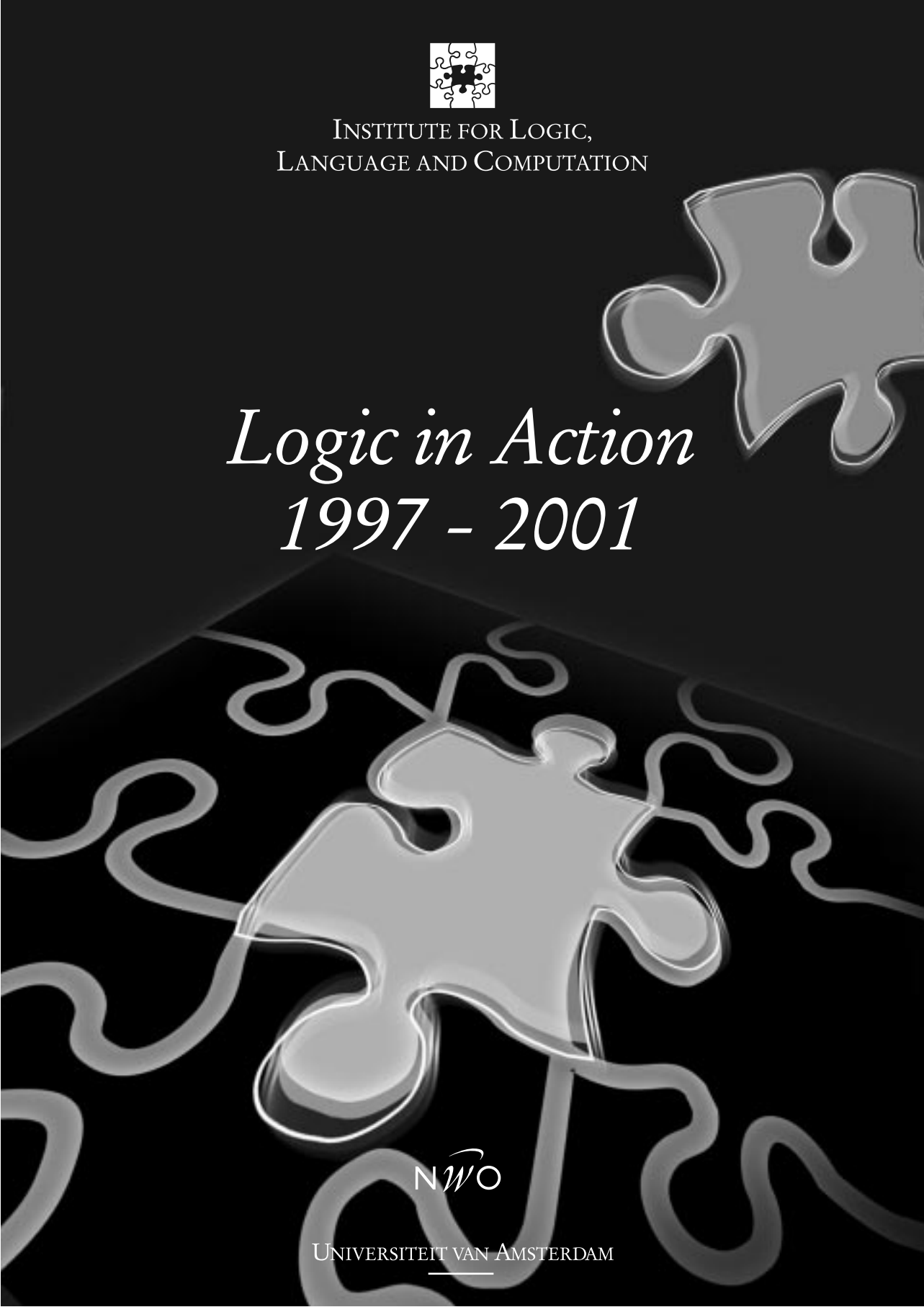
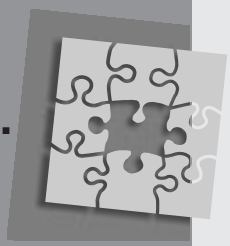

