a brief history of the institute for logic, language and computation
people, ideas & practices

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a brief history
This booklet presents a short history of the ILLC up to 2021 as seen by two of its founders, with a focus on the early years, from the 1970s until the 1990s. We have chosen a light narrative emphasizing trends and people, leaving a deeper historical assessment in the safe hands of the generation after us. Even so, we hope that the inevitable selections made in producing a text like this have been fair and informative.

Many colleagues and friends of the ILLC have generously contributed material, from text passages and vignettes to photographs and other illustrations. We are grateful for all the support we have received in the long process of preparation. In particular, we thank Peter van Ormondt without whose help the realisation of this booklet would have been impossible.
a brief history of logic in Amsterdam
The University of Amsterdam has a remarkable academic tradition in logic, broadly conceived as including connections with philosophy, mathematics, computer science and other fields - with the Institute for Logic, Language and Computation (ILLC) as its platform since 1991. This booklet presents a brief history of this institute, and of the ideas, the people, and the circumstances that shaped it.
Logic in Amsterdam

In the decades around 1900, the Netherlands once more became a vibrant presence on the international scene, with remarkable contributions to the arts, sciences, and industrial innovation that are still with us today. This period saw Nobel prizes in physics, chemistry, and biology awarded to Lorentz, Van ’t Hoff, and De Vries, significant contributions to painting, architecture and design by artists such as Van Gogh, Mondriaan, and Rietveld, and the rise of major industrial corporations such as Unilever, Philips, and Shell. The time of these creative activities has been heralded as ‘The Second Dutch Golden Age’.

Logic and mathematics

In this period, modern logic, too, became an area of specialised research in the Netherlands – though Simon Stevin’s book *Dialectike ofte Bewysconst* from 1585 may well be the first logic textbook published in a vernacular European language. The first innovative voice in Dutch logic sounded in the area of foundations of mathematics. Luitzen E. J. Brouwer (1881-1966) was one of the leading mathematicians at the time, reflecting on what it is that makes mathematics, the key to all of the exact sciences, so precise and secure. He made important contributions to the emerging field of topology, where the Brouwer Fixed Point Theorem is still a landmark. But it was his broader foundational perspective of intuitionism that gave a wholly new analysis of the mental activity of mathematics as constructing ever new objects and at the same time proving their properties in an ongoing infinite creative process. These ideas by a prominent mathematician, fuelled by a remarkable philosophical sensitivity, were radical in that they broke with laws of classical logic that had held sway for millennia in mathematics and elsewhere.

The stamp that the Dutch postal service dedicated to Brouwer in 2008 shows this rejection: intuitionistic logic does not accept the famous Law of Excluded Middle, ‘A or not-A’, coming to us from Antiqui-
ty, because mathematical statements are not always true or false at a particular stage of mathematical inquiry.

Over time, Brouwer's ideas unfolded their true content. Intuitionistic reasoning does not just reject old principles, it has a deep structure of its own that was brought to light by Arend Heyting (1898-1980), who was Brouwer's student around 1930 and later became his colleague, and by several generations of Dutch and foreign researchers after him. In the hands of an international community and pursued by modern techniques from proof theory and category theory, the intuitionistic research program is still very much alive. In particular, its combination of construction and proof goes to the heart of understanding computation, and thus to modern computer science.

Logic and philosophy

The next major voice in logic in Amsterdam was that of Evert Willem Beth (1908-1964). Trained as a philosopher, Beth's interests were broad, ranging from the history of philosophy to the foundations of mathematics and the empirical sciences. Beth made major contributions to pure logic, such as his Definability Theorem that explained the balance between reasoning and the expressive power of the language that the reasoning is couched in. And his method of semantic tableaux for testing validity, which was based, characteristically, on an analysis of broad styles of reasoning in the history of mathematics and of philosophy, was one of the first instances of an automated deduction system that could be programmed and run on computers, a technical paradigm that is still active today in computer science and artificial intelligence.

Beth saw a broad intellectual role for mathematical logic in combination with philosophy, an interface on which he wrote extensively, for instance, in his studies of Kant's notion of analyticity, of reasoning with modal expressions of necessity and possibility, and in his pioneering analysis of the structure of
the empirical sciences as a paradigm for the philosophy of science.

In line with these interests, Beth was one of the founding fathers of the ‘Centrale Interfaculteit’, an academic entity the core of which was constituted by strong, independent philosophy departments. And in line with that, Beth was also open to connections with the emerging formal linguistics of his day, in particular Chomsky’s work in transformational generative grammar, and with the developmental psychology of Jean Piaget, with whom he co-authored a book. Beth was an influential teacher, and many of his students, among whom Joop Doorman, Frits Staal, Pieter Seuren, Dick de Jongh and Hans Kamp, later became leading academics in their own right in the fields of logic, philosophy and linguistics.

