

ILLC Magazine

11

December 2009

In this issue amongst others:

The Integration of the Sciences: Interview with Bart Noordam and José van Dijk
ILLC within the ESF LogICCC Programme
A New Working Environment



"The Integration of the Sciences Is Picking Up Speed"

One is dean of the Faculty of Science, the other is dean of the Faculty of Humanities. Both believe that the university needs to change. "No scientific institution can remain the same eternally."

There are many differences between the faculties, but Noordam (DNI) and van Dijk (DNI) agree. They both see the need for a more integrated approach to research. One that is not based on the traditional division of disciplines, but on the integration of disciplines, with each one contributing to a common goal. They believe that the university needs to change. "No scientific institution can remain the same eternally."

Modelling Intelligent Interaction – Logic in the Humanities, Social and Computational Sciences (LogICCC)

LogICCC is a cross-European collaborative research programme bringing together researchers from a number of fields related to their interest in logic and intelligent interaction. ILLC researchers are involved in four of the eight LogICCC projects. The present research highlights research being pursued in LogICCC, and its position in ILLC within LogICCC, both from within the ESF and from within the ILLC. It's Hoogland, ESF Science Officer and an ILLC alumni, kindly accepted to write an introduction for our feature. Short description of the research projects in which ILLC researchers are partners follows. The short interview with Johan van Benthem at the end of this feature provides a general context for LogICCC.

Science Park 904: A New Working Environment

This spring, a large part of the ILLC has moved to the new building at the Faculty of Science in Wageningen Science Park '04. To see how this affects ILLC members in their day to day work, we have conducted an online survey. We got 22 responses to the following set of questions:

General questions

How often do you visit the new building in your office or in your home?

How do you think about the new building?

How do you think about the new building in your office or in your home?

How do you think about the new building in your office or in your home?



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COLOPHON

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Foreword

Dear friends of the ILLC,

with its eleventh issue the ILLC Magazine passed in its second decade of existence. This overlaps with an important change in the life of the ILLC, namely its relocation from the Roeterseiland complex and the Nieuwe Doelenstraat, to a new building in the Science Park. This has a significant impact on the life of ILLC researchers, not only because of a new working environment, but it also affects the way in which the different groups collaborate. To see how ILLC members adjust to the new environment, we have conducted an email survey. You can read about the results in the present issue of the magazine.

The physical location of the institute is not the only boundary condition that has changed: Bart Noordam is the new dean of the Faculty of Science. We were lucky enough to be able to organize a joint interview with both him and José van Dijk, the dean of the Faculty of Humanities, on the unique administrative challenges facing the ILLC and its parent faculties.

LogICCC, a large, cross-European ESF programme on logic and its applications to interaction, communication, cognition, and computation, has become a major factor in the research going on at the ILLC, and vice versa. ILLC researchers partner in four of the eight LogICCC projects. Naturally, the research highlight feature this year is about this programme. It features an introduction by Eva Hoogland, ESF Science Officer and ILLC alumna, short descriptions of the projects in which ILLC researchers are partners written by the local participants, and an interview with Johan van Benthem which goes into the genesis and the meaning of the LogICCC programme.

The regular features of the magazine are not missing this year either. This year's praise of inspiring research is due to Jelle Zuidema. Also, if you are wondering what logic has got to do with solar power, you should definitely read the alumni interviews. Both MoL alumnus Gustaaf Haan and PhD alumnus Harry Stein found careers outside of academia, but they still occasionally miss teaching students about Wittgenstein. As has become usual, the magazine concludes with the results of the questionnaire addressed to the new PhD students and a group photo. The latter is a testament to the welcome *Possibility* of having Friday afternoon drinks at the Science Park.

In addition to these pieces, we have a guest column by Robbert Dijkgraaf on starting early (read on to find out what), and an interesting text on Penrose tilings by Alessandra Palmigiano.

We would like to thank all contributors and we hope you will enjoy reading this eleventh instalment of the ILLC Magazine.

The editors,
Jacob Vosmaer and Lucian Zagan

Projects awarded, September 2008 – November 2009**VENI award for Davide Grossi**

- Davide Grossi was awarded a VENI grant for his project "Norm Implementation via Mechanisms". The starting date was 1 January 2009. For more information, see <http://www.davigrossi.name/>.

NWO Rubicon and VENI awarded to Erik Rietveld

- NWO has awarded a Rubicon grant to Erik Rietveld in 2008. The grant allows him to work for two years as a researcher at Harvard University's Department of Philosophy. In 2009 he was awarded a VENI grant for his project "Unreflective Action in Everyday Life". He receives 250,000 EURO for a three year appointment as postdoctoral researcher.

PhD project awarded to ILLC-ACLCL (FGW)

- In 2008, in the framework of "Dynamiseren van het Onderzoek", the FGW awarded a project (one PhD student) to a joint venture of Kees Hengeveld, Hedde Zeijlstra (both ACLCL), Maria Aloni, Jeroen Groenendijk, and Frank Veltman (ILLC). The title is: "Crosslinguistic Semantics".

Prizes and awards, September 2008 – November 2009**Katrin Schultz wins LOT publieksprijs**

- Katrin Schulz has won the LOT publieksprijs for her dissertation "Minimal Models in Semantics and Pragmatics. Free Choice, Exhaustivity and Conditionals". The prize was handed out at the Taalgala 2008, held in Utrecht.

Lorenz Demey, winner of ANTW-Selexyz Essay Prize

- Lorenz Demey, one of our MSc Logic students, has won the ANTW-Selexyz Essay Prize for his essay titled: "Een Geunificeerde Theorie van Bepaalde en Onbepaalde Beschrijvingen". The ANTW is the Algemeen Nederlands Tijdschrift voor Wijsbegeerte, or the General Dutch Journal for Philosophy.

Johan van Benthem has been endowed with the Henry Waldgrave Stuart Professorship in Philosophy at Stanford University

- Endowed professorships are living memorials to the donor's belief in intellectual values and social responsibility as well as the chairholder's commitment to increasing knowledge and understanding. At Stanford, the roster of endowed chairholders stands as an honour roll of the university's most distinguished faculty members.

Johan van Benthem has been awarded with the Weilun Visiting Professorship of Humanities at Tsinghua University

- Johan van Benthem was awarded the Weilun Visiting Professorship of Humanities at Tsinghua University in October. This is an honorary title presented to him by the vice-president of the university.

Personnel arrived (excluding PhD students, see pages 22-23), September 2008 – November 2009

- Tejaswini Deoskar, Faculty of Science, lecturer/postdoc as of 1 October 2008
- Georgios Barmpalias, Faculty of Science, lecturer as of 25 August 2009
- Raquel Fernández Rovira, Faculty of Science, postdoc as of 1 September 2008

- Daniele Porello, Faculty of Science, postdoc as of 1 January 2009
- Davide Grossi, Faculty of Science, postdoc as of 15 January 2009
- Aline Honingh, Faculty of Humanities, postdoc as of 1 April 2009
- Galit Weidman Sassoon, Faculty of Science, postdoc as of 1 December 2008
- Maxim Khalilov, Faculty of Science, postdoc as of 15 August 2009
- Sara Uckelman, Faculty of Science, postdoc as of 1 November 2009 (following her PhD at the ILLC)

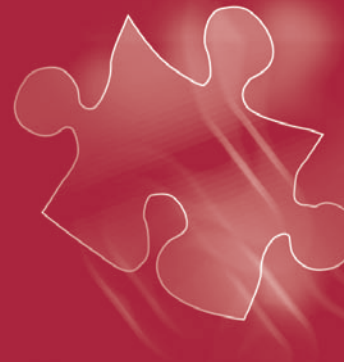
Personnel left, September 2008 – November 2009

- Paul Vitanyi, Faculty of Science/CWI, emeritus as of 1 July 2009
- Leigh Smith, Faculty of Science, as of 1 October 2008
- Yoav Seginer, Faculty of Science, as of 1 December 2008
- Avi Arampatzis, Faculty of Humanities, as of 1 May 2009
- Boban Arsenijević, Faculty of Humanities, as of 1 October 2009

PhD defences, September 2008 – November 2009

- 4 September 2008, Fabrice Nauze, "Modality in Typological Perspective"
- 18 September 2008, Falk Unger, "Noise in Quantum and Classical Computation & Non-Locality"
- 9 October 2008, Floris Roelofsen, "Anaphora Resolved"
- 17 October 2008, Marian Coughlan, "Looking for Logic in All the Wrong Places: An Investigation of Language, Literacy and Logic in Reasoning"
- 12 November 2008, Tine Wilde, "Remodel[li]ng Reality"
- 6 March 2009, Jakub Szymanik, "Quantifiers in TIME and SPACE. Computational Complexity of Generalized Quantifiers in Natural Language"

- 26 May 2009, Brian Semmes, "A Game for the Borel Functions"
- 1 July 2009, Hartmut Fitz, "Neural Syntax"
- 1 September 2009, Sara L. Uckelman, "Modalities in Medieval Logic"
- 3 September 2009, Andreas Witzel, "Knowledge and Games: Theory and Implementation"
- 23 September 2009, Chantal Bax, "Subjectivity after Wittgenstein. Wittgenstein's Embodied and Embedded Subject and the Debate about the Death of Man"
- 24 September 2009, Kata Balogh, "Theme with Variations. A Context-Based Analysis of Focus"
- 27 October 2009, Olivia Ladinić, "Temporal Expectations and Their Violations"





INTERVIEW WITH

BART NOORDAM AND JOSÉ VAN DIJCK

"The Integration of the Sciences Is Picking Up Speed"

One is dean of the Faculty of Science, the other is dean of the Faculty of Humanities. Both believe that the university needs to change. "No scientific institution can remain the same eternally."