Institute for Logic,
Language and Computation
Logic in Action
1997 - 2001
NWO
Universiteit van Amsterdam



1. A FAREWELL TO THE SPINOZA PROJECT LOGIC IN ACTION

In October 1996, the Dutch national research organization NWO awarded one of its annual Spinoza grants to Johan van Benthem, professor at the University of Amsterdam and Stanford University. This grant led to the project *Logic in Action*, whose aims were the study of information flow and the promotion of logic within the information sciences. Now, 5 years and 2 million guilders later, the project is coming to an end. On 20 December 2001, a one-day event will officially close it all, and reflect on the future. In the morning, three distinguished speakers explore current directions at the interfaces of logic and linguistics, computer science, and the cognitive sciences. In the afternoon, the Spinoza project leaders will present some results from the last 5 years – in a light manner, including some computer demonstrations. The day concludes with the presentation of a book on 'Logic in Action', to be presented to the participants.

Scientific Program

9.30 - 9.45	Johan van Benthem - Opening
9.45 - 10.30	Hans Kamp (Stuttgart) - Logic and Language
11.00 - 11.45	Joseph Halpern (Cornell) - Logic and Computation
11.45 - 12.30	Peter Gärdenfors (Lund) - Logic and Cognition
14.00 - 14.45	Jan van Eijck - Dissemination of Logic
14.45 - 15.30	Yde Venema/Paul Dekker - Logic in Communication
16.00 - 16.45	Maarten de Rijke - Computational Logic
16.45 - 17.15	Johan van Benthem - Closing remarks

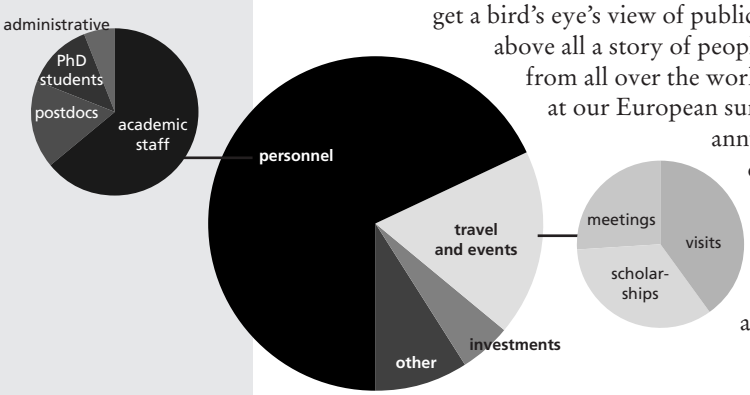
About our invited speakers

Hans Kamp (*www.ims.uni-stuttgart.de/~hans/*) is a professor of formal logic and philosophy of language at Stuttgart University. He has been a pioneer in temporal logic and semantics, and he is the founding father of discourse representation theory. Joseph Halpern (*www.cs.cornell.edu/home/halpern/*) is a professor of computer science at Cornell University, and the founder of the well-known inter-disciplinary TARK conferences. He has done ground-breaking work on epistemic logic and computation, creating new interfaces with game theory, and on foundations of decisions and probability. Peter Gärdenfors (*www.lucs.lu.se/People/Peter.Gardenfors/*) is a professor of cognitive science at Lund University. He was the founding editor-in-chief of the Journal of Logic, Language and Information. He is widely known for his influential work on belief revision, and recently, on informational representation in conceptual spaces.