Beth was also a prolific author, who published in Dutch, English, French and German, and he created a style of pursuing philosophy that has persisted until today, aiming at making conceptual finesse, mathematical precision and erudition go hand in hand.

The IGLO

Beth’s relatively short academic career was remarkable, not just for his research and teaching, but also for his many organisational activities. The collegial collaboration of the Amsterdam logicians in the departments of mathematics and philosophy created a stable environment for students and visitors. Attempts were made early on to organise these activities in an independent institutional setting.

In 1952, Beth founded the ‘Institute for Foundational Research and Methodology of the Exact Sciences’ (or ‘IGLO’, which is the acronym of the Dutch name), initially by partitioning his own office and asking a secretary to sit in the front, thus creating an illusion of space and grandeur. From the start, this environment had an international orientation, and in the 1960s, it was the base for a EURATOM project, which aimed to develop perhaps the earliest automated deduction system.
for big data in science, in this case the then emerging nuclear facilities of the European Community. Together with Heyting in Amsterdam, and in collaboration with his friend Alfred Tarski in Berkeley, Beth was also instrumental in creating the famous book series Studies in Logic and the Foundations of Mathematics, that has done much to shape logic as a field, and in creating the Division of Logic, Methodology and Philosophy of Science of the International Union of History and Philosophy of Science and Technology, which organised conferences where colleagues from all continents and political systems met and that are still major international venues for logic in its widest sense.

After Beth’s death in 1963, an interregnum followed with famous temporary successors, including some of the most resounding names of the field in the United States: Dana Scott, Richard Montague, and Haskell Curry. Frits Staal continued to play an important role and inspired a further generation, among whom Henk Verkuyl, Simon Dik, and Jan Kooij, who became leaders in the linguistics community.

In 1971, the chair passed to Martin Löb, a proof theorist whose famous work on provability in arithmetic extended that of Gödel in significant ways. In this period, the IGLO disappeared as a separate entity, mostly because of a revised academic statute, adopted after the student revolution of the late 1960s, reflecting entirely new attitudes and matching new democratic organisational structures.

What remained was the ‘Interfacultaire Vakgroep Logica’ (‘Interfacultary Logic Section’), a collaborative forum of logicians, philosophers and mathematicians, which functioned as a point of contact for the Faculty of Mathematics and Computer Science and the Faculty of Philosophy.

Logic and computation

The 1970s were a period of academic ferment for logic in Amsterdam. One important influence was the emergence of computer science (or in the perhaps more felicitous European term, ‘informatics’).
as a separate discipline with its own agenda beyond just being a handmaiden of automation and ICT, where Dutch scientists played an important role. Notable figures at the time were Edsger Dijkstra (a later Turing Award winner) and Adriaan van Wijngaarden, the director of the Mathematisch Centrum (‘Mathematical Centre’), a nationally funded research institute. These were the heydays of structured programming and procedural programming languages. In these developments, logic played an important role. Logical notions and methods were prominent in the specification and verification of programs, the design of programming languages, the study of algorithms and complexity theory, and other themes that were making large-scale computation both practically feasible and theoretically solid and that forged strong connections between theoretical computer science and mathematics. At the same time, ideas from logic pervaded the closely connected field of artificial intelligence. These close connections have persisted until today, and information and computation have become major themes for logicians in Amsterdam as well.

### Logic and linguistics

The second major development was the rise of modern linguistics in the mathematical style of Chomsky and his generation. While earlier philosophers and logicians, following the warnings of Frege, Russell and Carnap, might have been wary of natural language as unsystematic and vague, if not downright misleading, and hence in need of correction by specifically designed formal languages, the idea now gained ground that natural language has its own structure, serving its own purposes very well. A famous representative of this new perspective was Frits Staal (1930-2012), who studied mathematics, physics and philosophy, later became an eminent scholar of Sanskrit and Indian culture, and who was the holder of the chair in general and comparative philosophy until his departure to UC Berkeley in 1968.

Again, a connection with logic turned out important here, enshrined in the view expressed in Montague’s famous dictum that there is no difference in methodological principle between the natural languages of the linguists and the formal languages of the logicians. This contact, too, has persisted, and modern areas of formal linguistics such as formal semantics and formal pragmatics are unimaginable without the close collaboration with logic.

