Interview with Dick de Jongh and Renate Bartsch

In this issue amongst others:

Interview with Dick de Jongh and Renate Bartsch
Celebrated Professors: Johan van Benthem and Paul Vitányi
Master students who enrolled in the PhD programme

Part I: "I'm a bit of a late-bloomer"

Dick de Jongh, 1970

Marian Counihan

...that this little picture is one of...
Dear alumna, alumnum, staff member, PhD student and relation,

You have just received the biggest ILLC Magazine ever. Although we live by the rule that less is more, we have been forced to increase the number of pages again in order to cover the gamut of personal experiences of an ILLC alumnus: finding a PhD position, functioning as an ILLC alumnus and finally retiring as a professor.

We would like to thank all writers for their contributions and their enthusiasm.

On behalf of the editors
Martin Ostendorf

Staff changes February 2003 - February 2004

Now!
• Benedikt Löwe: assistant professor as of April 1, 2003
• Cristian Mateescu: scientific programmer as of December 1, 2003
• David Akin: postdoc as of February 1, 2004

The new PhD students: Fabrice David Ahn, postdoc as of March 1, 2004
• Wouter Kuijpers: scientific programmer as of January 1, 2004
• Christof Monz: postdoc as of February 1, 2004
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• Benedikt Löwe: assistant professor as of April 1, 2003

Free University of Bolzano, Dr. Maria Aloni has been awarded another two years.

The Deutsche Forschungsgemeinschaft (DFG) Grant “Determinacy and Combinatorics” The DFG project “Forschungs- gemeinschaft (DFG) approved the research project “Determinacy and Combinatorics” of Peter Koepke (Uni Potsdam) and Benedikt Löwe (Universiteit van Amsterdam) from 2003 to 2006.

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L language Use and Language Structure

Robert van Rooij

L language is one of the most precious gifts history has given us. It enhances cooperation among individuals by enabling us (among others) to communicate useful information. What is it about language and our use of it that allows us to do so? The answer is linguistic rules and our reasoning heuristics.

On the one hand, what we intend to communicate - the meaning of the utterance - is to a large extent governed by commonly known linguistic rules (syntactic and semantic conventions) that we all make use of. On the other hand, we communicate more by the use of an expression than can be derived from these linguistic rules, and this depends on our use of reasoning heuristics.

It is natural to view communication as a kind of cooperative game between speakers and hearers. A hearer has the task to interpret the utterance in the way intended by the speaker, and a speaker has the task to give enough clues by his or her use of the utterance to enable the hearer to do so. This kind of game does not have winners and losers, because both agents win or lose at the same time. But a game it is, since we can determine exactly what the rules of the game are and when players win or lose. As noted above, the communication problem central to the game is solved to a large extent by the use of linguistic rules, normally these rules do not fully determine what is actually meant by the speaker. For instance, what speakers want to refer to when they use such pronouns as ‘he’ or ‘they’ highly underspecified by their conventional meaning and depends heavily on contextual features, namely what the most salient male individual or group of individuals is. Underspecification is a virtue of natural languages, since it makes them flexible in the sense that a single message can convey different contents in different contexts. The use of context is also crucial to determine what is implicitly conveyed by means of conversational implicatures. In both cases, by relying on context, speakers do not have to be fully explicit and can use language in a more efficient and economical way. Not being fully explicit about what one intends to communicate, is, however, also risky, since it threatens secure and reliable communication. The hearer might be unable to infer what the speaker meant to say. Successful information exchange therefore requires a sophisticated reasoning heuristics. In my work I use theories of rational behaviour (game and decision theory) and techniques from non-monotonic reasoning to state and formalize such heuristics. For instance, it seems natural to assume that speakers only want to convey information that is of relevance to the goals of the conversational participants, and I use decision theory to formalize this notion. In my work I show that this notion helps us to determine what is actually meant by the speaker’s use of a sentence.
Let me illustrate the use of relevance with a simple example. Consider the Greek (nonmonotonic) principle that everything is false that the speaker could have said but did not say. For instance, from a speaker's assertion that she has a child, we normally conclude that she does not have more than one child, otherwise she could and should have said so. This kind of inference, however, should obviously be related to the goals of, or to what is of relevance to, the speech participants. For instance, the inference typically does not go through if the assertion was given in answer to the question 'Who has a child?', which was asked in order to find out, for instance, who can be issued a ticket at a reduced price.

Where reasoning heuristics make it possible to use a sentence to communicate more than what we say explicitly, linguistic rules allow us to say something explicitly in the first place. But why do we make use of rules, and where do they come from? We are, of course, able to communicate information with the help of linguistic signs at all; for instance, we can point to something to make that thing salient. This means of communication is obviously rather limited, and if we want to communicate something more interesting in a reliable way, the use of linguistic rules is crucial.

We therefore want to provide a functional motivation explanation of why these linguistic rules emerged. This is what I try to do using evolutionary game theory (EGT). Obviously, not every aspect of our actual linguistic rules can be explained in such a way: the rule that says that we can call a table a 'table' is completely arbitrary, because in Dutch we don't call it a table. Typological research, however, has shown that the languages of the world have a great deal in common, especially at a higher organizational level. I am interested to see to what extent these commonalities (linguistic universals) can be given a functional motivation within EGT.