2. CUTTING A CAKE

What to do with 2 million guilders? How to avoid becoming a prisoner of success, merely managing one's finances? This laureate's first thought was to make just one grand gesture, and buy a 'logic island' in the Florida Keys, which would serve as an eternal refuge for the field. But on second thoughts, a plan with three prongs emerged that fit naturally into my home environment of ILLC, the Institute for Logic, Language and Computation. One was a new project on 'Logic in Communication' that should strengthen the links between humanities and sciences in our environment, by investigating information flow in communication, perhaps just as basic a logical process as the traditional core business of reasoning. Another was a 'Computational Logic Lab' that would link our more theoretical world to computational realities, exposing logical theories to experimentation. And the third was a stream of 'Didactics and Dissemination', finding ways of connecting the newer trends in logic brewed in Amsterdam with education at various levels. Fortunately, several people shared this vision, and were willing to become its project leaders. Also, several institutions around us provided crucial support and recognition. *The Royal Academy of Arts and Sciences* gave fellowships to Paul Dekker and Yde Venema. The Centre for Mathematics and Computer Science provided additional support for Jan van Eijck. Most importantly, following an initiative by Karel Gaemers and Bert Geerken, the *University of Amsterdam* reserved permanent positions for Yde Venema and Maarten de Rijke 'post–Spinoza', and the same happened for Paul Dekker. Whatever has been achieved is thanks to all these people and organizations, without which this project could not have succeeded. But neither could it have worked without its general mainstay, our project manager Ms. Ingrid van Loon.

The cake that had to be divided is shown below. What it gave us was a steady flow of ideas, activities, and publications. For the three main projects, these are briefly indicated on the following pages. Instead of dreary lists, you will also get a bird's eye's view of publications and events. But research is above all a story of people. You will see traces of our guests from all over the world, students, and 'Spinoza lecturers' at our European summer schools. More detail is in our annual project brochures, obtainable via our electronic window *www.illc.uva.nl/lia*. And as a farewell gesture, we have written a little book *Logic in Action*, showing you five logicians in action, five years later.



3. Logic in Communication

The project 'Logic in Communication' is concerned with the formal study of communication and information flow. Its objective is the development and study of mathematical tools for the analysis of communication in both natural languages (linguistics) and artificial ones (computation). With the ultimate goal of developing a broad-range useful 'calculus of information science', the well-known Amsterdam traditions in dynamic semantics and modal logic join forces here. The result has been a meeting place with game theory, and computational theories of action. Achievements over the past five years, in addition to many publications on aspects of the above, include the creation of several new interdisciplinary thematic lines. We now know how to develop powerful modal logics of communication (thanks to work by Spinoza postdoc Alexandru Baltag, who has just become a lecturer in computer science at Oxford University). Also, we have learnt how to integrate dynamic logic with mathematical game theory, and how to interface the latter with modern linguistic optimality theory. A number of dissertation projects are under way at these interfaces now, with Marc Pauly's "Logic for Social Software" the first significant finished product. (Marc will be a lecturer in the multi-agent group at the University of Liverpool.) More generally, a broader community has been created making this a lively new theme at ILLC, and in the Dutch Graduate School for Logic, with fast-growing international contacts.

Paul Dekker

Paul Dekker was a KNAW fellow from 1996 – 2001, on successive projects "Models of Information Exchange" and "Discourse and Information Structure". For the period 2001-2006, he has been awarded a € 770.000 NWO Vernieuwingsimpuls grant on the topic of "Formal Language Games" which will pursue the logical/game-theoretical analysis of natural language use in a systematic manner, emphasizing dynamics and preferences of speakers and hearers. Homepage *www.illc.uva.nl/~pdekker/*

Yde Venema

Yde Venema was a KNAW fellow on the projects "Modal Logic" and "Dynamic Structures" (1995-1998) and "Modal Logic in Communication" (1998-2000). With Maarten Marx, he wrote a monograph "Multidimensional Modal Logic", and with Patrick Blackburn and Maarten de Rijke a state-of-the art textbook in the latter field. He is involved with current projects on Modal Logic, Automata Theory, and Coalgebra in cooperation with CWI Amsterdam, and colleagues worldwide. Homepage *www.illc.uva.nl/~yde/*