In this climate of old strengths and new interdisciplinary themes, a generation of students and professors grew up who recognised this constellation as their natural habitat.
Past and present locations of the ILLC
1. Binnengasthuisterrein
2. Oude Turfmarkt
3. Turfdraagsterpad 9
4. Plantage Muidergracht 24
5. Roetersstraat 15
6. Science Park 107
7. Science Park 904
the seventies: a broad community forms
The 1970s saw the emergence of a new generation of faculty and, very importantly, also of students who crossed easily between topics, lectures, and seminars in different academic environments and who made the newly emerging areas their home base. Building on work done by previous generations, they took things a step further and created new areas of research, exploring both old and new questions with new formal methods and conceptual frameworks from a variety of sources.
Logic

In logic, Anne Troelstra, appointed as Heyting’s successor in 1970, expanded the field of constructive mathematics with a study of new intuitionistic objects such as lawless sequences. Moreover, in a series of influential publications, he began to systematise the realm of constructive mathematical theories. Interestingly, this meta-theory was often pursued by means of techniques from classical logic, and so earlier ideological quarrels were replaced by more relaxed and successful collaboration. Troelstra’s colleague Martin Löb added classical proof-theoretic themes to this environment, and with the arrival of Dick de Jongh after his PhD studies with Kleene in Wisconsin, Löb’s work created a research program in ‘provability logic’, the study of properties of provability in major mathematical theories, which has been a highlight of logic in Amsterdam and other Dutch universities ever since. Provability logic creates a link between the foundations of mathematics and techniques from modal logic, a field that originated in philosophy as a study of necessity, possibility, and entailment. In this same spirit of seeking connections, Johan van Benthem, appointed in 1972 as an assistant professor of philosophical logic, wrote a thesis on modal correspondence theory, a model-theoretic study of modal logic from a mathematical point of view, which proposed the invariance notion of bisimulation as a key to understanding modal languages. This work brought out deep analogies between modal logic and classical first- and second-order logic, leading to a working style combining both, a hallmark of what is now called the ‘Amsterdam School’ in modal logic. Another important connection created at the time was that between intuitionistic logic, modal logic and universal algebra, which was pioneered by Wim Blok. Of course, more standard topics from mathematical logic were there, too: for many years, Kees Doets taught model theory and set theory as indispensable tools to a broad community.
More broadly, philosophical logic and mathematical logic kept interacting in Amsterdam as they had in Beth’s days, as exemplified in the work and highly influential teaching of Else Barth (later a professor of logic and analytical philosophy in Utrecht and, subsequently, Groningen) on the history of philosophy and on dialogical foundations of logic. A generation of students formed around this interface, such as Erik Krabbe, who would become a pioneer connecting logic and argumentation theory, Theo Kuipers, who connected logic with the philosophy of science in a dissertation on Carnap’s inductive logic, and, later on, Frank Veltman, who worked on conditional logic and became an assistant professor of philosophical logic at the University of Amsterdam in 1978.

Language

Once insights from Chomskyan linguistics were coupled with conceptual frameworks from analytic philosophy and then explored using methods from formal logic, a new field of formal semantics of natural language emerged. Originally, this occurred primarily in the US and Germany. But very soon Amsterdam added a signature of its own. Montague had presented his original ideas in Amsterdam while being a visiting professor earlier on, but it was the appointment of Renate Bartsch on Staal’s chair in 1974 that really jumpstarted the Amsterdam formal semantics scene. The broader local scene was conducive to that, with a special role for Simon Dik, a professor in general linguistics who would later develop his own framework of functional grammar. He coached a number of active students, including Jeroen Groenendijk, Alice ter Meulen, and Martin Stokhof, who wanted to explore the relationships between linguistic theory and philosophy of language. Another congenial and supportive colleague in the faculty of humanities was Teun van Dijk, an expert on text linguistics and literary theory.
a brief history
The 1970s saw the rise of Montague Grammar. We sensed its importance, but Montague’s papers were not easily accessible. The diversity of expertise present in the ILLC proved to be crucial.  

Jeroen Groenendijk

Computation

A third environment in the mix of influences at the time was the Mathematical Centre in Amsterdam where Peter van Emde Boas, appointed as a lecturer in 1977, and originally an expert on complexity theory, formal language theory and automata, was developing a strong interest in formal semantics. Together with his student Theo Janssen, he found several striking parallels between central phenomena in the semantics of programming languages, such as intensionality and anaphora, and their counterparts in natural language. Hence, the two quickly joined the semantics circle, and added a characteristic flavour, different from most places abroad, with an open window to influences from computer science. Montague’s Thesis could now also be said to cover a third realm: not just logic and linguistics, but also computer science. The formal semantics group that thus emerged was characterised by its multidisciplinarity: all members had a background in at least two disciplines: philosophy, linguistics, computer science. What bound them was their interest in natural language semantics and their conviction that logic, in a broad sense, provided the most suitable methodology.

people, ideas & practices
Epistemic logic was transformed from an exotic theme in philosophical logic into a central topic in computer science. The ILLC was both an instigator and a core participant in this transformation. Peter van Emde Boas

**Cross-connections**

Merges and cross-overs were highly characteristic of this formative period. People took each other’s classes, seminars were attended by a wide range of students and professors from different fields, dissertations by members of the founding group were co-supervised by staff from different departments (many are available on the ILLC website) and there were several joint appointments, such as De Jongh in philosophy and mathematics and Janssen in philosophy and computer science. Moreover, given the thin boundaries between fields, research in semantics ran over seamlessly into that on philosophical logic, making the work of Veltman on logics of conditionals fit in from the start. And there were also early notable joint projects. The L.T.F. Gamut two-volume textbook *Logic, Language and Meaning*, written around 1980 by Van Benthem, Groenendijk, De Jongh, Stokhof, and Verkuyl, is still in print in several languages today.