There are many differences between their faculties, Bart Noordam (FNWI) and José van Dijck (FGW) admit. The main focus of the Faculty of Science is on research. One third of its bachelor students eventually obtain a PhD degree. Humanities is traditionally more focussed on education, with only one out of every twenty students pursuing a career as a scholar. Underlying these numbers is a difference in scientific cultures, the deans say. However, as the boundaries between scientific disciplines are shifting, the differences between the faculties are fading quickly. Today, no one is surprised to see a humanities scholar working in a laboratory, or a scientific researcher discussing philosophy.

According to the deans, interfaculty institutes like the ILLC are a good example of the growing cooperation between scientific disciplines. They are testing grounds for new ways of organising research, for the growing interaction between the sciences has consequences for the structure of a university. "If you had the opportunity to start a university today, you would probably organise it differently", says Van Dijck. "Some universities in the US no longer have faculties, only research centres and schools. That kind of model can be very dynamic." Noordam adds: "Today's scientific world is more complex than the subdivision in faculties suggests. That does not mean faculties are redundant. People still need a home base."

What is important is that these home bases are flexible. As sciences evolve, institutions must follow. No scientific institution can remain the same eternally."

Real academics

The ILLC is the only interfaculty institute of the Faculty of Science and the Faculty of Humanities. Both deans speak highly of the institute. Van Dijck: "At my faculty, we take great pride in the ILLC. It is one of our best performing research institutes. In recent years, it has been successful in attracting external funding for research. The ILLC is a showcase of interdisciplinary research." Noordam: "The ILLC is housed in our faculty building. There was even talk of a possible merger of the ILLC with our Informatics Institute or our Institute for Mathematics. We have chosen not to do this, but I think it does show the value we place on the research programmes of the ILLC."

Van Dijck and Noordam particularly praise the work of associate professor Henkjan Honing, who works in the field of music cognition, with a special focus on the temporal aspects of music (such as rhythm, timing, and tempo) using theoretical, empirical, and computational methods. Honing's research fits neatly within the newly formulated research priority area "Brain and Cognitive Sciences", says Van Dijck. "The communication between the humanities and the sciences has long been one of my research interests. Many of my publications deal with the interface between medical science and the arts. Not just as a dean, but also out of professional interest, I find the scope of the research at the ILLC an interesting challenge. It is exceptionally rare that scientists of such widely different backgrounds share information." Noordam mentions University Professor of pure and applied logic Johan van Benthem, one of the founders of the ILLC.

"To me, he is a classic example of a scholar. I admire people who are equally at home in mathematics and the humanities. They are the real academics."

Cutbacks

It is no secret that the University of Amsterdam is on a tight budget. This has not left the faculties unaffected. Both the Faculty of Humanities and the Faculty of Science had to carry out cutbacks in expenditures. "Our organisation was reduced in size", says Noordam, who goes on to explain that in times like this, the position of interfaculty institutes can be precarious: "In a sense, the ILLC is positioned at the edge of both faculties. That is a dangerous spot to be in. When a faculty is forced to economise, it is tempting to cut away the edges and focus on the core of the organisation."

they play by those rules, they can decide for themselves how they want to spend the money." Van Dijck: "In my faculty the budget responsibility lies with the departments, not the research institutes. We rely for seventy to eighty percent of our funding on students, twenty percent is related to research – the opposite of the situation at the Faculty of Science. It would be illogical if we organised our faculty around that twenty percent."

For the time being, the fundamental differences between the two faculties that host the ILLC will remain. There is, however, a shift towards a unified policy with regard to the funding of research across the university. "If we want more cooperation between researchers, institutes, and faculties, it is imperative that we decompartmentalise the university", says Noordam.

"If you had the opportunity to start a university today, you would probably organize it differently."

José van Dijck

Van Dijck: "We maintained the interfaculty position of the ILLC. We did decide to concentrate the ILLC in the Watergraafsmeer, and to bring professorial chairs under the responsibility of one faculty only. That way, we created a maximum of administrative transparency."

Nevertheless, the ILLC still has to deal with two faculties that employ different systems for financing research. At the Faculty of Science, research institutes are responsible for their own budgets. Noordam explains the system in simple terms: "We give the institutes a bag of money and a set of rules. As long as

"We will run into more and more practical difficulties if the faculties hold on to their own ways of organising and funding research. Increasingly, decisions about research will need to be centralised."

Van Dijck explains that one of the disparities between the Humanities and the Science that was troublesome for the ILLC was recently resolved. Until last year, PhD students at the Faculty of Science received funding for four years, whereas at the Faculty of Humanities, the allotted period was only three years. Today, Humanities PhDs get an eight-tenths "tenure" for a period of four years.

Van Dijck: "In one of these years, the PhD student can decide to take up a teaching position for the additional two-tenths of the time. Other combinations are also possible, such as a full time PhD in three years and two months." Van Dijck adds that she wants to allow the research institutes more control over their budgets, in a way that is reminiscent of the situation at the Faculty of Science: "I am considering a model in which the institutes are free to decide whether they use their budgets to attract 'eerstegeldstroom' PhDs (direct state funding), or to match external funding for PhDs (research grants and third party funding). The institutes responded enthusiastically to this idea."

Multi-talented

The organisational changes at both faculties reflect the transformation of the sciences. Traditionally, humanities scholars worked on their own, whereas their colleagues at the Faculty of Science

library. Our cognition researchers frequently use medical imaging technology like MRI, and our phoneticians and art restorers work with expensive and advanced technologies. It is here that the cultures of our faculties meet. It is an ongoing process. The world is changing and science is at the forefront of that change. The integration of the sciences is picking up speed. Fifteen years from now scientific disciplines will have changed beyond recognition. The new generation of students in my own field – media studies – is multidisciplinary oriented and multi-talented. They are often as much at home in philosophy as they are in algorithms and computer hardware." Noordam: "Students are not daunted by these transformations. They follow their own interests, regardless of scientific demarcations. Disciplines like physics, chemistry and mathematics attract only one third of our students. The majority choose thematic studies."

It takes time and some struggle, but it is worth the effort." Van Dijck: "In our society, we have got used to people having multiple identities and multiple loyalties. The same will happen in science."

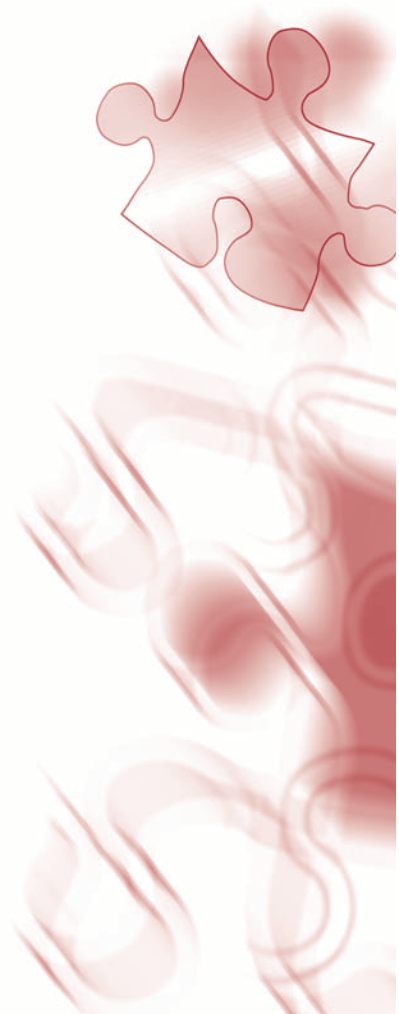
Interview and text: Rob Hartgers

"Today's scientific world is more complex than the subdivision in faculties suggest."

Bart Noordam

were more used to working in teams. Today, a great deal of humanities research is conducted in teams as well. This is partly because of a change in the policies of the Netherlands Organisation for Scientific Research (NWO), that seems to prefer larger research programmes. However, the team efforts are also a result of the growing complexity of the humanities research, explains Van Dijck: "It is a myth that humanities scholars spend most of their time in a

Van Dijck and Noordam are confident that the UvA will be able to adapt its organisation to the demands of the changing sciences. They cite the "research priority areas" ("zwaartepunten") that the university has formulated as a good example. Some of these, like "cognition", span five faculties. The interdisciplinary aspect is both the strength and the weakness of the priority areas, says Noordam: "It is complicated to find common ground when five parties are involved."