4. COMPUTATIONAL LOGIC

The 'Computational Logic' project is concerned with representing, accessing and manipulating informational content in both textual and non-textual form. In particular, logical methods for information analysis are confronted with significant language-processing tasks, including digital libraries, information retrieval, and question answering. The leading strategy is the development of 'variable weight' methods, seeking the right balance between detail of representation and complexity of algorithmic processing. The fine-tuning formalisms used come from modal logic, description logics, and other systems showing the required flexibility. To deal with the concrete tasks at hand, such logics are combined in various ways, including newly developed 'translation-based methods' giving control over the flow of deduction. In addition, the project involves large-scale statistical testing for the purpose of experimental evaluation of the systems designed – while always on the look-out for interesting new emergent phenomena at this bulk level. All these practical questions also have fundamental aspects, which are pursued as well, witness the systematic theory of logic design in the recent dissertation on 'Logic Engineering' by Carlos Areces. The group can also draw on the well-known work on constraint programming by Krzysztof Apt. From an organizational point of view, these activities have provided a focus for existing work in computational logic, leading to a merger with the 'Applied Logic Lab' founded by former NWO Pionier Michael Masuch. The result is a larger center on 'Language and Inference Technology', which has already attracted a large amount of follow-up projects. By 2002, the group is expected to have some 25 members.

MAARTEN DE RIJKE

Maarten de Rijke worked at CWI Amsterdam and the University of Warwick before becoming an associate professor at the University of Amsterdam in ILLC's newly created special focus project on Computational Logic. He is an active board member, editor and organizer in many international enterprises, including the European Association for Logic, Language and Information (FoLLI), the International Federation for Computational Logic (IFCOLOG), and the Transactions on Computational Logic. He has recently been awarded a Pionier project 'Computing with Meaning' with a M€ 1,7 total budget, which will address computational logic and natural language processing in a systematic manner using the paradigm developed in his Spinoza period. In addition, he has initiated several projects with both academic and industrial funding that address related themes, including applications to feature interaction, knowledge bases, and digital documents. Homepage *www.illc.uva.nl/~mdr/*

5. DIDACTICS AND DISSEMINATION

Didactics and dissemination is a kernel project for translating ILLC-style logic research into insights and tools for a larger community. Pilot projects over the Spinoza years have included university course innovation, electronic distance teaching, and research on interactive documents, by Jan van Eijck, Jan Jaspars, Paul Dekker, and others. New university courses, such as Computational Semantics, include an integration of logic teaching with programming in several paradigms (imperative, functional and logic programming). Further initiatives included teaching semantics of natural languages and programming languages from a joint perspective, using forms of dynamic 'context semantics'. The latter approach is also the engine for the 'DYNAMO' project, an executable implementation of dynamic semantics from the modern Dutch School. The computational vehicle for this are semantic tableaus, introduced by E.W. Beth in the 1950s – whose international community serves as a forum for presentation. Collaborators on this are Spinoza Ph.D. student Juan Heguiabehere, and Breanndán Ó Nualláin. The course projects are supported electronically by a growing array of reusable visualizations, demos, and applets: see *http://www.science.uva.nl/~jaspars*. A major venue for presenting this work was the First International Congress on Tools for Teaching Logic in Salamanca, whose second installment will be held in Amsterdam. In addition, the project has produced texts directed toward high schools, trying to influence the still haphazard 'informatics' curriculum in Dutch secondary education. The first book of this kind is "Computation, Reasoning and Calculation", which will be one in a longer series to appear with Amsterdam University Press. Finally, the project is involved with experiments turning more traditional handbooks in the field into interactive electronic resources, witness the LoLaLi project sponsored by Elsevier Science BV.