Why? It is hard to say what exactly made all this happen. There was definitely a feeling in the air, perhaps because of the academic revolution around 1970, that a new world was in the making, disregarding old dogmas and boundaries, and the same seemed true academically. What also played a role was the appointment of a generation of young professors whose interests matched and provided the right complementarity, and who got on together well at a personal level. And finally, there was a continuous influx of young talented students in philosophy, mathematics, linguistics, computer science, and elsewhere. These people retained their attitudes of openness and mutual exchange over the years, even though they might change fields every now and then. They would become the people who created the ILLC.
a brief history
the eighties: consolidation
The time was now ripe for more structured organisation. The interests of the community forming around 1980 were not accidental, they formed a natural kind. The interface of philosophy, mathematics, computer science, and linguistics continually attracted a wide group of new students for whom this was a natural combination, rather than an interdisciplinary fad. Accordingly, a further degree of organisation made sense, and new more sustained initiatives sprung up.
There were now lively, long-running research seminars where people from different departments would discuss papers of shared interest, ranging from linguistics to logic and computation, and discover and expand commonalities leading to joint publications and dissertation projects. Talking to one’s colleagues became the natural thing to do. There were more and more courses teaching students from different backgrounds the basic necessities for participation, thus broadening the base of the community.

Moreover, the bi-annual Montague Colloquium became a regular international event with widely read proceedings, that documented the latest advances in the logical study of natural language and on related topics in philosophical logic. These proceedings later turned into the GRASS series (which appeared with Foris Publications in Dordrecht, and later with De Gruyter in Berlin), which also reflected the lively interactions with a like-minded community at the University of Groningen, including Frank Heny, Frans Zwarts and their students and colleagues, where Van Benthem had moved in 1977 to join the departments of philosophy and mathematics.

**New appointments**

Through the 1980s, new appointments were made. Van Benthem returned to Amsterdam from Groningen in 1986 as the successor to Löb on Beth’s chair, an appointment supported by the three departments represented in the community as a way of having a central logic chair dedicated to the integrated environment that was emerging. New students joined him, such as Reinhard Muskens, Maarten de Rijke, Victor Sanchez, and Yde Venema, later on well-known names in the history of the ILLC.

Another important development was the appointment in 1988 of Remko Scha to the chair of computational linguistics, who brought hands-on experience with computational linguistics and its interfaces to industry (Philips Electrologica, Philips NatLab, BBN Laboratories in Boston).

I first attended the Amsterdam Colloquium in 1980. It was the most inspiring and most demanding environment imaginable, and for at least a decade, it was where I presented my main new work.  

*Barbara H. Partee*
Leen Torenvliet joined the theoretical computer science group, and so did, at a later stage, Paul Vitányi, who worked on Kolmogorov complexity and information theory, and Krzysztof Apt, who worked on logic programming. Vitányi and Apt joined on part-time appointments, having their main affiliations at the Centrum voor Wiskunde en Informatica (National Research Institute for Mathematics and Computer Science, CWI), the successor of the former Mathematisch Centrum. This group was an important part of the community, both through its interactions with the logicians, philosophers and linguists, but also by linking up with developments within computer science more broadly. This proved of vital importance as connections between logic and computational linguistics, artificial intelligence and cognitive science became more robust in the 1980s. In this lively atmosphere, the initial interests of the 1970s community gradually coalesced and transformed, forming lines with a recognisable thematic signature and increasing international recognition and influence.

**Foundations of mathematics**

Logic and the foundations of mathematics continued its strengths in intuitionism, culminating in the monograph *Constructivism in Mathematics* by Troelstra and Dirk van Dalen, the definitive text in the field. It shows how further perspectives entered constructivist research, coming from classical proof theory and category theory. Several of Troelstra’s PhD students, among whom Ieke Moerdijk, would become leaders in these areas. In parallel, the foundational agenda was enriched as De Jongh and Albert Visser kept extending provability logic, where ideas from philosophical logic, viz., Veltman’s conditional logic, turned out useful in the study of relations between mathematical theories.