Research Highlight: ILLC within the ESF LogICCC Programme

Modelling Intelligent Interaction – Logic in the Humanities, Social and Computational Sciences (LogICCC)

LogICCC is a cross-European collaborative research programme bringing together researchers from a number of fields related in their interest in logic and intelligent interaction. ILLC researchers are involved in four of the eight LogICCC projects. The present research highlight feature brings together perspectives on LogICCC, and in particular on ILLC within LogICCC, both from within the ESF and from within the ILLC. Eva Hoogland, ESF Science Officer and an ILLC alumna, kindly accepted to write an introduction for our feature. Short description of the research projects in which ILLC researchers are partners follow. The short interview with Johan van Benthem at the end of this feature provides a general context for LogICCC.



LogICCC is an ESF EUROCORES Programme

The European Science Foundation (ESF) – founded in 1974 – is an association of 80 member organizations devoted to scientific research in 30 European countries. In the Netherlands, both the Netherlands Organization for Scientific Research (NWO) and the Royal Netherlands Academy of Arts and Sciences (KNAW) are ESF member organizations. The ESF is committed to facilitating collaboration in European science on behalf of its member organizations. In practice, this means that since its establishment, the ESF has coordinated a wide range of pan-European scientific initiatives. Interestingly, its flexible organization structure means that the ESF can respond quickly to new developments. And since the ESF favours "bottom-up" approaches, it positions the scientific community in the driver seat of the field's medium to long-term development.

In the recent years, the European Science Foundation has proven to be

a successful incubator of cutting edge basic research programmes at the interface of the Humanities and the Computational Sciences. In this area of the research spectrum, home to the ILLC, disciplines like philosophy, linguistics, and cognitive science naturally merge with mathematics and theoretical computer science to gain a deeper understanding of the core issues of information, communication, cognition, and computation. The ILLC has played a pioneering part in this development. In ESF programmes like "New Frontiers of Infinity: Mathematical, Philosophical, and Computational Prospects" (INFTY), "Games for Design and Verification" (GAMES) and "Experimental Pragmatics in Europe" (EURO-XPRAE), the ILLC is well represented, only to be topped by LogICCC, in which the ILLC partners in four of the eight projects.

The EUROCORES Programme "Modelling Intelligent Interaction – Logic in the Humanities, Social and Computational Sciences"

(LogICCC) aims at a deeper understanding of intelligent interaction by letting logic in its modern guise act as a catalyst and a "matchmaker" between the different disciplines that hold separate pieces of the puzzle posed by this pervasive but also elusive phenomenon. The programme – with a budget of 6.5 millions euros, supported by 13 national funding organizations – has invited researchers from a wide variety of disciplines to team up. Some of these researchers are logicians, others are not. But what all participants in LogICCC have in common is their interest in understanding interaction, pursued with the common language and models provided by logic in its modern, pluriform, and outward-looking guise.

In this article, you will find more about the LogICCC programme, its conception, and the four projects in which ILLC researchers are involved. In addition, the LogICCC workshop "Modelling Interaction, Dialog, Social Choice, and Vagueness", to be held on 26-28 March 2010 in Amsterdam, may provide you with a first-hand experience with the four projects. (*Eva Hoogland*)



Computational Foundations of Social Choice (CFSC)

Principal investigators:

- Felix Brandt (Ludwig-Maximilians-Universität München, Germany)
- Ulle Endriss (University of Amsterdam, The Netherlands)
- Jeffrey Rosenschein (Hebrew University of Jerusalem, Israel)
- Jörg Rothe (Heinrich-Heine-Universität Düsseldorf, Germany)
- Remzi Sanver (Istanbul Bilgi University, Turkey)

Associate partners:

- Vincent Conitzer (Duke University, Durham, USA)
- Edith Elkind (Nanyang Technological University, Singapore)
- Edith Hemaspaandra (Rochester Institute of Technology, USA)
- Lane Hemaspaandra (University of Rochester, USA)
- Jérôme Lang (Université Paris-Dauphine, France)
- Jean-François Laslier (École Polytechnique, Paris, France)
- Nicolas Maudet (Université Paris-Dauphine, France)

Social Choice Theory addresses questions regarding the design and analysis of methods for collective decision making. Examples for such methods include voting procedures and protocols for fairly dividing a set of goods amongst the members of a group. The field has been developed as a rigorous scientific discipline since the 1950s, although its roots can be traced back much further, to illustrious historical figures such as the Catalan philosopher, alchemist, and missionary Ramon Llull (1232-1315), the French mathematician, politician, and political scientist M.J.A.N. de Caritat, Marquis de Condorcet (1743-1794), and Charles Dodgson (1832-1898), the author of "Alice in Wonderland", better known under his pen name Lewis Carroll.

In recent years, Social Choice Theory has attracted the attention of a growing number of logicians and computer scientists. Logic plays a role, for instance, as a tool for reasoning about the formal properties of different mechanisms for conducting an election. Computational concerns are relevant,

for instance, when we want to understand how much information a group of people will need to exchange, in the worst case, if they want to fairly divide a cake (or any other type of good) between themselves. There is now a flourishing international research community working in the field that has come to be known as Computational Social Choice. The LogiCCC project "Computational Foundations of Social Choice" brings together some of the most active research groups from that community, in Europe and beyond. The key objectives of the project are to deepen our understanding of complexity-theoretic and algorithmic issues arising in Social Choice Theory, to develop logic-based languages for modelling and reasoning about social choice problems and preference structures, and to apply established techniques from Artificial Intelligence to problems of collective decision making.

At the ILLC, the project formally involves Ulle Endriss (principal investigator) and Daniele Porello (postdoc), and in practice also a number of other people working on Computational Social Choice, notably Stéphane Airiau, Umberto Grandi, and Joel Uckelman. (*Ulle Endriss*)

Dialogical Foundations of Semantics (DiFoS)

Principal investigators:

- Reinhard Kahle (Universidade Nova de Lisboa, Caparica, Portugal)
- Benedikt Löwe (University of Amsterdam, The Netherlands)
- Peter Schroeder-Heister (Universität Tübingen, Germany)

The aims of the "Dialogical Foundations of Semantics" project are twofold: (1) to describe the foundational value of Lorenzen's dialogical logic, and (2) to embed it into a modern scientific context taking into account its historical roots. More broadly, the foundational investigations of the project consists in (i) discussing and clarifying technical points of dialogue semantics, and (ii) evaluating its philosophical

background claims, as well as its potential to lay the foundations for logical reasoning in mathematics, computer science, and linguistics.

The embedding into a modern context and the historical roots are subjects of several collaborative projects between two sites each. The partners in Tübingen and Lisbon are investigating the role of negation and of definitional reasoning as paradigms for reasoning in general, the use of dialogues in informal and semi-formal mathematical proofs, the use of zero-knowledge proofs and extended logic programs in computer science, and of dialogical versions of the propositions-as-types approach within linguistics. The Amsterdam researchers, Benedikt Löwe and Sara Uckelman, are primarily working towards the second aim, by looking at the use of dialogues and debate in historical logical practice. This research involves such diverse topics as modelling medieval theories of *obligationes* (game-like disputations involving two players, one which puts forwards propositions, the other of which is obliged to respond to those propositions according to certain rules) with multi-agent dynamic epistemic logic; determining what, if any, is the relationship between *obligationes* and actual disputations which took place in university teaching; investigating the role of dialogue in mathematical practice and proof, both mediævally and modernly; and studying the dialogical tradition in mediæval Indian logic through the informal working group DDAHL (Dynamic and Dialogical Approaches to Historical Logic), involving researchers in Amsterdam, Lille, Tübingen, and India.

At the ILLC, besides Benedikt Löwe (principal investigator) and Sara Uckelman (postdoc), the project also includes Catarina Dutilh Novaes as an associated researcher. (Sara Uckelman)

Logic for Interaction (LINT)

Principal investigators:

- Johan van Benthem (University of Amsterdam, The Netherlands)
- Erich Grädel (RWTH Aachen University, Germany)
- Lauri Hella (University of Tampere, Finland)

- Jouko Väänänen (University of Helsinki, Finland and University of Amsterdam, The Netherlands)
- Dag Westerståhl (Göteborg University, Sweden)

Associate partners:

- Samson Abramsky (Oxford University, United Kingdom)
- Gabriel Sandu (Université Paris 1, CNRS / ENS, Paris, France)

The "Logic for Interaction" project aims at developing mathematical foundations for interaction. Intelligent interaction involves agents in complex scenarios like conversation, teamwork, or games. Contours of a broad mathematical description are starting to emerge today, based on several individual research developments that are brought together in LINT. The project gathers logicians, computer scientists, and philosophers from six European countries in an effort to lay the grounds for a unified account of the logic of interaction. These groups represent a wealth of approaches to interaction, including game semantics and category theory, modal and epistemic logics of games, and ideas from formal semantics of natural language.