JAN VAN EIJCK

Jan van Eijck is a senior researcher at CWI Amsterdam, division of Information Systems, a professor of Computational Linguistics at UiL-OTS (Faculty of Humanities, Utrecht University), and a scientific director of the Dutch Graduate School in Logic (OzsL). He has written well-known textbooks on philosophy, logic, and programming. His main current research interest is dynamic semantics and its implementations, developing linguistic issues in parallel with insights from computer science – seeking applications both ways. He is preparing a monograph on "Context Semantics for Natural Language", while vigorously pursuing computational implementations in terms of semantic tableaus. Homepage *http://www.cwi.nl/~jve/*

6. THE FREE SPACE

In addition to the above three projects, *Logic in Action* had a free space for general activities, allowing room for 'freischwebende Intelligenz' of various sorts. This has allowed us a broad array of contacts with colleagues worldwide, and the sponsoring of numerous initiatives enhancing the role of logic in 'informatics'. Many contacts of this sort have been documented in the successive brochures of the Spinoza project, which include contributions by colleagues with strategic vision, project researchers, and students on the move on our planet.

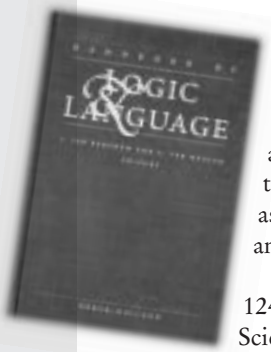
JOHAN VAN BENTHEM

Johan van Benthem is a professor of logic at Amsterdam University (ILLC) and Stanford University (Center for the Study of Language and Information CSLI) His Spinoza years have produced book manuscripts on *Updates for Communication* and *Logic in Games*, several papers on modal logics of space, and some new didactic projects, including *Hoe Wiskunde Werkt* ('How Mathematics Works') with Robbert Dijkgraaf. With Alice ter Meulen, in 1997, he edited the *Handbook of Logic and Language*, which is now a 'pilot document' at ILLC for integrating logical methods with electronic document access. He was awarded an honorary doctorate at Liège, 1998, and was elected a member of the Institut International de Philosophie in 2001. This year, he became the chairman of NWO's national stimulation program for the Cognitive Sciences. Homepage *www.illc.uva.nl/~johan/*

7. PUBLICATIONS, EVENTS, GUESTS

7.1 Publications

On a reasonably reliable count, *Logic in Action* has produced some 186 research reports and published papers, and 23 books and edited volumes. Out of this torrent, we display a few:



Handbook of Logic and Language

"This Handbook documents the main currents in contemporary research at the interface of logic and natural language, including its broader ramifications in computer science, linguistic theory and cognitive science…The primary purpose of this Handbook is to chart the scientific territory of this research community, serve as a vademecum to its travelers and communicate its main results and achievements to its widening audience."

1247 pp., J. van Benthem & A. ter Meulen, eds., 1997, Elsevier Science Publishers, Amsterdam & the MIT Press, Cambridge (Massachusetts).

Modal Logic

"This is a modern, advanced textbook on modal logic, a field which caught the attention of computer scientists in the late 1970s. Researchers in areas ranging from economic to computational linguistics have since realized its worth….The authors focus on the use of modal languages as tools to analyze the properties of relational structures, including their algorithmic and algebraic aspects, and applications to issues in logic and computer science such as completeness, computability, and complexity are considered…
The work is ideal for anyone wanting to learn modern modal logic."

554 pp. P. Blackburn, M. de Rijke & Y. Venema, Cambridge University Press, Cambridge.

Denkende Machines: Computers, Rekenen, Redeneren

Jan van Eijck, Jan Jaspars, Jan Ketting, Marc Pauly
Amsterdam University Press, Amsterdam, to appear in Spring 2002

"Computers are being designed by humans, to perform tasks posed by humans. The basic pattern of the tasks performed by a computer turns out to be so simple that around 1930 Alan Turing,

mathematician and philosopher, and one of the heroes of early computer science, managed to put forward a mathematical description of the essence of mechanical computation. Everyone who understands the concept of a Turing Machine (Alan Turing's abstract model of a computer) knows all there is to know, at an abstract level, about how computers work.
This book sketches some of the history of computation and mechanical 'thinking', and then explains what every layperson should know about the concepts involved."