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In Memoriam

On 1 December 2003 we received the sad and shocking news that our respected colleague Wim Blok had died in an accident. Wim Blok was a professor of mathematics at the U of Illinois at Chicago, and one of the world's leading researchers in the field of algebraic logic. This branch of mathematics dates back to the nineteenth century and seeks to understand and solve logical problems using tools from universal algebra.

Wim Blok studied at the U Va. and obtained his PhD degree there. His primary interest was set-theoretic topology, which at the time was represented at the U Va. by the well-known topologist J. de Groot. After the lecturer's untimely death, and inspired by Philip Dwinger's visit to Amsterdam, Blok's interest turned to algebraic logic. This resulted in his dissertation ‘Varieties of Interior Algebras’, which he wrote under the guidance of Dwinger and defended in 1976, with Annette Troelstra acting as second referee.

In this first phase as a researcher at the U Va. during the 1970s, Wim Blok made seminal contributions to the field of modal and related logics. His dissertation and its follow-up publications transformed the study of completeness and incompleteness phenomena for modal and intuitionistic systems. More generally, his use of new powerful algebraic methods strongly influenced the Amsterdam modal semantics of the period, leading to various publications and life-long contacts.

In the 1980s, Wim Blok moved to the U S and initiated a new line of thought in abstract algebraic logic, and this too was to have a broad impact. In particular, he gave a lot of thought to the question what it could mean for a logic to have an algebraic semantics. With Don Pigozzi and others, he set up an entire framework for the study of logics by algebraic means. Their publications - notably ‘A (generalized) Logico’ (M emoirs of the American Mathematical Society, 1989; cf. the M athSciNet review by Hajnal Andréka) - have become classic sources.

Wim Blok was a regular visitor to the ILLC. When visiting his family and friends in the Netherlands he would usually spend some time at our institute and often give a presentation of his work. Only a few years ago, he spent a sabbatical in Amsterdam, during which he gave a much-appreciated course in abstract algebraic logic. When we heard the news of his death, we were in the middle of making plans to intensify this collaboration and, more particularly, preparing another extended visit.

It is with great sadness that we announce the loss of this respected colleague. In a way, the world will be felt by many in the international community, given Wim Blok's reputation and range of activities. At the same time, we have lost a good friend, as Wim was famous for his warmth and genuine interest in the work and lives of others. Our thoughts go to the family: he leaves behind: his wife Mary and son Philip in Chicago, and his relatives here in the Netherlands.

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Dick de Jongh

In Memoriam

Dick de Jongh and Renate Bartsch have several things in common: both are a professor at the ILLC, albeit in different areas, both have interests that extend far beyond their immediate subjects, and both are facing the major life-event of imminent retirement.

However, their perception of retirement differs as greatly as their areas of expertise do.

The most prominent feature in Dick de Jongh's study is one of those transient - i.e., with speakers that resemble designer candleholders. During the interview, Dick de Jongh spoke softly, as though he did not want to disturb the air in the room. Strings of deliberately spoken words, interspersed with silences, ended as unexpectedly as they started.

‘I’m a bit of a late-bloomer.’

In 1961, Dick de Jongh embarked on a study of physics and chemistry. However, because life in a lab was not to his liking, he soon turned to mathematics - or, more accurately, to the foundations of mathematics. ‘I liked the foundations of mathematics. It was exciting, so I pursued it. But not because it seemed a good career step: I’ve always lived for the moment, and never planned much.’

With a kandidaats (Bachelor’s) degree in his pocket, Dick de Jongh left Lcder for a master’s to obtain his MA in logic, philosophy and the foundations of mathematics. At the time, Amsterdam was the only place where one could study the foundations of mathematics.

In those days, this study attracted a great deal of attention. Questions like ‘What are numbers?’ were the subject of significant dispute.

The interest has now diminished somewhat, for one because, in spite of years of hard work, we don’t seem to have come closer to solutions. A is often the case in philosophy, differences in opinions and different movements did not cease to exist despite what we then viewed as important developments and major breakthroughs. But at the time, the foundations of mathematics aroused my interest, and after finishing my master’s in 1964, I went to Madison. Wisconsin, to write a thesis on intuitionistic logic (I LL), arose from the work of the Dutch mathematician Brouwer, who at the beginning of the 20th century took a strict position on the foundations of mathematics. H is viewpoint gave rise to a different type of logic than most mathematicians use. Brouwer’s logic is much stricter, but its elegance lies in the fact that once it is proven that a certain number or object exists, the proof provides the method to construct it.”

In 1968 Dick de Jongh returned from the US with a completed PhD thesis, and started to work at the U Va. Apart from another two-year position in Buffalo (New York), he has continued to work at the U Va. ever since. Nevertheless, he has held a professorship for only three years.

‘I’m a bit of a late-bloomer’, Dick de Jongh said. ‘For one because personal circumstances made it impossible for me to accept such an exacting position any sooner. At a critical stage in my life, I was raising my children single-handedly. I was able to retain a full-time job, but a professorship requires much more. Besides,
I did not perceive my professorship as a license to shake things up.