The ILLC part of LINT is centred on the new concept of dependence logic and its older relatives, such as (in)dependence friendly logic. The idea is to base the mathematical part of the logic of interaction on this concept. In its simplest form, dependence logic is the straightforward extension of first order logic by so-called dependence atoms, which express the functional dependence of a given variable on some other variables. For example, the meaning of the dependence atom $=(x,y)$ in a given data is that the values of x determine in this data completely the values of y (even if the language has no function symbol for this). Dependence logic has a simple syntax, but can in fact express on finite structures everything in non-deterministic polynomial time. Hence various issues of complexity are under investigation. Dependence logic is non-axiomatizable in its full generality, but work is underway to completely axiomatize fragments of it.

LogiCCC projects:

- Computational Foundations of Social Choice (CFSC) features researchers from Amsterdam, Düsseldorf, Istanbul, Jerusalem, Munich and associates from Durham (North Carolina), Paris, Rochester (New York), and Singapore.
- Dialogical Foundations of Semantics (DiFoS) features researchers from Amsterdam, Lisbon, and Tübingen.
- Games for Analysis and Synthesis of Interactive Computational Systems (GASICS) features researchers from Aachen, Aalborg, Bruxelles and associates from Cachan, Paris, and Warwick.
- The Logic of Causal and Probabilistic Reasoning in Uncertain Environments (LcpR) features researchers from Düsseldorf, Prague, Salzburg and associates from Birmingham, Grenoble, and Rome.
- Logic for Interaction (LINT) features researchers from Aachen, Amsterdam, Göteborg, Helsinki, Tampere and associates from Oxford and Paris.
- Logical Models of Reasoning with Vague Information (LoMoReVi) features researchers from Barcelona, Prague, and Vienna.
- Social Software for Elections, the Allocation of Tenders and Coalition/Alliance Formation (SSEAC) features researchers from Kiel, Turku, Valladolid and associates from Lyon and Tilburg.
- Vagueness, Approximation and Granularity (VAAG) features researchers from Amsterdam, Berlin, Lund, Zagreb and associates from Edinburgh.

More information:
<http://www.esf.org/logic>



There are two versions of semantic games behind dependence logic. One version is computationally costly, but determined and has perfect information. The other version is less costly, but non-determined and has imperfect information. The connection between these two versions is not yet completely understood. Not surprisingly, LINT involves expertise in imperfect information games. Also, one new development to consider is probabilistic dependence logic.

At the ILLC, except for Jouko Väänänen and Johan van Benthem, the project also involves Pietro Galliani as a PhD student. The work of many other ILLC researchers is indirectly involved. (*Jouko Väänänen*)

Vagueness, Approximation, and Granularity (VAAG)

Principal investigators:

- Peter Gärdenfors (Lund University, Sweden)
- Velimir Işgum (University of Zagreb, Croatia)
- Manfred Krifka (Zentrum für Allgemeine Sprachwissenschaft, Berlin, Germany)
- Robert van Rooij (University of Amsterdam, The Netherlands)
- Ulrich Sauerland (Zentrum für Allgemeine Sprachwissenschaft, Berlin, Germany)

- Frank Veltman (University of Amsterdam, The Netherlands)

Associate partners:

- Ewan Klein (University of Edinburgh, United Kingdom)
- Michael Rovatsos (University of Edinburgh, United Kingdom)

The European collaborative research project "Vagueness, Approximation, and Granularity" targets a broad, interdisciplinary reassessment of vagueness, with contributions to general cognitive science, linguistic semantics, experimental psychology, and formal pragmatics. The Amsterdam subproject "Towards a Game-Theoretic Explanation of Vagueness" is headed by Robert van Rooij and Frank Veltman.

Much of what is said in language is vague. It seems obvious, however, that sharing more factual information is always preferred in a cooperative communication setting, meaning that vagueness cannot have an advantage over preciseness. The main aim of the Amsterdam subproject, then, is to explain the prevalence of vague terms in natural language.

On the one hand, it is hypothesized that vagueness is unavoidable because (i) measuring communicative success as a 1-1 correspondence between speaker's intention and listener's interpretation is unreasonably strict, and (ii) agents

are in general not well-informed about their own purposes and preferences. On the other hand, we seek to explain the prevalence of vagueness hypothesizing that being vague is advantageous because (i) thinking and communicating in vague terms might be cheaper in computational terms for bounded rational agents, and advantageous if they face memory and/or communication constraints; (ii) it allows us to communicate more if the game is non-cooperative, and (iii) language is not only used to communicate facts about the world, but also to express value judgments. It is hypothesized that vague terms are more useful here than precise terms. The goal of the project is to formalize these hypotheses and to show that vagueness is indeed unavoidable and useful, as conjectured above. In this enterprise, we will make use of decision and game-theoretic tools, particularly of recent developments in these areas aimed at modelling bounded rationality.

At the ILLC, quite a number of persons are working on vagueness or other themes related with the project. These include not only the principal investigators, Frank Veltman and Robert van Rooij, but also Raquel Fernández, Galit Weidman Sassoon, Harald Bastiaanse, and Lucian Zagan. (*Robert van Rooij*)

Logic and LogICCC. A Short Interview with Johan van Benthem

For LogiCCC to become an ESF programme, a lot of energy was put into the lobbying work. A group of well-known researchers, from all over Europe, conjoined their efforts for convincing about the opportunity of such a programme. As one of the people involved in this phase, we invited Johan van Benthem to answer a few questions.



Logic in its recent guise plays a significant role in such thematic areas as interaction, communication, computation, and cognition. And so, we see it mentioned in connection with interactive computational systems, social software and computational social choice, the mathematical foundations of interaction, dialogue semantics, probability and uncertainty, vagueness. What is logic in our days? How would you comment the pluralism that seems to characterize it?

It is a contentious issue what logic is, and the "definitions" one finds in textbooks or philosophical treatises are often about a century out of synchronization with current developments. The traditional definition as "the science of reasoning" emphasizes proof and consequence, which omits the equally important definability and computability dimensions of the field that have flourished since the 1930s. There are also definitions like "the science of formal systems" that make logic a sort of universal algebra, that is, a small corner of mathematics. But like all healthy disciplines, logic has been expanding its range of topics – definitions only fix, at best, certain historical phases. For instance, for several decades already, most logical research has taken place at the interface with computer science, but this huge shift still has not registered in public consciousness. Personally, I would say that logic today is the study of basic informational processes, and information-driven human agency. Not surprisingly, the "ILLC formula"! These informational processes include inference, but also observation, questions, and communication.

They generate knowledge, belief, and other attitudes, and they typically play in social dynamic settings: involving interaction with others. Of course, like many radicals, I try to adopt a cloak of historical respectability. And thus, I find that the interactive stance in logic is close to views in Antiquity on the various sources of knowledge, with conversation and argumentation as a major paradigm for logical study.

Finally, the "pluralism". People often feel that expansion means dilution, and experience an acute loss of certainty. While my definition for logic may claim a broader territory than earlier ones, the unity of a scientific field resides in its methods, not in specific topics, laws, or theories. And there, the mathematical system-building methodology of the past still seems perfectly adequate to me, and it provides a powerful force for coherence. Indeed, this methodology does not suggest pluralism in the sense of competing cultures plus a facile relativist view that they are "valid in their own home". I rather see a constant mathematical re-evaluation of the space of possible systems, finding new analogies and invariances, creating unity in what looks like pluralism. For instance, in my own recent work on "logical dynamics", what used to be a host of competing "alternative consequence relations" seems to fall more neatly into just classical consequence plus explicit informational actions.

What is the significance of a cross-European collaborative research programme on logic and its applications? How do you see logic as a research field (in Europe and worldwide) a few decades from now?

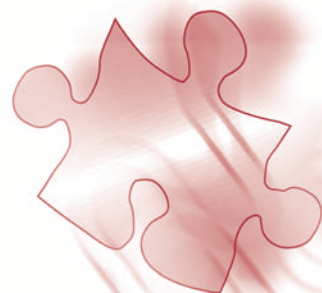
I feel very pleased that we managed to make logic one of the ESF spearpoints. Our field has the reputation of being a bit "past its prime", with probability, neurocognition, and other paradigms taking over, and it was a great experience explaining to the many councils and officials involved that it also has an interesting future. I felt that Europe is an interesting place for starting such developments. First, the core group of people making the proposal for the LogICCC

programme brought together some of the most creative leaders across our continent, logicians active in major centres for computer science, mathematics, philosophy, linguistics, and cognitive science. This founding phase was highly complex, and a public benefit: we did not write specific projects for ourselves, but only argued and lobbied for a funding programme that would benefit the field, or at least, its innovative wings. I spare you the details of what happened in various places, from Cyprus to the UK, until the many-country multi-million euros fund was finally created. But in the end, I felt that Europe is a significant place for this to happen. While much of logic after the Second World War has been dominated by the United States (and quite rightly so, since that is where the drive and great results were to be found), I now often feel that less conventional newer developments are cooking in Europe, in a unique constellation of modern logicians and congenial thinkers from neighbouring fields. This started already in the 1970s, when major developments in logic and linguistics, or logic and computer science, got initiated out here. You can also see it with the highly successful ESSLLI summer schools. They were not imported, but started here – and now, they are being exported to other continents. I feel that such shifting centres of initiative are good for a field, and Europe might produce a new "Vienna Circle" – though it need not be in Vienna, and it need not be a circle.