**Modal logic**

At the same time, through the 1980s, the mathematical approach to modal logic and its philosophical applications, pioneered...
It was fascinating that natural language meaning could be conceived of, not as timeless and ideal, but as alive and real, and still admit of rigorous, logical characterisation. Paul Dekker

by Kripke, Kamp, Fine, Gabbay, Goldblatt, Blok, and many others, kept flourishing in a highly recognisable style, witness Van Benthem’s books *The Logic of Time* (1983), *Modal Logic and Classical Logic* (1985), Veltman’s *Logics for Conditionals* (1985), and a further stream of publications by De Jongh. Later, in the 1980s, this program was to receive new impetus through connections with computer science and algebraic logic, and become the Amsterdam School in its current shape, with trademark features such as fruitful connections between modal and classical logics through correspondence theory, and the balance between expressive power of rich modal formalisms and desirable computational simplicity. These were notably different from the purely philosophical or mathematical approaches to the field found elsewhere.

In this new guise, over the years, modal logic turned out to be a core calculus for both epistemic logic, the study of information and knowledge, and dynamic logic, the study of computation and action in general.

**Dynamic semantics**

A third striking development in the 1980s was the emergence of a new approach to semantics emphasising the role of information and information exchange. The ILLC approach is related to earlier theories of Hans Kamp and Irene Heim, but significantly different in major respects. Dynamic semantics, developed by Groenendijk and Stokhof for anaphora and discourse coherence, and in an independent version by Veltman for information update, became one more international trademark of the Amsterdam environment.

Dynamic semantics combines ideas from Montague semantics, philosophical logic, and computer science to provide an account of meaning that is rooted in the dynamics of communication between linguistic agents. Its core idea is that the meaning of an expression is tied to its potential for modifying information states of speakers and hearers in a systematic manner. It quickly became clear that, from this new starting point, a novel perspective arises on much of formal semantics and the philosophy of language. The dynamic, information-oriented turn is of course a direct reflection of the many-sided nature of the

\[(\exists x \varphi \land \psi) \leftrightarrow \exists x (\varphi \land \psi)\]
Amsterdam community as it had formed at that time. Dynamic semantics in the Amsterdam fashion proved to be a lasting influence in formal semantics throughout the 1990s up to the present-day, and turned into a well-known and acknowledged framework for exploring a large range of aspects of natural language meaning.

And more

The above list is not exhaustive. Logic and philosophy at Amsterdam also included connections with the formal philosophy of the empirical sciences in Beth’s spirit, though this seed eventually did not become a major focus in its own right. What did attract international attention were some further research lines generated by the Amsterdam logic and language milieu. In particular, Van Benthem and his PhD students Jan van Eijck, Víctor Sánchez and Michael Moorton, together with congenial colleagues elsewhere such as Frans Zwarts and Dag Westerståhl, developed the theory of generalised quantifiers, a topic in both linguistics and mathematical logic that is now part of the heartland of formal semantics.

This work in its turn led to a lively interest in categorial grammar, a mathematical-linguistic paradigm for natural language based on a calculus of resource management that is closely related to lambda calculus, proof theory, category theory, and algebraic logic. For at least a decade, this last line put the ILLC in close touch with an active international community, from Poland to the US, with colleagues such as Wojciech Buszkowski, Mark Steedman, Emmon Bach and Dick Oehrle.

Agenda setting

By the mid 1980s, the Amsterdam group with its overlapping strengths in the areas of mathematical proof and computation, philosophical modality, information flow and language use had acquired an international reputation for doing cutting edge research in various fields. Research agendas were being set right here. As a prominent visitor once put it: ‘You had to go to Amsterdam to see where things were heading.’
Ten early dissertations

First row:
Piet Rodenburg, Ingemarie Bethke, Kees Doets, Gerard Renardel de Lavalette, Frank Veltman

Second row:
Ieke Moerdijk, Jeroen Groenendijk & Martin Stokhof, Michiel van Lambalgen, Theo Janssen, Leen Torenvliet

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the birth of the ILLC
Now that the broader intellectual environment worked, both in research and teaching, the issue of institutionalisation arose.
While the bottom-up growth since the 1970s ensured personal commitment and support from colleagues in a range of departments (philosophy, mathematics, computer science), both in teaching and research, it seemed time to create a more stable institutional setting that could protect these developments, and serve as a platform for broader ambitions and outreach. Ideas like this were floated many times in the early 1980s, e.g., by Peter van Emde Boas, that were partly inspired by the creation of a department of computer science at the time, which showed that new organisational forms were possible. Before ‘marriage’, however, came ‘engagement’.

The ITLI

In 1986, following Beth’s lead when starting the IGLO in the 1950s, a voluntary association was formed calling itself the ‘Instiut voor Taal, Logica en Informatie’ (ITLI, ‘Institute for Language, Logic and Information’), without official sanction or status, but based on a coherent group of staff in various ranks and their students who shared a number of goals. Mindful of Lenin’s adage that a political party is a mob with a newspaper, the ITLI produced a founding document, signed by Johan van Benthem and Martin Stokhof.