'I think I will spend at least two days a week at the Institute after my retirement, hopefully to work on this new study, but also to continue supervising several current PhD projects. But much will change. For example, for the last eight years I've devoted much of my time to the ILLC Master Program, and, to my regret, this will come to an end. I have been involved in the organization of this programme from the start and I will certainly miss the contact with the students. This last year will thus be one of goodbyes for me. Although this is sad it is also a relief, because I'm finding it increasingly difficult to combine all these activities. In addition, I will be able to devote more time to my hobby, the Amsterdamse Fietsersbond (Amsterdam Cyclists' Association). The Fietsersbond has grown to more than 12,000 members, the Fietsersbond (Amsterdam Cyclists' Association) has a chain of three rings, on which work is now progressing. I hope to devote more of my time to this when I'm retired. Will i be bored? No, there's never enough time.'

Whereas Dick de Jongh swiftly and unreservedly agreed to an interview, Renate Bartsch first seemed a bit disgruntled about the proposal. 'Why?' she asked in a dignified tone, 'should we talk about my retirement if it is not due for more than a year? The same goes for Dick. Really, I don't see the point.' Of course, Renate Bartsch may be right. Yet, once the interview began, she seemed to forget her reservations. Renate Bartsch holds a professorship at the Philosophy Department, which is located in a former nursery. Seated in a red office chair in one of the many boxlike rooms that overlook the courtyard, she talked easily and willingly.

'I was born in East Prussia, but my family fled to the Dutch area when I was five. Since then I've been back to Prussia only once, to visit the Russian and the Lithuanian parts, from whence my family hails. But I haven't seen the Polish part yet, and that's one of the things I want to do in my retirement. I no longer have the desire to make long trips. I've undertaken so many, to Japan, Haiwai, India, the USA, but now I want to discover... Well, my immediate surroundings, I guess. At the moment, I'm building a house near the Amsterdamse Bos and I'll spend part of the year in the region where I grew up. I'd like to get to know the nearby mountains and forests.

Renate Bartsch has been living in the Netherlands for almost 30 years now, first in Utrecht, and I really wanted a position in a metropolis. So when I heard that someone else had got the job, I therefore chose to do my doctoral work in philosophy, and went with my supervisor - Professor H. van Essen - to the University of Leiden, where between 1964 and 1968 I obtained my PhD in the philosophy of language. During that time, I went to Harvard for a year, where I had the privilege of studying with people like Quine, D. Reuben and Putnam. After working at the Philosophical Seminar of the University of Leiden, and also part time at a gymnasium in Amersfoort, I worked in Berlin as an assistant professor of linguistics. During this period, I met M. Montague, who was about to become a full professor in Germany. I was very impressed by his ideas and afterwards I asked him whether I could come and work with him. He agreed and I went back to Berlin where, next to my work, I took part in a seminar by Professor Schnelle on Montague's universal grammar. At the same time, I organized the necessary funding from the Deutsche Forschungsgemeinschaft. Unfortunately, by the time I acquired the financial means and was ready to pack my bags, M. Montague had died. I went to Los Angeles, anyway, for a year, and took part in a seminar led by David Kaplan and Barbara Partee, in which we developed Montague's theory for various linguistic constructions. In the meantime, I did my habilitation as an assistant professor, which is a licence to become a full professor in Germany about the same time. I got a job at a university in Japan, and I really did not want to accept a position in a metropolis. So when I learned about the vacancy in Amsterdam, I applied for the job.'
I've never experienced my emigration to Holland as a huge step. Language in a changing society. On the other hand, I mean the more planned development, as one sees with the introduction of terminology, and styles or registers for new or changing professions, and in new social groups generally.

I feel very ambiguous about it. On the one hand, I shall enjoy the freedom that comes with retirement. I've already reduced the number of hours I devote to work, and I really do enjoy the slower pace - not having to rush to catch the train, but being able to finish my coffee and the paper before I leave. Next year, I'll be able to do whatever I like - and that's an uncharted luxury. On the other hand, all these new privileges are just a diversion. I'm getting old, less fit. When I see people who are ten years my senior, I realize that this really is the last phase. But I'm sure I'll enjoy the limitless freedom that lies ahead of me. Will I manage to put into it? I don't know. I don't think I'll be one of those seventy-year-old professors who still attend every lecture all over the country. But who knows? Sophie van der Sluis

I joined the ILLC staff in April 2003. Before that, I was at the Rheinische Friedrich-Wilhelms-Universität (RFWU) Bonn, one of Germany’s Traditionsuniversitäten. The tradition that is being upheld in these universities is a blend of the traditions of the 1960s/1970s and the Humboldtian tradition of unity of research and higher education. The prime characteristics of this are the principle of Akademische Selbstverwaltung (administration by the academic staff without full-time administrative appointments), Freiheit von Forschung und Lehre (freedom of research and teaching) and the primacy of research in practice and motivation: the implicit goal of teaching is to educate the future generations of researchers.