What is the significance of such a programme for the ILLC? ILLC researchers are involved in four of the eight selected projects.

The fact that ILLC swept up so much LogICCC money is significant, but not surprising: you would expect people at our institute to have ideas in the logical avant-garde. *Noblesse oblige*. Beyond that, I feel that these projects exemplify several interesting developments. One is that even core mathematical logicians got involved in new broad themes where their past expertise gets wider scope, such as dependence, or dialogue. Another is that interesting new coalitions were

formed, linking ILLC to new groups beyond our traditional European friends and allies. Of course, this was not just LogICCC: we should also think of major projects like our Marie Curie Research Training Site GLoRiCass on logic and games. Together, these projects also pose a challenge to ILLC. Our traditional organization, like that of ESSLLI, reflects the realities of the 1980s and 1990s: logic, language, computation, in interaction with computer science, linguistics, mathematics, and philosophy. Themes like games, cognition, or other LogICCC topics cut across these, and suggest contacts with new disciplines beyond our "old friends", such as economics and cognitive science. Should we change our self-image, and eventually our organization, accordingly? Please note that this is not overheated fashionable enthusiasm: many respectable research institutes all around us in the sciences have been doing exactly the same. Realities keep changing.



BY JELLE ZUIDEMA

Inspiring Research



Sometimes it is research that you completely disagree with that inspires you the most, especially if it is close to what you worked on yourself. In 2001, the journal *Science* published a paper titled "Evolution of Universal Grammar", by mathematical biologists Martin Nowak and Natalia Komarova, together with computer scientist and linguist Partha Niyogi. The paper concerned mathematical models of language learning and evolution and showed, the authors claimed, that there must be quite detailed, innate knowledge of language for successful communication to be possible at all in a population. It strongly supported the nativist camp in the *big debate* in linguistics about whether and to what extent language is innate.

The math in the paper is very elegant - and it was a lot of fun to play around again with differential equations and bifurcations - but the problem with it, I found, is that the model is completely wrong. In the year following its publication, I spent a lot

of time and energy in understanding where exactly it went awry. It is interesting to see how many people uncritically accept conclusions from papers with lots of math and the right rhetoric, even if very few of them, I am convinced, have actually bothered to go through the derivations.

For me, two earlier inspirations were crucial to discover the error in the *Science* paper. The first was the research of my MSc advisor, theoretical biologist Paulien Hogeweg. She always emphasized that in every model, implicit assumptions are made, and advocated a "multi-modelling" approach where one tries to design multiple models of the same empirical phenomenon. By comparing the behaviour of these different models, you often find surprising differences and discover hidden assumptions that you might want to reconsider. I think this is still an important message in cognitive science and linguistics, where too often researchers are too much in love with their own little models and fail to see the problematic assumptions hidden behind fancy notation.

The second inspiration was the work of my later PhD advisor, linguist Simon Kirby. He studied the first "iterated learning" models. His work helped me realize that language learning is a very special kind of learning problem, because the target of learning is not God-given, so to speak, but the result of the learning that occurred in earlier generations. That implies that the language that children need to learn reflects the learning biases of earlier generations of learners. This point may seem quite trivial, but it turns out that much of the formal work in learnability theory and many of the verbal arguments for the "poverty of stimulus" or "critical period" are put on their heads when you realize what it really means. By building a

computational iterated learning model that closely resembled the mathematical model from the *Science* paper, and closely analyzing the quite different outcomes, I figured out that the error in the original paper was that it assumed a wrong upper bound.

I have moved on, of course - after spending perhaps a bit too much time on the nitty-gritty details of computational and mathematical models that few people really care about. One inspiration in the last few years stands out as a motivation for me to sometimes look up from such obscure modelling and consider the *big questions* instead, and that is Jared Diamond's book *Guns, Germs, and Steel*, in which he describes how the enormous differences in power and technology between people on earth have come about since Homo Sapiens emerged in Africa. I have tried to make everybody I know read this book. It might be wrong in many details, but the overarching story is totally convincing to me; it showed me that sometimes it is research that you completely agree with that inspires you the most - but only if it is far beyond what you have worked on yourself.

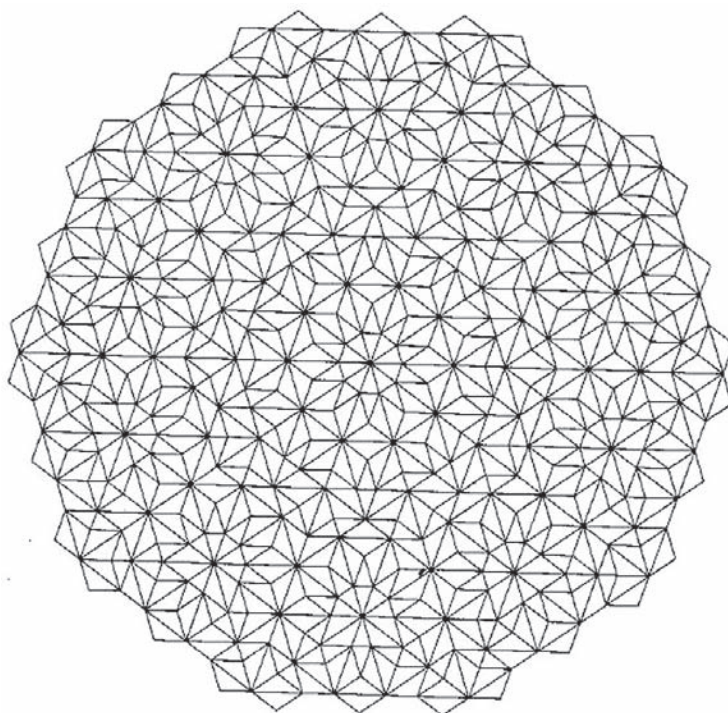
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Penrose Tilings: Geometry Rearing Its Head in Logic

Tilings are a ubiquitous and age old geometrical phenomenon that you can run into (or walk on) in every street. Alessandra Palmigiano explains how Penrose tilings, after their discovery in decision theory, found their way through non-commutative geometry back into logic and into her own research.



Mathematically speaking, a *tiling* of the plane is a covering of the plane by means of a set of plane figures, the *prototiles*, with no overlaps and no gaps. Penrose tilings are fascinating mathematical objects: they are non-periodic tilings of the Euclidian plane, generated by a set consisting of two prototiles: two isosceles triangles whose edges are of length $(1, 1, \tau)$ and $(\tau, \tau, 1)$ respectively, $\tau = (1 + \sqrt{5})/2$ being the *golden ratio*. Using certain matching rules, this set of prototiles generates uncountably many non-isomorphic tilings: some of them (such as the one in the picture) exhibit a beautiful symmetry. However, the matching rules guarantee that none of these tilings is invariant under any translation of the plane (this is what their being *non-periodic* means). Hence, no Penrose tiling can be described in terms of a bounded region of the plane regularly repeating itself so as to cover the whole plane. However, any bounded region of a Penrose tiling infinitely repeats itself within the tiling (and also in any other Penrose tiling).

Thus, the Penrose tilings together form a maze from hell: they cannot be classified by any procedure based on "local" information.

Penrose tilings provide interesting case studies in group theory, discrete mathematics and algebraic geometry, and have also been usefully applied in the physical and chemical study of quasicrystals. Penrose tilings are also linked to logic in various ways: firstly, the very existence of finite *aperiodic* sets of prototiles (that is, of a set of prototiles that only generates non-periodic tilings of the plane) was discovered, surprisingly recently, in decision theory, in connection with the following problem: "given a finite set of prototiles, does it admit a tiling of the plane?". In 1961, it was shown that this problem is effectively decidable if every set of prototiles that generates a tiling of the plane also generates a periodic one. This problem was then proven to be undecidable, which implies the existence of some finite set of prototiles that only generates non-periodic tilings of the plane.

Two years after the publication of this undecidability result, the first such set was presented, which counted 20.426 distinct prototiles. In 1973, Penrose discovered the two-element set named after him. To this day, there is no known aperiodic tiling that uses less than two prototiles.

