

Personal

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Born November 6, 1954
Marital status: unmarried, son of 7

Education

1974-1977 BA Philosophy (with honors)
1977-1982 MA Philosophy (with honors), Mathematics
1983-1987 PhD (funded by Netherlands Organisation for Scientific Research (NWO)), first at Delft University of Technology, later at Dept. of Mathematics and Computer Science, University of Amsterdam
1987 PhD dissertation *Random sequences*, Dept. of Mathematics and Computer Science, University of Amsterdam

Positions held

1987-1988 Lecturer in Probability and Statistics, Dept. of Mathematics, Delft University of Technology
1988-1993 Huygens Fellow of the Netherlands Organisation for Scientific Research (NWO)
1993-1998 Lecturer in Logic and Artificial Intelligence, Dept. of Mathematics and Computer Science, University of Amsterdam
1994-1999 Director, NWO Research Project ‘Reasoning with uncertainty’
1999 EPSRC Fellow at the Human Communications Research Center, University of Edinburgh
1998-2001 Senior Lecturer in Logic and Artificial Intelligence, Dept. of Mathematics and Computer Science, University of Amsterdam
Since March 1 2001 Full professor of Logic and Cognitive Science, Dept. of Philosophy, Faculty of Humanities, University of Amsterdam
Since January 1, 2002 Co-Director NWO Research program: ‘Logic meets psychology: nonmonotonicity’ (with Frank Veltman)

Professional service

1997-2000 Editor Journal of Symbolic Logic
2000-present Editor Journal of Logic, Language and Computation

In 2001 I was a member of the NWO committee for post doc proposals in the Humanities.

Starting 2007, I am a member of the Steering Committee of the NWO Cognition Scheme. I co-organised several conferences in Amsterdam, such as ‘Reasoning with uncertainty in robotics’ (1995), ‘Logic, computability, complexity’ (1997), ‘12th Amsterdam Colloquium’ (1999)

Refereeing for *Annals of Pure and Applied Logic*, *Journal of Symbolic Logic*, *Journal of Philosophical Logic*, *Journal of Logic, Language and Information*, *Information and Computation*, *Cognitive Science* etc.

I was member of the Advisory Committee defining the Call for Proposals of the EU 6th Framework project ‘Wht does it mean to be human?’ (2003).

Funding

The aforementioned NWO grants total 1.77 M euro. A newer project, funded by the NWO Cognition Scheme, is ‘Reasoning and the brain’, together with Geurts and Hagoort of the F.C. Donders Center for Cognitive Neuroimaging in Nijmegen, and Buitelaar and van der Gaag (University Hospital Nijmegen), with the aim of studying brain correlates of non-monotonic reasoning in healthy and autistic subjects.

Teaching

Undergraduate courses

Introductory logic (for various groups, including mathematicians, philosophers, computer scientists)

Probability theory

Statistics

Cognitive robotics

Recursion theory

Graduate courses

Philosophy of mathematics

Philosophy of probability

Reasoning with uncertainty

Model theory

Set theory: large cardinals

Set theory: forcing and independence results

Quantum logic

Psychology of reasoning

Current issues in Cognitive Science

Logic and cognition: from time to tense

Courses at European Summer School for Logic, Language and Information

Substructural Quantification (1996; with Jaap van der Does)
Logic and Cognition: Vision (1998; with Jaap van der Does)
Tense, Aspect and Nominalisation (2002; with Fritz Hamm)
Semantics and Cognition (2002; with Keith Stenning)
Language, logic and the brain (upcoming in 2008)

Supervision

Master's Theses

Topics of MSc theses prepared under my direct supervision include philosophy of mathematics, set theory, cognitive robotics, reasoning with uncertainty, historical linguistics, semantics of tense and aspect (Spanish, French, Polish, Hebrew), ERP studies of tense and aspect, psychology of reasoning (children, adults, illiterates), autism, ADHD, philosophy of logic, formalisation of law, neural modelling of logical reasoning, metaphorical reasoning.

PhD students

Natasha Alechina (1995): *Modal quantification*
Marco Vervoort (1999): *Games, walks and grammars*.
Darrin Hindsill (2007): *It's a process and an event: perspectives in event semantics*
Three PhD projects will finish in 2008:
modelling evolution of language (Fitz)
psychology of nonmonotonic reasoning (Counihan)
ERP studies of the cognitive processing of temporal expressions (Baggio)
Running PhD projects:
Philosophical presuppositions of formal semantics (Andrade)
Modelling noun-to-event coercion (Sweep)
Reasoning in autists (Pijnacker)
Origins of truth (Achourioti)
Levels of explanation in cognitive neuroscience (Keestra)
Sociology of mathematics (Wilhelmus)

Management

I am an active member of the Steering Committee of the Cognitive Science Center Amsterdam (CSCA), which unites groups in psychology, linguistics, neurobiology and philosophy, with the goal of fostering teaching and research in cognitive science. Responsibilities include organising the CSCA Lecture

Series, managing the Master Program in Cognitive Science, and organising the Summer School forming part that program.