There has some consequences for student life and studying in the Humboldtian system. For students, there are almost no obligations - no obligatory courses and to a certain extent not even obligatory credits (after the first two years you can continue your studies without ever attending a lecture). In general, student tutoring is frowned upon as an unwanted means of restricting the self-determination of students: the general assumption is that students are fully responsible adults, and if they decide to idle, that’s their own decision. The dissertation thesis (roughly equivalent to a master’s thesis) tends to be a research project with sometimes publishable results (and more than two years of work put into it). There is not even a serious attempt at evaluating the quality of education: Freiheit der Forschung und Lehre is a sacrosanct principle of the system and any attempt at evaluation is seen as infringing the essence of academia. Since many students cannot cope with this amount of liberty, a comparatively small percentage graduate. However, those students who can deal with this system usually profit greatly from it, learning the material as well as a lot about organizing their lives and work, and about making independent decisions.

I also spent a not insignificant portion of my academic life at American universities, mostly in the system of the University of California (UC) - which has been described to me, in half jest, as ‘the strictest bureaucracy on earth’. Coming from the German system, this was a different world: teaching is not seen as a submerged part of research, but as a topic of academic identity in its own right and with its own rules. This coupled with the power of the non-academic administration in American institutions results in a rather different type of student life: students formally enroll in classes (the concept of enrolling in courses is utterly alien to German students - as it is to Dutch students, as I have learned), success and failure in class is recorded in official transcripts, a large majority of students take courses seriously, and there is both supervision of students and considerable evaluation pressure on faculty members.

Renate Bartsch

‘I asked what it was like to have this position in an new town in a foreign land.

‘When I got to A msterdam in 1974, a close cooperation soon developed between myself, Jeroen Groenendijk, Martin Stokhof, René A. van der Sluis, Simon Dik and Teun van Dijk. We all were very involved in pragmatics at the time. One month, one of us would give a lecture, and then we’d have dinner together and discuss the lecture topic. Later, some colleagues from Nijmegen joined the group. They were very fruitful times. Of course, gradually we all developed our own specific interests and the group fell apart, but for me this was an excellent start at the UvA. With Jeroen Groenendijk, Martin Stokhof, Theo Jansen and Peter van Emde Boas, we formed a group that worked on Montague grammar and related topics.’

Over the course of 30 years, Renate Bartsch was involved in other matters besides Montague grammar.

‘A part from my long-lasting partiality for developing Montague grammar in the direction of more flexibility and dynamics, I’ve devoted my time to other major subjects. First, I’ve studied the social development of language, and its standardization. By development I mean, on the one hand, the natural development of

language in a changing society. On the other hand, I mean the more planned development, as one sees with the introduction of terminology, and styles or registers for new or changing professions, and in new social groups generally. I’ve focussed on what makes communication between people possible. I was especially interested in the notion of “correctness”, that is, in what people consider correct usage and how this is developed and reinforced from generation to generation. Correctness is the foundation of the intersubjectivity of language.

‘Secondly, I tried to find a way to think and reason about “concepts”, whereby concepts are taken to be ever-changing and elusive. I studied the formation of concepts and how circumstances, context and experience can shape one’s understanding and give rise to specific connotations. In a way, therefore, this study was complementary to the study on the standardization of language. Now, though, the focus was on the subjectivity of concepts and the influence that non-linguistic factors can have on the development of subjective rather than intersubjective meaning. Within this area I also tried to find ways to think about propositional attitudes - such as “X believes p” - and how far we can or cannot understand each other’s propositional attitude reports. In this study, the public notion of correctness, and especially truth, was taken as securing the objective and intersubjective aspects of concept formation, which still leaves room for the subjective aspects resulting from very personal experiences.’

‘Recently, I’ve expanded this view of language as a systemic conceptualisation, lately, I have studied how consciousness interacts with language and can give rise to language, and how language can then give rise to higher forms of consciousness. I’m now especially interested in the influence of episodic memory on the understanding of situations and linguistic utterances. I’m using Proust’s work to illustrate and study the role of episodic memory.’

I asked Renate Bartsch whether she thinks that things could have turned out very differently.

‘Of course, looking back, it all seems not much more than a chain of coincidences. When I was young, I wanted to be a doctor. However, I dreaded cutting up corpses, so I studied a wide variety of subjects hoping to find another calling. After my studies, I had the privilege to be able to choose between several thesis options. If I had not picked semantics, I would not have come to Amsterdam, etc. In the end, small choices can make large differences.‘

Finally, I asked whether retirement was something Renate Bartsch looks forward to, after so many years of being a professor.

‘I feel very ambiguous about it. On the one hand, I shall enjoy the freedom that comes with retirement. I’ve already reduced the number of hours I devote to work, and I really do enjoy the slower pace - not having to rush to catch the train, but being able to finish my coffee and the paper before I leave. Next year, I’ll be able to do whatever I like - and that’s an uncharted luxury. On the other hand, all these new privileges are just a diversion. I’m getting old, less fit. When I see people who are ten years my senior, I realize that this really is the last phase. But I’m sure I’ll enjoy the limitless freedom that lies ahead of me. Will I manage to put into it? I don’t know. I don’t think I’ll be one of those seventy-year-old professors who still attend every lecture all over the country. But who knows?’