The second link between logic and Penrose tilings is closer to my personal interests, and has to do with their classification [1]: Penrose tilings bijectively correspond, up to isomorphism, to equivalence classes of points of (a closed subspace of) the Cantor space C . The Cantor space is a very well-known object in algebraic logic: it is the topological space that is dual to the Lindenbaum-Tarski algebra of classical propositional logic. To be precise, the clopen subsets of the Cantor space both generate its topology and represent the classical propositional formulas, up to logical equivalence. Loosely speaking, the Cantor space is just the Lindenbaum-Tarski algebra in a topological dress. So its link with classical propositional logic cannot be stronger.

Nothing remarkable so far, but now comes the interesting twist: the equivalence relation $=$ on C whose cells classify the Penrose tilings is such that the topological (hence the logical) information of the Cantor space is trivialized in the quotient space: this is a clear indication that Penrose tilings cannot be meaningfully described in terms of classical logic and topology. From a topological point of view, a natural

way to get around this problem is to make the equivalence relation into a first-class citizen and endow it with a meaningful (topo)logical structure. This has been done in [1] in the context of a branch of mathematics called *noncommutative geometry*, and the resulting topological structure is algebraically very rich.

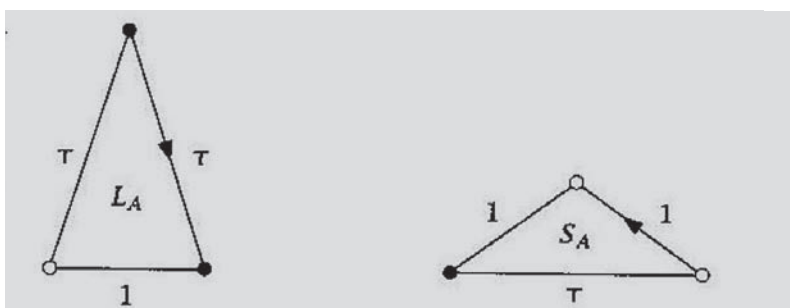
Because of its richness, the classification of Penrose tilings has been achieved in two different (but of course equivalent) ways: in [1], with methods rooted in functional analysis; in [2], with a logically inspired approach, by means of the Lindenbaum-Tarski algebra of a noncommutative logic of "finite observations" (cf. [4]) on the geometric behaviour of Penrose tilings.

The essential feature of Penrose tilings, their being impervious to being captured by any "local" description, motivates the jump from classical to noncommutative topology, hence from classical to non-classical logic. However, the *direct* connection (i.e. without passing through the Cantor space) between the two constructions was left as an open problem in [2]: how can the first one be obtained in terms of the other? Taking the move from this case study, in [3] we develop a Stone-like correspondence that encompasses the one between this Lindenbaum-Tarski algebra and $(C,=)$ and as an application we give an answer to the open problem.

Alessandra Palmigiano

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The two prototiles



INTERVIEWS WITH GUSTAAF HAAN AND HARRY STEIN

Alumni



After the Master of Logic programme, **Gustaaf Haan** (1976, MoL 2007) wandered away and became involved in renewable energy. He founded his own company, and now he is screwing solar modules onto roofs. PhD alumnus **Harry Stein** (1959, PhD 1997) has stayed closer to his roots. Nowadays, he is a philosophy teacher at the Murmellius Gymnasium in Alkmaar.

Gustaaf Haan

You are one of the owners of De Zonnesfabriek. What is this company doing?

De Zonnesfabriek helps people and companies to switch to renewable energy. We give advice about applications, request grants, and actually install the devices. We work foremost with solar energy, which has two classes of applications: photovoltaic solar cells and solar thermal collectors. Most popular are the photovoltaic modules. We are also into wind energy, but windmills do not sell well.

Business is doing well. Renewable energy is a hype and people are thinking green. Especially in the Netherlands, the solar industry has been given a boost by the establishment of stimulatory subsidies. Purchasing now is financially feasible, and the demand is growing. Competition also increases. That is a good thing; prices are falling and options are expanding.

That is very interesting, but what is the connection with the ILLC?

While screwing solar modules onto a roof, I hardly ever puzzle about the $P = NP$ problem. So there is no relation except for the fact that one of our biggest clients has been the Universiteit van Amsterdam. We have installed photovoltaic modules onto the roofs of three of the buildings of Roeterseiland. One of them was Euclides, the very building I graduated in 2007. It was really nice to return two years later. The building was completely empty, and the atmosphere felt strange and spooky. Especially for me, who knew Euclides as a place where I studied hard and experienced good times.

How did you end up in the renewable energy industry?

After I finished the Master of Logic, I was aiming for an academic career. I stayed at the ILLC as a teacher to wait for a good opportunity for a PhD position. However, by the time that opportunity occurred, I was already involved in something else. I

worked for the Wiardi Beckman Stichting, a research institute of the Dutch political party PvdA. I was accepted as a researcher into their energy and climate policy group. It had nothing to do with logic; it was all about my own interests.

Later I became employed at Pilgrims Consult, which is an agency that advises companies about the environment and renewability. Here I discovered that the majority of the older generation thinks the environment and the energy supply are important and interesting points of discussion. Frustratingly however, they do nothing about it. A friend came across the same problem. Together we decided to help people take action and we founded De Zonnesfabriek.

Where did that interest in renewable energy and the environment come from?

I took an interest in renewability long before Al Gore. I was raised with it. My parents already protested against the construction of nuclear power plants. Besides, I am a child of

my time; nowadays social security is assured, so it is time to tackle the issues of our energy supply.

How did you experience the ILLC and what did you learn?

I truly enjoyed the intellectual challenges and the enormous demands that were made. I explored the limits of my own intellect. I encountered subjects of which I thought I could take no more, and had to acknowledge the superiority of some of my fellow students. Those things stimulated me.

Although my current work has nothing to do with logic, I still profit from my time at the ILLC. Contrary to what some people say, you do get smarter by studying logic. Your intellect is kissed awake. You learn how to see through problems. Logic doesn't make you think logically per se. However, it does make you think analytically.

Another skill I have learned is the ability to read texts about subjects I am not practiced in. To stay updated about the latest developments in my field I have to read very technical articles. Previously, I would have quitted reading those because I encountered words I didn't understand in the first three lines. However, my studies of logic have taught me to go on. The structure of

a text is part of its meaning, and it can help you understand things you are not trained in.

Do you ever regret that you didn't go for that academic career?

In academic research I would miss the social drive I found in my work for the Wiardi Beckman Stichting, Pilgrims Consult, and now for De Zonnefabriek. Science can be about socially relevant subjects, but logic is really abstract. Problems are detached from their context so the structures underneath can be studied.

However, I do miss the ILLC and especially that very thinking about purely abstract subjects. The abstractness presents an intellectual challenge different from the ones I encounter in my work. Another thing I miss is the teaching I used to do. I really enjoyed that, especially the introductory course about Wittgenstein and logic.

Something for the future?

For now, I am busy improving the world's energy supply. My hands will be full with that job for the first couple of lives. But somehow in the future, I would like to make myself useful in science again. I feel especially drawn towards teaching.

Harry Stein

How did you end up at the ILLC?

When I was twenty-five, I started my studies in philosophy at the Universiteit van Amsterdam. Soon, I found myself specializing in the philosophy of language. After my graduation, I took off with a PhD on Wittgenstein at the ILLC. With that subject I found myself on the verge of the research area of the institute. I was really doing philosophy, while the work of the others was more formal and mathematical. My promotor, Martin Stokhof, was also the only other person who knew more about Wittgenstein.

Your dissertation was rewarded with an Erasmus study prize. What did that mean to you?

Every year the Erasmus committee rewards the five best dissertations in the Humanities. In 1997, the year of my promotion, I received the prize. It was an honour, and especially the prestige that goes with it turned out to be very useful. It served me well in the competition for appointments and grants. I did receive some money, but the consequence of the prize for my CV was more important.

So after your promotion you aimed for an academic career?

After my promotion, I stayed at the ILLC to further investigate Wittgenstein. My dissertation was about the rule-following paradox in Wittgenstein's *Philosophical Investigations*. As a postdoc, I focused on Wittgenstein's *On Certainty*. In that book, Wittgenstein contradicts the broadly accepted idea that knowledge should be based on a solid foundation: a basis that is absolutely certain. Wittgenstein states that foundations like that do not exist. Therefore, knowledge cannot be grounded.

Why did you decide to say goodbye to the academic world?

My time at the ILLC was a really good one. I got the opportunity to truly philosophize. I could think and





“In research you are never finished; you can always go further, dig deeper, and perform better.”

Harry Stein

puzzle as much as I thought was necessary. There was a huge academic freedom. To me, that was really valuable. Next to that, there was a nice atmosphere, with friendly people.

Apart from those good things, there were some aspects of my job that I did not enjoy. Philosophizing can be really lonely. It's you alone, in your office, thinking, reading, and writing. Unlike many sciences, there is no research group to cooperate with. That was especially applicable for me; in my department, my investigation was pretty isolated.