This text outlined several major goals, including: creating a stable research environment, running a teaching program in close connection with the research, setting up a graduate program, establishing a series of research reports, participating in major international publications, organising regular high-profile international events, and engaging in fund raising from national and European sources.

In the next five years, the ITLI functioned on all these fronts, as can be seen from five annual reports documenting its activities. Inside, organisation was minimal and informal, with an internal democracy...
based on gatherings of the whole group. Some bureaucratic stability was provided by funds acquired from the Dutch national Network for Logic, Language and Information, subsidised by the Ministry of Education for setting up a national graduate program in logic. Jan Bergstra, a professor of programming research in the computer science department, and Martin Stokhof jointly defined the framework and conducted the negotiations with colleagues in Groningen, Nijmegen and Utrecht. For four years, the network organised and coordinated post-graduate teaching and research in semantics, logic, and theoretical computer science.

Establishing the ILLC

In 1991, the University of Amsterdam decided on a restructuring whereby departments lost a lot of their traditional powers. Henceforth, research was to be organised in dedicated research institutes, cutting across departments where useful, while parallel dedicated teaching institutes administered both traditional curricula and new interdisciplinary ones. These institutes would be evaluated on a five-year basis to keep structures flexible and let people decide freely, at regular intervals, where they thought they fit best.

This provided an opportunity for the ITLI community, which applied successfully for formal institute status. (In fact, the ILLC was the first institute at the University of Amsterdam that was established under the new regime.) With the support of the departments of philosophy, mathematics, and computer science, the Institute for Logic, Language and Computation started its activities, now officially recognised.

The name-change from ‘Information’ to ‘Computation’ reflected the accession of two new groups, the Programming Research group led by Jan Bergstra from computer science, and the Computational
Linguistics group led by Remko Scha from the humanities. Except for a few fluctuations in its participating groups, mainly due to external organisational changes, the current ILLC is this same institute, now into its 30th year of existence.

The aims of the ILLC were largely those of the ITLI, as can be seen in its founding documents. But it provided a more effective platform, partly through the greater autonomy of the institute format. Under a succession of directors, the institute has expanded considerably in terms of staff and students, with its international visibility and influence growing as well, by conducting research that continued to have considerable impact and enjoy international visibility and recognition, but also by taking the lead in large international projects and organisations. The structures put in place back then are still functioning today. They will be explained below, in tandem with the intellectual trajectory of the institute over the next almost three decades.

Setting up a university-wide institute between two big faculties, the Faculty of Science and the Faculty of Humanities, was not as easy as the preceding may suggest, given the remarkably resilient traditional divisions and attitudes in a university. In a way, structures like the ILLC defy the laws of academic entropy, and there is a constant danger that things and people will return to their original, divergent locations, with various surrounding departments eager for a ‘Polish partition’. What helped in keeping the ILLC together were various factors. There was the coherence of the research program, there was the collegial cohesion of internal democracy, and also, the institute has always been appreciated as an important asset by successive presidents and rectors of the University of Amsterdam.

The ITLI was primarily an organisational entity, and the ILLC was like that in its early days, but that changed in 1999, when

Erik-Jan van der Linden

A clear test, and a proven stumbling block for many interdisciplinary institutes, is the problem of the founding generation. Once the initial movers retire, what happens next? The ILLC has been exceptionally lucky in finding ever new administrative talent for its leadership, sometimes coming from researchers who might have thought they did not have it in them.

the then newly established Faculty of Science was organised in terms of institutes that were given budget responsibility. This was a major change. Institutes now had to make annual budgets, for academic and non-academic staff, office costs, computers, web access and other infrastructure, and later on, also for housing. They were now responsible for long-term personnel planning, within general constraints set at the faculty level.

Growth became a much more tangible affair, it being the result of attracting external funding, optimising the participation in various teaching programmes, and so on. In the following years the ILLC used this opportunity to structure its internal operations more clearly and to increase its visibility to the outside world. It took a while for the Faculty of Science and its institutes to settle into the new structure, but the ILLC thrived in the new setting.

Being one of very few university-wide research institutes is an honour, but it also carries its burdens. Institutional independence only occurred in the Faculty of Science: up to the present day the ILLC budget in the Faculty of Humanities is managed at the faculty’s own central level. This has created an imbalance in teaching requirements and other working conditions between researchers at the ILLC appointed in the Faculty of Science, and those who belong to the Faculty of Humanities. Another consequence is that the ILLC has less room to develop a long-term strategy for new appointments for its programs in the Faculty of Humanities. The task of running the ILLC on a day-to-day basis in two different organisational cultures makes the life of an ILLC scientific director definitely challenging, but also uniquely interesting.