Research interests

Philosophy and foundations of mathematics, in particular of probability

Until 1995 most of my work was in this area. I was particularly interested in the origin of, and justification for, the axioms of set theory. This tied in with a long-standing interest in the foundations of probability theory. I have always favoured an objectivist interpretation of probability theory, based on the notion of relative frequency, but I was aware of the mathematical difficulties in formalising this interpretation. I finally succeeded in giving a consistent formulation of probability as relative frequency, and showed that this formulation entailed revising the axioms of set theory (see [4], [7], [11], [10] and [16]). One axiom which had to go as the so-called Axiom of Choice. Mathematics without this principle looks rather different, a topic investigated in some depth together with V. A. Kanovei (see [18]).

Artificial intelligence and reasoning with uncertainty

From 1994 I directed an NWO project on reasoning with uncertainty in AI. The project consisted of 3 postdocs and 4 PhD students. Our initial interest focussed on reasoning with uncertainty in robotics: see [13]. Later I became interested in cognitive applications of AI, and in particular in what AI models of perception can tell us about human perception and its relation to language. The papers [24], [20], [21] and [23] give an overview of the results obtained here.

Interest in robotics has continued and I am currently applying planning techniques from robotics to the semantics of tense and aspect, for which see below.

I have continued to do practical work on reasoning with uncertainty, and have recently completed (collaborating with two psychiatrists) the construction of a Bayesian network for diagnosing alcoholism: see [35].

In March 2004 I was an expert witness at the trial of the nurse L. de B., accused of 8 murders. The counsel for the defense asked me to look critically at the statistical argument used by the prosecution. This (very) critical assessment has resulted in the publications [33] and [38].

Psychology of reasoning

In 1998 I started collaborating with the psychologist Keith Stenning of Edinburgh University. The aim of our collaboration is to bring the insights of

modern logic to bear on the psychology of reasoning. This field has interpreted a number of celebrated experimental results as providing evidence for the nonlogical character of thought. We have reanalyzed these experiments [22], and conducted a number experiments on the basis of this analysis (see [29]), which have led us to the conclusion that experimentation in psychology has much to gain from logical theorising. Recent work includes applications of nonmonotonic logics to reasoning phenomena [36], neural models of nonmonotonic reasoning [36, 31], and methodological issues in the psychology of reasoning [30, 44, 46, 42]. I am also working on deviant reasoning patterns in autism: see [41] and [43].

Cognitive semantics of natural language

Together with Fritz Hamm (Tübingen) I have developed an approach to the semantics of tense and aspect based on the idea that tense and aspect codify different features of planning toward a goal. This has led to a formal semantics based on a combination of the event calculus from cognitive robotics, constraint logic programming and Feferman's type-free truth theory. The result can be found in the book [32]; linguistic topics treated include *Aktion-sart*, tense in English and in French, grammatical aspect and nominalisation. The book starts off with a synopsis of what is known about the cognitive representation of time, and argues that planning is of paramount importance here. The journal *Theoretical Linguistics* has featured a pré cis of the book, together with commentaries by linguists; see [37]. Recently the theory has been adopted as a framework for making predictions about the electrophysiology of language processing (see [40, 45, 39]) and for deviant tense processing in attention-deficit hyperactivity disorder [47].

Lectures

I prefer visits to colleagues (and inviting them) above visiting conferences, therefore comparatively few lectures at conferences are listed below.

Lectures at Depts. of Mathematics Amsterdam, Delft, Utrecht, Nijmegen; City University of New York, Stanford University, Cornell University, University of California at Los Angeles, Mathematical Sciences Research Institute (Berkeley), University of Wisconsin at Madison, Marquette University (Milwaukee), Hebrew University (Jerusalem), Tel Aviv University, Mathematisches Forschungszentrum Oberwolfach, University of Manchester, University of Athens, University of Genova, University of Siena, Stekhlov Institute of Mathematics (Moscow), University of Warsaw, University of Poznan, Stockholm University.

Lectures at Depts. of Computer Science Amsterdam: Birmingham, Edinburgh, Tübingen University, Saarbrücken University.

Lectures at Depts. of Philosophy Amsterdam, Utrecht, Nijmegen, Groningen, Rotterdam, Leiden; Stanford University, Carnegie-Mellon University, University of California at Irvine, University of Indiana at Bloomington, Leuven University (Belgium), Helsinki University.

Lectures at Depts. of Linguistics Amsterdam; Humboldt University (Berlin), Saarbrücken University, Tübingen University, School for Oriental and African Studies (London), Bielefeld University

Lectures at Depts. of Psychology/Neuroscience Amsterdam; Leuven University (Belgium), Edinburgh

Some invited lectures at conferences Dagstuhl Workshop on Complexity and Randomness(1992), Logic Colloquium '93 (Keele), 5th Workshop on Logic, Language and Cognition (Stanford 1996), 3rd International Conference on Information-Theoretic Approaches to Logic, Language and Information (Taiwan 1998), Logic Colloquium '01 (Vienna), 12th International Congress of Logic, Methodology and Philosophy of Science (Oviedo 2003), 8th International Workshop on Cognitive Science (San Sebastian 2003), 5th International Workshop on Computational Semantics (Tilburg 2003), Sinn und Bedeutung 9 (Nijmegen 2004), 'Prinsjesdag-symposium' (Ned. Ver. voor Psychiatrie; Amsterdam 2004), 13th International Congress of Logic, Methodology and Philosophy of Science (Beijing 2007)

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