Furthermore, I did not feel comfortable with the competition for research funds. The academic world

is a Darwinian environment; there are only a few places and a limited amount of money. My generation had to work with temporary contracts. Every three years we had to fight again for our position and for a next bag of money. We always had to deliver excellent work and someone else's success was a bad thing. A situation like that gives enormous pressure.

So you decided to switch?

After a burnout, I couldn't continue my work the way I wanted to. I took my leave from the academic world but, I did not want to abandon philosophy. Since I

always truly enjoyed teaching while at university, I became a philosophy teacher at the Murrnellius Gymnasium in Alkmaar. My choice turned out to be a good one. I swapped a vocation for a job. In research you are never finished; you can always go further, dig deeper, and perform better. As a teacher, you have an upper limit. To be good you only need to put in a certain amount of time.

You never miss the research and the ILLC?

I miss the possibility to focus on only one subject, very concentrated and for a long time. At the ILLC I had the unrestricted freedom to study until I was contented. It was no problem to get stuck for two months. As a teacher that is absolutely impossible.

On the other hand, as a teacher I can address every aspect of philosophy I want. A philosophy teacher has more freedom than most. We have to teach an obligatory core, but there is also a lot of space for other subjects that have our interest. The Murrnellius is probably the only high school in the Netherlands that teaches Chinese philosophy.

Your students in Alkmaar are all experts on Wittgenstein?

To be honest, Wittgenstein is one of the few philosophers I never, ever, attend to. Philosophy of language is one of the hardest subjects. I used to teach a course solely devoted to Wittgenstein at university. For most students, it took about seven weeks for the penny to drop. I thought it was not worth the effort to present it in high school.

However, two weeks ago, in a lost hour, I explained to a student who happened to be in my classroom the central argument of Wittgenstein. It was the argument I treated in my thesis. He actually understood it; perhaps I should introduce some philosophy of language into my lessons.

Interviews: Jorine Zandhuis

BY ROBBERT DIJKGRAAF

Starting Early

GUEST COLUMN



In my youth I was a great fan of comic books, but this was not widely appreciated. For my parents' generation comic books were evidence number one of the general decay of Western civilization. They were a symbol of easy and sloppy thinking. For me the combination of pictures and text gave just the right combination of stimuli for the two hemispheres of my brain. Comic books even gave me my first entrepreneurial experience: I started a small library where I decided to lend my substantial collection at a small fee to my friends. It was an absolute commercial disaster, since no one returned the books.

These days my eleven years old son is also deeply caught up in a comic book. In fact, reading this book has made him particular concerned about the policy in a certain hotel. Not just any hotel, but a hotel with infinitely many rooms that keeps on moving its guests. He has been reading about Hilbert's hotel in *Logicomix*, a graphic novel that sketches the history of modern logic following the colorful life of Bertrand Russell and has turned into a surprise international bestseller.

in number theory into a bestseller. Announcing at that time a one million dollar prize for anyone who could actually solve Goldbach's Conjecture was a nice additional publicity stunt.

That mathematics and logic can attract such a broad audience, even a young audience, I do not find surprising. Abstract issues can cast a magic spell. The concept of infinity is particular fascinating. I often lecture for younger children and there is

younger than today and couldn't yet read – running to the bakery and counting the steps on the way. Suddenly they started to count in steps of two and three, and shifting the patterns. They were playfully entering and exploring the world of number theory.

Scientific thinking and logical reasoning should have an essential role in everyone's education. Starting at elementary school, or even earlier, is a perfect moment. Clear thinking comes naturally at that time. As I can personally attest, children often have the annoying habit of correcting parents' sloppy reasoning. We should make a serious effort to convince all parties that one cannot start soon enough with exposing children to the wonderful world of logic. Beginning with a comic book might be just the right idea.

“That mathematics and logic can attract a broad audience, even a young audience, I do not find surprising.”

The fact that a comic book can reach so many people with the life stories of Cantor, Frege, and Wittgenstein is remarkable, although one of the coauthors, Apostolos Doxiadis, had shown with his earlier work *Uncle Petros and Goldbach's Conjecture* that he could turn an open problem

nothing more puzzling to them. That something can be "there" but cannot be reached is simply impossible to accept.

Logic and mathematics are the first abstract worlds that young children meet. I remember well my own children – they were much

Robbert Dijkgraaf is University Professor of Mathematical Physics and President of the Royal Netherlands Academy of Arts and Sciences.

Science Park 904: A New Working Environment

This spring, a large part of the ILLC has moved to the new building of the Faculty of Science in Watergraafsmeer: Science Park 904. To see how this affects ILLC members in their day to day work, we have conducted an email survey. We got 22 responses to the following set of questions:



General questions

How many routes from the entrance of the building to your office do you regularly use?

The building is quite maze-like, with six (emergency) stairs and four elevators. Do people take advantage of this opportunity for variation while traversing the building? A fair amount, it seems. On average, people use **2.14 different routes**.

Did you know SP 904 has a roof terrace on the second floor?

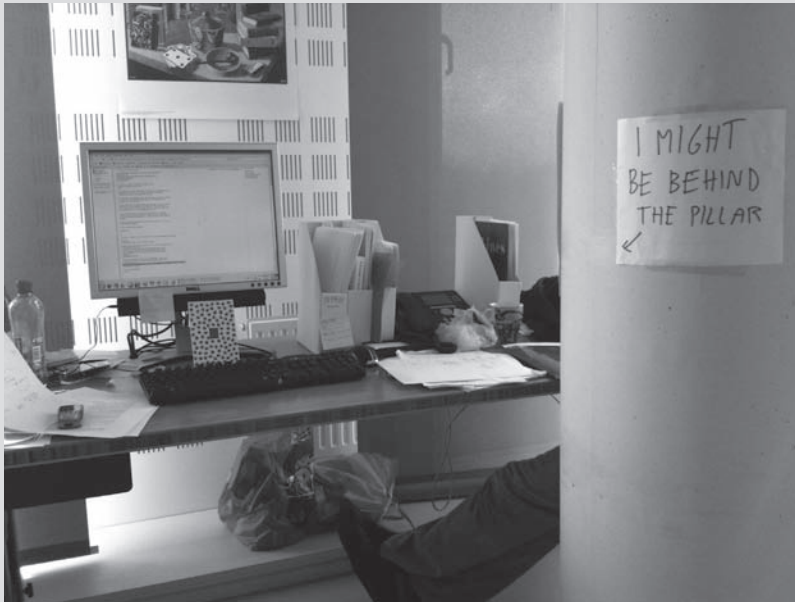
A new environment is an opportunity for exploration and discovery. Out of the 21 respondents, **13** knew of (and had seen) the roof terrace on the second floor of the B-part of the building.

What is your favourite trick for fooling the security gates at the elevators on the ground floor?

The general public and the students are separated from the academic workforce by a system of RFID-actuated security gates. The most visible of these are the ones by the elevators on the ground floor; these gates can be tricked however. Apart from walking right behind someone else, respondents wave their coats or hands at the motion sensors on the opposite side of the gate. Simpler solutions include sneaking in via the stairs, where the gates do not try to hit you, or simply asking for a security card at the front desk...

How many pillars (concrete or steel) adorn your office?

Rudy Uytengaak, architect of the C-part of the building, decided to do without load-bearing walls and rather to intersperse the interior with concrete and steel pillars. As a consequence, our average respondent has **0,857 pillars** taking up space in his or her work area.



Do you still get lost sometimes while navigating SP 904?

Luckily, very few respondents answered this question in the affirmative.

Would you sign a petition asking Sorbon to sell cookies at the espresso bar which are big enough to feed only half an orphanage?

Because of the isolated location of the new building, people are more dependent on "Campus Hospitality Provider" Sorbon when foraging for nourishments. It turned out that few people felt that chocolate chip cookies as big as compact discs were bordering on the excessive, and truth be told, there is also something to be said for solving the Humungous Cookie Problem by sharing. Not buying the cookies was another popular solution.

Would you like to watch movies in C3.108 (the meeting room)?

The institute meeting room C3.108 was not equipped with a blackboard initially, but it did come with an enormous flat screen panel. It seems a fair number of respondents feels this huge TV should be used for watching movies: 13 out of 21 replied favorably.



Regarding the open workspaces

How often have you asked Karim, Peter or Tanja to reset the code to your locker?

The workspaces used by MoL students, PhD students and visitors have no walls or doors: instead, they have lockers with an electronic 4-digit lock. We thought that people would be forgetting the combinations to their lockers all the time, but it turns out that it's mostly the conductor of this survey who forgets that sort of thing.

How many officemates can you recognize by their ringtones?

The lack of walls in the open workspaces exposes people to a rich and lively world of sounds. Beyond recognizing officemates by their ringtones, this has helped some of our respondents develop other special abilities, such as recognizing people by the sound of their footsteps or "the distinctive rhythm with which they unlock their lockers".