Sophie van der Sluis

visiting appointments at UCLA and UC Irvine.
OF course, these brief descriptions of what I called the 'Humboldtian' and the 'US' system are very coarse caricatures of life at the named institutions, but although I simplified the description by overemphasizing the dissimilarities, it cannot be denied that the systems are markedly different, and that both have their share of advantages and disadvantages. The strict bureaucracy of the US system and the deliberate lack of it in the Humboldtian system are two extremes in a spectrum of higher education, which has many shades between the two extremes. Since I came to Amsterdam, I have seen the current situation of our system here as a rather sensible 'hybrid arrangement', while the underlying principle of the system is academic freedom. It is neither hostile to administrative measures and external quality assessment nor oblivious to the non-research-related viewpoints of academic education.

In general, the Humboldtian system is very good at dealing with research-oriented students, whereas the US system is very good at dealing with large numbers of students who have to acquire basic skills; students with no interest in research are, in general, ill-served at German Traditionenuniversitäten, and the strict administrative measures of the US system make it very hard to arrange exceptions and independence for exceptional students who might become the researchers of the future.

In the past five years, we have seen a forceful political attempt to shift the European academic life towards the Anglo-Saxon system (Bologna Agreement). The introduction of Bachelor's and Master's degrees is the most visible consequence of this. This is one way to deal with the problems mentioned, that is by giving all students (including those not interested in research) the chance to receive a basic academic education and a university degree (at the Bachelor's level), whilst keeping a research degree for those interested in continuing (the Master's degree). It also gives us the chance to introduce measures with a positive effect on the organization of teaching in the Bachelor's phase: a strict enrolment system for courses, stringent evaluation criteria, less freedom for the students to choose, etc. These measures seem to make our life as instructors tougher (in the long run, though, they might not), but as they serve a good purpose in Bachelor's programmes, we should be happy to embrace these novelties. These measures are more problematic for research-oriented Master's programmes, such as the MSc in Logic where they have the potential to create unnatural and unintended constraints. To quote another aphorism of the Seven Sages, while absorbing some of the positive aspects of US academic policy, we should work towards a Solonic κυριαρχία and make sure that the restrictive administrative measures stay limited to the Bachelor's programmes where they can do a lot of good, and keep some freedom for staff members and students alike at the research-oriented Master's level. A far cry, however, are students going to learn the skills of independent research if the system stifles independence?

What was it like doing your PhD at the ILLC?

'I had a great time. The research itself was a lot of fun: looking at one subject so closely and figuring it out completely was a great experience. The aim of the project was to develop a feel for the relationship between the notion of definability and that of interpolation'. In the end it turned out to be difficult to make general statements about it. When I look back, I realize it was a very limited subject on which only I and a few other people at the ILLC worked. What I really mean is that it was a very limited subject to me: I don't doubt that you could work on it for another 20 years. However, to me the subject was exhausted. Afterwards, I wanted to apply methods other than mathematical analysis to reach insights, I mean that in a broad sense. I didn't want to spend any more days sitting back to back in a room: I'd rather go out and talk to people and learn that way. If I'd wanted to continue as a post-doc, the subject would have had to be broader. Anyway, shortly after getting my PhD, I applied for the position of coordinator of the Cognition Programme - and I got it.'

What exactly do you do at NWO?

'The most important job of NWO is to organize the allocation of subsidies in a precise manner. However, that's not my work. My function has a dual nature: I must stimulate research into cognition and create a broader societal framework for cognition research.

To stimulate cognition research one first has to realize that a lot of research on cognition is already being done. However, this is mainly
‘Human beings are so much fun.’

On the other hand, they also shield which researchers can more easily investigate rhythm and structure in the singing of birds. We must be realistic, though. For many guests, talking and listening to speeches was all that happened. For them it was just an enjoyable day, after which they went back to their own research. To me such an afternoon is a success if a few people turn out to be bridge-builders between the disciplines. So I try to develop the facilities to engender bridge-builders within science. These people may enable colleagues within their fields to talk to researchers in other fields. Of course, the questions of one group are not necessarily of interest to the other group, but then they should adapt them. This process in itself is highly educational. Through these bridge-builders - or “translators”, as I sometimes call them - both fields can achieve new insights.

‘From MRI scanner to completeness proof, it’s all cognition.’

I remember that when I got my PhD, I didn’t know a single psychologist at the UvA. Although I had nothing to do with the philosophers at the ILLC, I did keep in touch with them. An institute creates a framework within which researchers can more easily make and maintain contact. On the other hand, they also shield themselves from what's happening on the outside. From a scientific point of view, it can be worthwhile for linguists and philosophers of language at the ILLC to talk to development psychologists.

‘In mathematics, problems are clearly defined, and some problems have proofs that are so beautiful that they have to be “by the book”, to quote Erdős. In most cognition problems, however, you don’t find that kind of beauty. Nevertheless, the problems are so interesting and so much fun that it stir’s one’s scientific interest: human beings are so much fun, and can do such surprising things.’

If you were to go back to doing research yourself, would you opt for a cognition project?

‘Yes. I’d opt for a broad cognition investigation, in which attention is paid to empirical results. First I’d have to find out more about empirical methods, but then I’d use my formal capacities and find the connection with formal research. But at the moment this is not something I’m considering. I’m enjoying myself far too much for that.’