7.2 Events

Our project has been involved in the organization of about 80 workshops, colloquia, and other types of meeting. This number as such may not be very informative, but a few illustrations may help:

Workshop on Logic and Games; Amsterdam; November 19-20, 1999
Inference in Computational Semantics (ICoS-2), Schloss Dagstuhl, Germany, 29-30 July, 2000
8th Conference on Theoretical Aspects of Rationality and Knowledge (TARK VIII), July 11-14 2001, Siena
7th-11th Annual CSLI Workshops on Logic, Language & Computation, Stanford; May-June
The 2nd, 3rd and 4th International Tbilisi Symposium on Language, Logic and Computation; Tbilisi (September 1997), Batumi (September 1999), Borjomi (September 2001), Georgia

8. PEOPLE

People are the longest-term investment of any project. *Logic in Action* has initiated various activities for making people flow as well as information.

8.1 Visitors

Logic in Action has sponsored about 62 visitors from all over the world.

8. 2 Travel
Of course, we have not just received visitors, we have also been on the move ourselves. Over the past 5 years, Spinoza members gave project-related presentations in countries in every hemisphere: e.g. South Africa, Taiwan, Argentina and many European countries.

8.3 Scholarships
The project has also provided 9 scholarships to students in ILLC's Master of Logic program (www.illc.uva.nl/gpil), and 13 visiting stipends to the European Summer Schools in Logic, Language and Information (www.esslli.org).

8.4 Speakers
Spinoza lectures have been given at the ESSLLI Summer Schools by
1997 (Aix-en-Provence): Solomon Feferman (Stanford University), "What is a logical operation? (according to Tarski, McGee and me)"
1998 (Saarbrücken): Moshe Vardi (Rice University), "Alternating Automata: Unifying Truth and Validity Checking for Temporal Logic"
1999 (Utrecht): Sergei Artemov (Moscow University), "Explicit Provability"
2000 (Birmingham): Ruth Kempson (King's College London), "On Making Syntax Dynamic"
2001 (Helsinki): Edward L. Keenan (UCLA), "Logical Properties of Quantification in Natural Language"

8.5 Awards
Logic in Action also sponsored the FoLLI Dissertation prize, awarded so far to the following people:
1998
Dr. Nir Friedman: "Modeling Beliefs in Dynamic Systems", Stanford University, 1997
Dr. Lisa Matthewson: "Determiner Systems and Quantificational Strategies: Evidence from Salish", University of British Columbia, 1996
1999
Dr. Peter Grünwald: "The Minimum Description Length Principle and Reasoning under Uncertainty", University of Amsterdam, 1998
Dr. Matthew Stone: "Modality in Dialogue: Planning, Pragmatics and Computation", University of Pennsylvania, 1998
2000
Dr. Jelle Gerbrandy: "Bisimulations on Planet Kripke", University of Amsterdam, 1999
Dr. Khalil Sima'an: "Learning Efficient Disambiguation", University of Amsterdam / University of Utrecht, 1999

Now that the party is over…

Logic in Action has been a large-scale investment in ideas, activities, but the lasting investment are of course *people*. It will be clear from the above information that there is life after Spinoza. As in gripping novels, readers may want to know 'what happened to the heroes'. Well, they are thriving! Paul Dekker is starting an NWO Vernieuwingsimpuls project on 'Formal Language Games', Maarten de Rijke an NWO Pionier project on 'Computing with Meaning', Yde Venema is involved in new projects on Modal Logic and Coalgebra that take him all over the planet, and Jan van Eijck has signed several text book contracts, in addition to resuming his project leadership in Information Systems at CWI. So what is left for the Spinoza prize winner, now that the party is over? Johan van Benthem has become the chairman of NWO's national stimulation program for the *cognitive sciences*, handing out money to those who want to bridge an even wider range of disciplines than the ones found in this brochure – and learning a lot in the process. In the biblical parable of the 'talents', people were asked which multiplication factor obtained for the original award they had been given. Econometrists could no doubt compute such a number for *Logic in Action* as well. But there is absolutely no need to end an exciting project with things financial! Or: if we do, let us lift them at once to a higher level. As Karl Marx once said: "Logik ist das Geld des Geistes". 'Logic is the money of the spirit', and whatever stock markets, government budgets, or academic politics may do, the latter source of intellectual commerce is inexhaustible.