A clear test, and a proven stumbling block for many interdisciplinary institutes, is the problem of the founding generation. Once the initial movers retire, what happens next? The ILLC has been exceptionally lucky in finding ever new administrative talent for its leadership, sometimes coming from researchers who might have thought they did not have it in them.
The list of directors illustrates that this rejuvenation has taken place, and it shows no sign of letting up: Johan van Benthem started in 1991, Martin Stokhof, who already functioned as deputy director when Van Benthem spent the spring quarters in Stanford, took over in 1998 and passed the baton to Frank Veltman in 2004, who was in charge until 2009, followed by Jeroen Groenendijk for a short period, and then by Leen Torenvliet, who was succeeded by Yde Venema in 2011, who in 2016 saw Sonja Smets take over.

One long sentence, one long sequence of dedicated scientific directors who have been fortunate to lead an institute that has left its mark.

But in a way this list is misleading. The ILLC has many other crucial positions in its research and teaching programs described below, all of them filled competently and energetically, first by members of the founding generation, and gradually also by the next generation appointed after them.

This may be a good place for making a point that some academics, who see all organisation and administration as an unnecessary evil, do not always appreciate. The success of the Amsterdam logic environment rests obviously on the quality of people and dynamics of their ideas. But its consolidation and progress also had a lot to do with choosing the right organisational structures to protect and foster these individuals and their ideas. The same point has been made about general intellectual history: universities are not just loose collections of individuals, they are also creative and historically remarkably resilient and successful, creative social inventions.

The ILLC’s PhD community is cohesive and vibrant whilst allowing each candidate to pursue their specific research interests. Luca Incurvati
Sonja Smets, director since 2016
research organisation at the ILLC
The way in which research at the ILLC is organised reflects a bottom-up perspective: it is the internal developments within the relevant disciplines that set the agenda and that determine the organisational structure. This means a high degree of autonomy for researchers to define their projects and it requires an institutional structure that is sufficiently flexible to accommodate and facilitate changes.
This model is particularly suited for the kind of theoretical research at which the ILLC excels, even when less effective for governance of more applied research. And an additional advantage is that it does not attempt to define the remit of the ILLC. Such definitions tend to proceed in terms of ‘core’ and ‘periphery’. The identity of the ILLC, however, is not like that: it resembles a doughnut. When asked whether they felt that their kind of research was central within the ILLC, the large majority of all the PhD students that were asked that question during one of the annual rounds of interviews said ‘No’.

**Programmes**

Research at the ILLC is structured into three main programmes: *Logic and Language*, *Logic and Computation*, and *Language and Computation*. Within these programmes, individual researchers find their habitat, including professors with their PhD students. And they also are the home of various larger groups, often organised around grants that run for a number of years.

Although the scope of the programmes is wide, they are more than just administrative umbrellas. The various projects that constitute a programme have clear connections in terms of research questions and methodologies. They can be complementary in some respects, while overlapping in others. These commonalities are explored and fostered through a variety of activities, from joint papers to shared supervision of Master students and PhD students. Also, the programmes run various colloquia in which ILLC researchers as well as researchers from elsewhere present their latest results. The exchanges that are facilitated by these colloquia serve an important role in establishing and maintaining the shared identity of the programme.

**Themes**

To create additional flexibility, topics of broad contemporary importance in the institute are organised into special themes that unite researchers from different programs for a period of time. Examples of such themes over time have been: *Games, Learning and Cognition*. The creation of these themes is the outcome of a bottom-up process anchored in actual research activities and emerging concerns in scientific communities. The games theme was a natural extension of results in natural language semantics and epistemic logic to interactive multi-agent scenarios, while games also played an important role in the mathematical logic research. Likewise, learning had turned out to be a shared concern in many parts of the ILLC, a central question being how formal systems come into actual effective use. And finally, the cognition theme reflected a growing awareness in the theoretical ILLC community that actual data about human performance do not represent an irrelevant ‘comedy of errors’, but speak to the heart of what logic as a relevant study of reasoning should be concerned with.

Themes can also be fuelled by a desire to establish new outreach of the ILLC: in the case of games the connection is with game theory in mathematics and the social sciences, in the case of learning with the information sciences and statistics. And sometimes there is the practical motive of wanting to be where the action is: the cognition theme definitely also had something to do with the exciting new developments in modern cognitive science.

From a high-level conceptual point of view many commonalities can be defined that link research projects carried out in the three programmes. But it is only when there is an actual need from within a number of projects to investigate a shared set of issues that it makes sense to create a research theme and devote resources to it.