Merlijn Sevenster
During the past year Johan van Benthem and Paul Vitányi have been honoured with appointments as a University Professor at the UvA and a Fellow at the CWI, respectively. These posts give their occupants the opportunity to do research work on a full-time basis.

Johan van Benthem and Paul Vitányi describe their research and the opportunities they intend to devote themselves to in the coming years.

Celebrated Professors

Johan van Benthem

What a university professor wants

November 2004

Enough of these doubts and evasions! My academic ambitions, past and present, have always been a mix of private and public goals. Let me start with the latter. They fit well with a university professor appointed as a faculty member of the academic education department. But purely unselfish motives are boring. In his once famous and oft-quoted words, "I am glad to see that logical methods have achieved in other areas, identifying the natural 'joints' of expressiveness and complexity in communication, planning, and action. For this purpose, I am thinking of new types of properties of logical systems that would address various sorts of 'communicative completeness'."

A crucially important ambition is to design a university professor who can create a new perspective on the former, with new insights comparable in depth and scope to those of the Golden Age in the 1930s by Gödel, Tarski, and Turing. Contributing just a bit here seems a lot of ambition!

And there are further changes in perspective. I look at the present, Karl Marx once said, "Philosophers have merely interpreted the world, but now it is time to change it." Logic is not just a tool for analysis, it is good for everybody, comparable with mathematics or philosophy. But it would also be an eminently relevant logic that would enrich and change communication, belief revision, or information processing in many agent interactions. I see this as a major shift in defining logic, and my broader ambition would be to live long enough to see the day when this new perspective starts yielding major technical insights comparable in depth and scope to those of the Golden Age in the 1930s by Gödel, Tarski, and Turing.

I have realized another longer-term ambition. I have set my sights on an even broader front. Why do we teach logic at all? Is it just a form of artistic self-expression? Is it the desire to lure other young people into the trap we ourselves once walked into, set by our own teachers? I would like to think that logic is a broad cultural asset which is good for everybody, comparable to mathematics or philosophy. But then it should be possible to make the results of modern logic accessible to a general public, and I intend to devote the time I save on routine activities on new actions toward this goal.

If you think the total of external ambitions in this column is over-reaching, at least consider pursuing them further away from home, saving you from being pressed-ganged into the new venture inside ILLC!
Giant Brains

Paul Vitányi

In a famous passage on the archetypal deterministic world view, Laplace’s all-powerful demon, given all the positions and movements of every particle at one given point in time, is able to see all of the past and future spread out before him crystal clear - nothing remains hidden from him. Here I can only approximate this giant feat, using fallible memory and prediction. The past serves as a basis for the future.

Studying at the HBS (short for ‘Hoger BurgerSchool’, a new obsolete type of grammar school), the excellent Canisius College in Nijmegen, under the watchful tutelage of the members of the Society of Jesus, I lapped up Tolkien and more scientific fiction, as well as non-fiction. Of none of the books I read was Cybernetica [C ybernetics] by Professor S.T. Bok, Professor of Biology at the UvA, who maintained that human memory was contained in some mysterious globules that he had discovered in the brain. A nother book, De Leermatrix (The Learning Matrix), by the German engineer K. Steinbuch, developed a kind of reinforcement model for hierarchical memory based on the newly invented ‘core memory’ of computers - in effect the first usable, applicable neural network.

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NWO Cognition Grants

Six applications involving the ILLC as applicant or co-applicant have made it to the final round in the award of NWO Cognition Grants. Roughly a third of all applications submitted will be approved. Here is a summary of the six proposals:

**Cochlear Implants and their Effect on First Language Acquisition**
From the ILLC: Pieter Adriaans and Dick de Jongh

The aim of this project is to integrate fundamental research in grammar induction and linguistics in order to develop new diagnostic tools for the assessment of language development in clinical situations. In the project, first language acquisition by children with cochlear implants will be compared with language acquisition by children with normal hearing. Researchers in various fields, ranging from audiology, speech and language, through linguistic approaches to language acquisition, to information theoretic approaches to formal learning theory - will participate in this project. We hope to make a major breakthrough in the field of cognition by gaining a deeper understanding of formal issues in language acquisition related to good linguistic models with applications in diagnostic contexts.

**Logic, Neural Networks and Optimality Theory**
From the ILLC: Reinhard Blutner and Henk Zeevat

Ever since the discovery of neural networks, there has been a controversy between two models of information processing. On the one hand symbolic systems have proven indispensable for our understanding of higher intelligence, essentially when cognitive domains like language and reasoning are examined. On the other hand we believe that intelligence resides in the brain, where computation appears to be numerical, not symbolic; parallel, not serial; distributed and not as highly localized as in symbolic systems. We claim that this controversy can be resolved by a unifying theory of cognition only - one that integrates both aspects of cognition and design the proper roles to symbolic computation and numerical neural computation. The overall goal of this project is to develop and study formal systems suitable for grounding the formal basis for such a unified theory.