New PhD Students

Six new PhD students have started since the previous edition. Get to know them by reading their answers to our traditional welcome questionnaire.



Name and age: Jos de Bruin, 54
Started: May 2008
Group: Language and Computation

Where are you from? What other places did you live in before coming to Amsterdam?

The Netherlands. I lived in Brazil (as a child), the Netherlands (most of the time), and the US (3 years).

Could you tell us about your academic background?

Cognitive psychology and AI.

What is your research topic?

A computational model of step-wise language acquisition.

Who are your supervisors?

Remko Scha and Jacqueline van Kampen (UIL-OTS, University of Utrecht).

Are you a "logician"?

I am not a logician; does that make me a "logician"?



Name and age: Pietro Galliani, 26
Started: October 2008
Group: Logic and Computation

Where are you from? What other places did you live in before coming to Amsterdam?

I am from Bologna (Italy).

What is your research topic?

Dependence logic.

Who are your supervisors?

Professor Väänänen.



Name and age: Umberto Grandi, 25
Started: October 2008
Group: Logic and Computation

Where are you from? What other places did you live in before coming to Amsterdam?

I was born in Italy, near Milan. I lived in Pisa and in Paris (just for one semester) before coming to Amsterdam.

Could you tell us about your academic background?

I studied Mathematics in Pisa (bachelor and master).

What is your research topic?

Computational Social Choice: applying logic and other tools from theoretical computer science to study structures and mechanisms from and for society.

Who are your supervisors?

Ulle Endriss.

Are you a "logician"?

Mhh... Maybe I am more an interested mathematician.

Where do you like to work?

In order: on the blackboard; walking; near my pillar in Science Park.

What is your favourite game?

Not that I like games very much. Card games are OK.

What is your favourite / least favourite aspect of living in Amsterdam?

Favourite: the abundance of bicycles. Least favourite: the scarcity of parmesan.

What is your favourite Dutch word?

Natuurlijk.

Is there anything else you might like to add?

I didn't say anything about the weather!



Name and age: Hadil Karawani, 27
Started: September 2008
Group: Logic and Language

Where are you from? What other places did you live in before coming to Amsterdam?

Jerusalem and Haifa.

Could you tell us about your academic background?

Master degree in Linguistics from the Hebrew University of Jerusalem.

What is your research topic?

Mood and temporality in counterfactuals, cross-linguistically.

Who are your supervisors?

Frank Veltman and Josep Quer.

Are you a "logician"?

I wish!

Where do you like to work?

Presupposition failure.

Where and how do you like to spend the time when not working?

At sea, ... and wind surfing.

What is your favourite game?

The last game I played was Prince of Persia (megahit).

What is your favourite / least favourite aspect of living in Amsterdam?

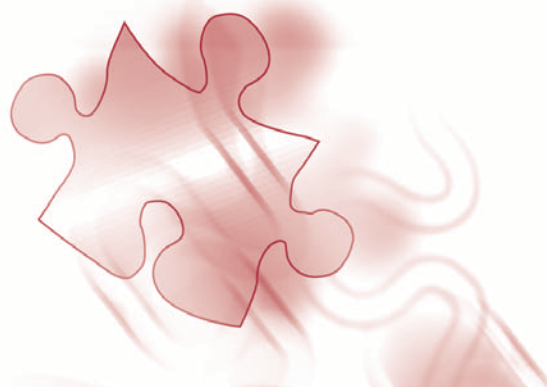
It *miezers* all the time.

What is your favourite Dutch word?

'tuurlijk.

Is there anything else you might like to add?

Sugar?





Name and age:
Bruno Loff, 24
Started: September 2008
Group: Logic and Computation

Where are you from? What other places did you live in before coming to Amsterdam?

Lisbon, Portugal. No other.

Could you tell us about your academic background?

I studied recursion theory at the IST, Lisbon.

What is your research topic?

Computational complexity.

Who are your supervisors?

The awesome Harry Buhrman.

Are you a "logician"?

That's what my mother says back home.

Where do you like to work?

Good question!

Where and how do you like to spend the time when not working?

Listening to good music (Zorn, Frith, Brotzmann, etc., as well as the old-timers Mozart, Beethoven, etc.), watching a good film (Pasolini, Tarkovsky, Fassbinder, Bergman, etc.), and badly improvising on my saxophone.

What is your favourite game?

Play catch.

What is your favourite / least favourite aspect of living in Amsterdam?

There are plenty of dualities: Bimhuis / Paradiso; punks / yuppies; Asian cuisine / Dutch food; poetic architecture / isolated living-style; independence / loneliness; euphoria / depression ...

What is your favourite Dutch word?

Shouldn't write it here.

Is there anything else you might like to add?

Yeah, go figure: I'm looking for a room right now! My number is 0611 128 488.

(Editors' note: "Now" stands for 9 November 2009.)



Name and age:
Lucian Zagan, 29
Started: September 2008
Group: Logic and Language

Where are you from? What other places did you live in before coming to Amsterdam?

I grew up in Suceava, Romania. I moved to Cluj for my undergraduate studies, and later on I also lived for short period in Timișoara. Afterwards I moved to Hungary, spending two wonderful years in Budapest. Then I visited the United States: Chapel Hill first, and New York afterwards. Following a detour to Bratislava, in Slovakia, I arrived in Amsterdam, where I have settled the camp for writing my PhD thesis.

Could you tell us about your academic background?

Philosophy all the way.

What is your research topic?

Vagueness and language use.

Who are your supervisors?

Frank Veltman.

Are you a "logician"?

Coming to ILLC, I realized how much I am a philosopher. But due to the nature of the topics I am interested in, I have to look at what logicians or researchers in other neighbouring fields, as linguistics or cognitive science, are doing. In any case, these divisions are somewhat artificial.

Where do you like to work?

Wherever I meet inspiring people.

Where and how do you like to spend the time when not working?

Pojorâta, a place you won't find easily on the map, is the place where I like to spend most of my vacations. I enjoy a lot to hike and I try not to miss any opportunity. As it happens, sometimes I spend more time planning than actually hiking. But I enjoy that just as much. I also take pleasure in

reading literature. Hermann Hesse is one of my earliest favourites. Marguerite Yourcenar, José Saramago, and Imre Kertész are some of my recent favourites. When it comes to films, nothing beats Ingmar Bergman's *Wild Strawberries* yet, but I do find it enjoyable watching for competitors. And, as I do it quite often, it seems I like a lot to sip my coffee quietly.

What is your favourite game?

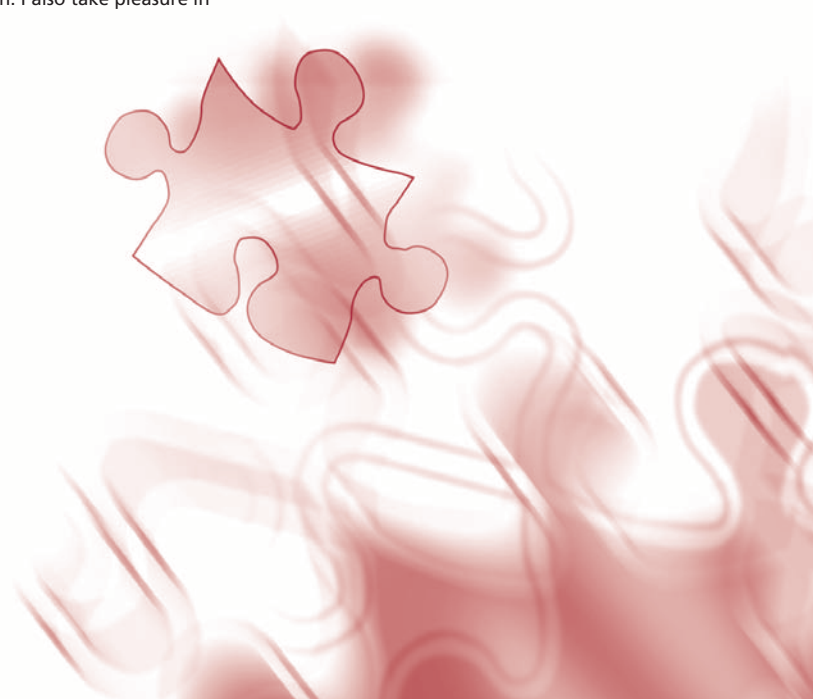
Ticket to Ride.

What is your favourite / least favourite aspect of living in Amsterdam?

If that is allowed, I think there is much truth in, and so I would like to revive, my colleague Micha Franke's answer to this question some years ago: "(Sorry, but) I think that the city has a very selfish, inconsiderate and narcissistic flair at times. I'm also not into violent biking, spacious districts dedicated to sex and drugs, or the disproportionate exploitation of expatriates through a crippled system of housing corporations. Amsterdam is beautiful though, special and charmingly small but international."

What is your favourite Dutch word?

Prachtig.





Photographer: Yanjing Wang