Denecker  
Katholieke Universiteit Leuven  
Dept. of Computer Science, Celestijnenlaan 200A  
3001 Heverlee, België  
Tel.: + 32 16327544. E-mail: marcd@cs.kuleuven.ac.be

Prof.dr. C. Jonker  
Radboud Universiteit Nijmegen, Division Cognitive Engineering  
Nijmegen Institute for Cognition and Information  
Spinoza Building, Montessorilaan 3, 6525 HR Nijmegen  
The Netherlands Tel.: +31 24 3612646.  
E-mail: C.Jonker@nici.kun.nl

Dr. J.W.H.M. Uiterwijk  
Universiteit Maastricht, IKAT  
Postbus 616, 6200 MD Maastricht  
Tel: + 31 43 3883490. E-mail: uiterwijk@cs.unimaas.nl

Dr. E.D. de Jong  
Universiteit Utrecht, Inst. for Information & Computing Science  
P.O. Box 80089, 3508 TB Utrecht  
Tel.: + 31 30 253.9049. E-mail: dejong@cs.uu.nl

Dr. M.F. Moens  
KU Leuven, Interdisciplinair Centrum voor Recht & Informatica  
Tiensestraat 41, 3000 Leuven, België  
Tel.: + 32 16 325383  
E-mail: marie-france.moens@law.kuleuven.ac.be

**EDITORS BNVKI NEWSLETTER**

Dr. J.W.H.M. Uiterwijk (editor-in-chief)  
Address details: see above.

Prof.dr. E.O. Postma  
Universiteit Maastricht, IKAT  
Postbus 616, 6200 MD Maastricht  
Tel: + 31 43 3883493. E-mail: postma@cs.unimaas.nl

Prof. dr. H.J. van den Herik  
Universiteit Maastricht, IKAT  
Postbus 616, 6200 MD Maastricht  
Tel.: + 31 43 3883485. E-mail: herik@cs.unimaas.nl

M. van Otterlo, M.Sc.  
University of Twente, Dept. of Computer Science  
P.O. Box 217, 7500 AE Enschede  
Tel.: + 31 53 4894111. E-mail: otterlo@cs.utwente.nl

Dr. M.F. Moens (section editor)  
Address details: see above.

Dr. K. Verbeeck (editor Belgium)  
Vrije Universiteit Brussel, Computational Modeling Lab  
Pleinlaan 2, 1050 Brussel, Belgium  
Tel.: + 32 26293724. E-mail: kaverbee@vub.ac.be

Dr. R.J.C.M. Starmans (section editor)  
Manager Research school SIKS, P.O. Box 80089  
3508 TB Utrecht  
Tel.: + 31 30 2534083/1454. E-mail: office@siks.nl

Ir. E.M. van de Vrie (section editor)  
Open Universiteit Nederland, Opleiding Informatica  
Postbus 2960  
6401 DL Heerlen  
Tel: + 31 45 5762366. Email: Evert.vandeVrie@ou.nl

**HOW TO SUBSCRIBE**

The BNVKI/AIABN Newsletter is a direct benefit of membership of the BNVKI/AIABN. Membership dues are € 40,- for regular members; € 25,- for doctoral students (AIO's); and € 20,- for students. In addition members will receive access to the electronic version of the European journal *AI Communications*. The Newsletter appears bimonthly and contains information about conferences, research projects, job opportunities, funding opportunities, etc., provided enough information is supplied. Therefore, all members are encouraged to send news and items they consider worthwhile to the editorial office of the BNVKI/AIABN Newsletter. Subscription is done by payment of the membership due to RABO-Bank no. 11.66.34.200 or Postbank no. 3102697 for the Netherlands, or KBC Bank Veldwezelt No. 457-6423559-31, 2<sup>e</sup> Carabinierslaan 104, Veldwezelt, Belgium. In both cases, specify *BNVKI/AIABN in Maastricht* as the recipient, and please do not forget to mention your name and address. Sending of the BNVKI/AIABN Newsletter will only commence after your payment has been received. If you wish to conclude your membership, please send a written notification to the editorial office before December 1, 2005.

**COPY**

The editorial board welcomes product announcements, book reviews, product reviews, overviews of AI education, AI research in business, and interviews. Contributions stating controversial opinions or otherwise stimulating discussions are highly encouraged. Please send your submission by E-mail (MS Word or text) to newsletter@cs.unimaas.nl.

**ADVERTISING**

It is possible to have your advertisement included in the BNVKI/AIABN Newsletter. For further information about pricing etc., see elsewhere in the Newsletter or contact the editorial office.

**CHANGE OF ADDRESS**

The BNVKI/AIABN Newsletter is sent from Maastricht. The BNVKI/AIABN board has decided that the BNVKI/AIABN membership administration takes place at the editorial office of the Newsletter. Therefore, please send address changes to:

Editorial Office BNVKI/AIABN Newsletter  
Universiteit Maastricht, Tons van den Bosch,  
Dept. Computer Science, P.O. Box 616, 6200 MD  
Maastricht, The Netherlands  
E-mail: newsletter@cs.unimaas.nl  
<http://www.cs.unimaas.nl/~bnvk>