**The Evolution of Meaning in a Game-Theoretical Setting: Cognitive Constraints and Experimental Architecture**
From the ILLC: Paul Dekker, Robert van Rooy and Frank Veltman

The project is concerned with how meaningful communication can emerge. This question is approached from a theoretical, an empirical and an experimental angle. The starting point is recent experiments within AI in which simple meaning conventions evolve in a group of robotic agents. Our goal is twofold, namely to show that a particular way of communication will only emerge in a context in which agents are engaged in a suitable joint ‘project’. As for the latter goal, psycholinguistic investigations have shown that a particular way of communication will only emerge in a context in which agents are engaged in a suitable joint ‘project’. For the former, the main challenge is to develop a notion of meaning that suits the needs of both the psycholinguist and the experimenter in AI.

**The Origin of Novelty**
ILLC is co-applicant.
From the ILLC: Jaap Kamps and Michiel van Lambalgen

The origin of novelty is a hotly debated issue in many scientific disciplines. The central question in these debates is about the origin of new structures not contained in existing structures. Our project will address this research question head-on. A yet there are no satisfactory detailed explanations of the origin of novelty. The aim of the proposal is to combine current approaches to novelty in human cognition, as they are now independently pursued in various disciplines. In the project we will explore biological insights into evolutionary key innovations, analyse novelty in the context of domain theories axiomatized in formal logic, and explain the origin of novel knowledge and skills from purely descriptive language to the use of non-descriptive logical expressions. A for the latter goal, psycholinguistic investigations have shown that a particular way of communication will only emerge in a context in which agents are engaged in a suitable joint ‘project’. A for the former, the main challenge is to develop a notion of meaning that suits the needs of both the psycholinguist and the experimenter in AI.

**What Makes Cognitive Tasks Hard?**
From the ILLC: Johan van Benthem and Peter van Emde Boas

Intuitively, humans and computers "feel" differently when performing complex tasks like playing strategic games. Computers undergo the complexity of a game, while humans experience its difficulty. Understanding the relation between complexity and difficulty is an important step towards bridging the gap between understanding artificial and human intelligence. This proposal brings together the fields of mathematical logic, AI, and experimental economics and psychology in a combined effort to understand how humans and computers reason in related tasks of different complexity, particularly when uncertainty is involved. More specifically we will investigate, using a series of newly invented games, whether significant changes in the complexity of games as measured by mathematical models or algorithmic measures match up with changes in strategy and representation when human subjects play these games. The project is the first joint effort of ILLC with CREED (Center for Research in Experimental Economics and Political Decision-Making, Amsterdam) and IJKT (Institute for Knowledge and Agent Technology, Maastricht).

**Reasoning and the Brain**
ILLC is co-applicant. From the ILLC: Michiel van Lambalgen

Our objective is to broaden the scope of research in the psychology of reasoning by investigating the connection of reasoning to other cognitive capabilities, notably memory. We will focus particularly on defeasible inference (in the area of conditionals, implicatures, tense and aspect), which we intend to study with brain imaging techniques in normal subjects and autistic patients. These aims are motivated by several considerations: defeasible inference plays an essential role in everyday life; there are many different types of defeasible inference; and well-developed logical and semantic theories are available. Furthermore, one of the characteristics of autistic spectrum disorders is a lack of cognitive flexibility, and it seems reasonable to expect that autistic patients will experience difficulties with at least some types of defeasible inference.
Master students who enrolled in the PhD programme

What do South Africa, Iceland and the United States have in common? Not much, perhaps - except that they are all represented at the ILLC by PhD students. Marian Counihan (South Africa), Börkur Sigurbjörnsson (Iceland) and Brian Semmes (United States) participated in the Master of Logic programme at the ILLC and are currently doing their PhD in Amsterdam. Although their reasons for choosing the ILLC may differ, their stories are remarkably similar.

Marian Counihan thinks that being in an academic environment is challenging not only because of the mental stimulation but also because of the social environment. 'I don't want to be intimidated by academics, nor to believe words simply because they're on paper,' she said. 'I don't want to take myself too seriously - although that's not always easy in an academic environment, since I feel I should be on my best behaviour all the time.'

Counihan studied mathematics at Wits University in Johannesburg and at the University of Cape Town. She first found out about the Master of Logic programme while attending a summer school in Johannesburg, where she met some Dutch logicians who did not fit the image she had of scientists. 'I was pleasantly surprised by their enthusiasm and sociability,' Counihan recalled. 'I remember thinking: if I'm going to be in an academic environment, I want it to be the one they are in.'

Two years ago, Counihan packed her bags and left for Amsterdam. She is now a member of the logic and cognition group at the ILLC. Amsterdam turned out to be a more inspiring academic environment than South Africa in several respects. 'In South Africa, universities are low on the national priorities list, since a lot of people are not even getting a good primary education,' Counihan said. Consequently, priorities within universities are totally different. 'In South Africa, education has to be directly relevant to the economic and social state of the country. Departments like classics and comparative literature have largely disappeared in the last few years. Even philosophy is under pressure to justify its existence. So that creates a whole different atmosphere. Reading Aristotle is a lot more of an arcane thing to do there than it is here.'