PHOTO GALLERY


MARCO AIELLO


CARLOS ARECES


ALEXANDRU BALTAG


JOHAN VAN BENTHEM


ALEXANDER BERGO


ANNETTE BLEEKER


BOUDEWIJN DE BRUIN


PAUL DEKKER


JAN VAN EIJCK


ROSELLA GENNARI


JELLE GERBRANDY


JUAN HEGUIABEHERE


EVA HOOGLAND


JAN JASPARS


GWEN KERDILES


INGRID VAN LOON


MAARTEN MARX


CHRISTOF MONZ


HANS DE NIVELLE


BREANNDAN O'NUALLAIN


MARC PAULY


JON RAGETLI


MAARTEN DE RIJKE


YDE VENEMA

Master of Logic students


Eyal Hurvitz


Walter Dean


Jason Mattausch


Shai Berger


Iouri Netchitailov


David Gabelaia


Seth Cable

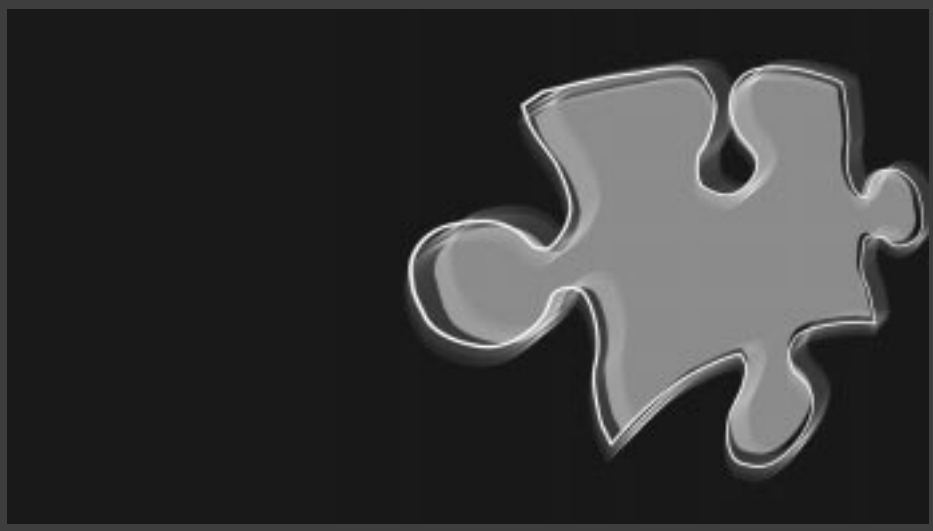

Raj Singh

Information
The preceding is just a selection of the many activities we have been able to support with *Logic in Action*. You can learn about our full project activities via the homepage *www.illc.uva.nl/lia*. Click through, and all will be revealed! There is also a series of annual *Logic in Action* brochures reporting on our 5 years of activity, available via the same website. Logic in action will continue, of course, and you can always check some more traditional portals for the field:

ILLC, Institute for Logic, Language and Computation, University of Amsterdam: *http://www.illc.uva.nl/*
OzsL, the Dutch Graduate School in Logic *http://www.ozsl.uva.nl/*
FoLLI, the European Association for Logic, Language and Information *http://www.folli.org/*

ILLC
Universiteit van Amsterdam
Plantage Muidergracht 24
1018 TV Amsterdam
The Netherlands
Phone: +31 20-525 6051
Fax: +31 20-525 5206
E-mail: illc@science.uva.nl

Design: Crasborn Grafisch Ontwerpers BNO, Valkenburg a.d. Geul - 01688



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