In this respect, there is probably no greater difference imaginable than that between South Africa and the United States - a country considered by many to be the Valhalla of university training. It's also the country where Brian Semmes received his education, notably at the illustrious Massachusetts Institute of Technology (MIT).

'I was particularly interested in the interdisciplinary programme that MIT offered,' Semmes said. 'As my principle interests were theoretical computer science and, subsequently, logic, it would've been difficult to choose between a traditional mathematics and a traditional computer science degree. Going to MIT meant that I didn't have to make that decision.'

Of course, avoiding this decision was in itself a decision. And as it turned out, there were both advantages and disadvantages to the path Semmes chose. 'I'd decided to go to graduate school, but I was still unsure whether to study computer science or mathematics.' In the end he applied mostly to PhD programmes in computer science. However, the results of his applications were, as he put it, "less than spectacular", perhaps partly because he had not followed a traditional computer science programme. 'In retrospect', he admitted, "I didn't plan very well what I was doing - partly because I wasn't sure what I wanted to do.'

He finally decided on the Master of Logic programme in Amsterdam. "It suited my background better and there was less danger of being pigeon-holed. I needed flexibility, and I wasn't going to get as much flexibility at other places."

At the ILLC, Semmes became interested in set theory. Since Amsterdam is traditionally not as strong in this area of logic, he applied for a PhD programme in mathematics at UCLA. "I was accepted, but for various reasons it didn't work out. So I left UCLA and returned to Amsterdam. It was a particularly difficult decision, because the US is thought of as the place to go to graduate school. There were possibilities for me in the US, and some people thought it strange that I was going to Amsterdam to study."

One of these "some people" is Börkur Sigurbjörnsson, who smiled when he said that his own stay in Amsterdam is a result of a "misunderstanding". Having grown up in Iceland, Sigurbjörnsson had to go abroad in order to have a future in science. 'The University of Iceland is too small to offer a wide variety of courses. The undergraduate education is quite broad, but when it comes to graduate education there are fewer opportunities.'

But even as an undergraduate he couldn't get what he wanted in Reykjavik. Sigurbjörnsson's dream was to study applied mathematics and theoretical computer sciences, but he had to settle for the other way round: theoretical mathematics and applied computer sciences. 'A though neither of the subjects satisfied my interest, I somehow managed to graduate with a BSc in both,' he said, again with a smile.

"I just can't get used to the Dutch lunch."
‘In a way, information retrieval brought me to Amsterdam.’

After graduating, Sigurðbjörnsson planned to go to the States to do his PhD. But he could not get into the schools he wanted - and that led to the ‘misunderstanding’ that brought him to Amsterdam, where he now works on information retrieval in semi-structured documents. ‘While trying to think up plan B’, Sigurðbjörnsson explained, ‘I was reading a computer science book published in the Netherlands. For some obscure reason I got the idea to do “university Netherlands” into Google, and up came the University of Amsterdam. I looked at the page and found a link saying “Programmes in English”: I clicked it and saw a link to the graduate study program. I clicked on it and used to use plastic almost everywhere. Not to mention the dark summer nights and the terrible weather in Canada. As a Nordeuropean person, I need to cool down every now and then. So I go to Iceland every winter to get my dose of snow. There’s nothing like sitting inside in the warmth, drinking hot cocoa and watching the snowstorm outside.’

That brought Cunhini to the complete lack of nature in the Netherlands. ‘When you go on the train through the Netherlands the whole landscape is just countryside. I mean, none of it is just nature. In South Africa you can drive for hours through land in which people don’t feature at all. That’s something I really miss.’

That’s something Semmes can agree with. In general, there’s a good interaction between researchers in the logic and those in the mathematics groups, he said. ‘A thorough, of course, it’s sometimes difficult to keep up with what others are doing. For me, however, the advantage of this institute is that logic is the principle focus. I’m not aware of a similar focus in the US to pursue such a doctoral study. Of course, there are many excellent places to study logic, but generally you do it in a mathematics, philosophy or computer science department. And then as a student you’re pigeon-holed as a mathematician, a philosopher or a computer scientist.’

As a former PhD student at UCLA, Semmes certainly knows what he is talking about. ‘A academic life in the US can be rough sometimes. The archetype of a “suffering graduate student” exists in the US, and I’m not sure that it exists here. In general, it seems that graduate students in America have to endure some not-so-wonderful treatment in order to get their degree. I’d say there’s more of a status division in the States between graduate students and the establishment.’

Life in Amsterdam, however, also has its disadvantages. ‘I just can’t get used to the Dutch lunch,’ Semmes confessed. ‘I mean, I like sandwiches - and here you do have nice bread and nice ham and cheese - but it’s hard to eat them every day. Also, I don’t drink milk, and sandwiches by themselves aren’t very filling.’

‘And you need to carry cash here,’ Sigurðbjörnsson added. ‘I used to use plastic almost everywhere. Not to mention the dark summer nights and the terrible weather in the Netherlands. As a Nordeuropean person, I need to cool down every now and then. So I go to Iceland every winter to get my dose of snow. There’s nothing like sitting inside in the warmth, drinking hot cocoa and watching the snowstorm outside.’
‘Vultus est index animi’ – Cicero
(The face is the index to the mind)