In some cases, such as the *Games* and *Learning* themes, the primary need to start investigating them came from within the ILLC community, since these topics were emerging spontaneously within several programmes, and merited sustained attention. In the case of Cognition, it was a perceived opportunity to further develop links with disciplines outside the ILLC.
and a fascination that even theorists can feel for engaging with empirical facts, that provided the initial impetus.

**Collaborative research**

The style of research at the ILLC also reflects some major changes that have been taking place over the years. While the basic skills for research still involve individual thinking and scholarship, projects came to involve larger groups, as reflected in a fast-increasing number of co-authored papers emanating from the institute. These are journal papers, contributions to books, and in some cases chapters of dissertations. Research is increasingly becoming a social endeavour, and the institute functions as a guild where students learn from experts and work in what may be compared to ateliers of established artists.

**External funding**

Collaborative research is conducted in multi-person, multi-annual research projects. These are externally funded, by national and European funding organisations. ILLC researchers were early beneficiaries of the funding mechanisms that were put in place on national and European levels since the 1980s.

In the Netherlands, the national research funding organisation NWO initiated a re-organisation of its funding portfolio under the slogan ‘focus and mass’. The goal was to introduce and facilitate collaborative research projects, which were already mainstream in the natural sciences and life sciences, also in the social sciences and humanities, and in those natural sciences disciplines, such as mathematics and theoretical computer science, which hitherto had also been of a rather individual nature. This required a fundamental change in mind-set and research practices in these areas, one that took a while to be accomplished.

But it harmonised very well with the ILLC culture of cross-disciplinary collaboration, a fact which gave ILLC researchers a definite competitive advantage.

By defying traditional university divisions, the ILLC has fostered fresh, sometimes unexpected connections and infused new life into research agendas of established disciplines.  

Krzysztof Apt
As information processing has become the domain of computing machinery, Turing machines, algorithmics and quantum computing have become central to ILLC research. Leen Torenvliet

The policy change at nwo followed the introduction of collaborative project funding schemes at the European level that started in the 1980s. Initially these European funding schemes had ample opportunities for basic research, though later the emphasis was increasingly on applied research. Opportunities at nwo increased when it started the ‘Vernieuwingsimpuls’ funding scheme in 2000. And when the European Research Council was launched in 2007, ILLC researchers were well-prepared to apply there.

Over the years ILLC researchers have been very successful in the acquisition of external funding made possible by these new realities at national and international levels.

The next chapter provides some concrete examples of how these new funding streams have enriched the ILLC: it describes four projects that have played an important role in shaping the ILLC’s research environment in its first two decades.
four key projects
Many smaller- and larger-scale research projects have been important to the ILLC over the years, and it is impossible to do justice to them all. In this chapter we describe the main characteristics of four projects that have been of particular importance for the development of the institute in the early years.
The DYANA-project
Adding a European dimension
1989-1995

The DYANA-project ran in two phases: one from 1989 to 1992, and a follow-up from 1992 to 1995. DYANA was funded by the European Union as an Esprit Basic Research Action. It was a large project, with seven partner institutes: The Centre for Cognitive Science, Edinburgh; the Institut für maschinelle Sprachverarbeitung, Stuttgart; the Seminar für Sprachwissenschaft, Tübingen; the Centrum für Informations- und Sprachforschung, München; the Research Institute for Language and Speech, Utrecht; the Department of Linguistics and Philosophy, Oslo; and the ILLC, Amsterdam. Frank Veltman was the ILLC’s site manager during the first phase of DYANA, and its project leader in the second phase.

DYANA was the first large-scale collaborative research project in the area of natural language semantics in which researchers of the ILLC took part. It provided them with unprecedented opportunities to collaborate extensively with researchers in other major centres in Europe and to attract talented PhD students and postdocs. It also increased international visibility. The distinct influence of Amsterdam-style dynamic semantics is definitely also due to the opportunities provided by DYANA, and so are the sustained coalitions with European institutes in follow-up initiatives beyond DYANA.

Dynamic semantics was the core contribution of the ILLC to the DYANA-project, notably through the contributions of Veltman, Groenendijk, Stokhof, Beaver, and Dekker. The further development of the dynamic perspective and its formalisation formed the core of their work, along with applications to such central empirical topics as quantification and anaphora, presuppositions, default reasoning, and so on. DYANA also triggered a number of related research lines: important work was done on categorial grammar and type theory, discourse coherence, epistemic modalities, tense and aspect. This work
includes contributions by local associates such as Herman Hendriks and Jaap van der Does, and international visitors such as Gennaro Chierchia, Friederike Moltmann, Anastasia Giannakidou and Craige Roberts.

The cooperation with researchers in Edinburgh and other centres formed the nucleus of a number of other types of cooperative endeavours, notably the Foundation for Logic, Language and Information (FoLLI), the European Summer Schools in Logic, Language and Information (ESSLLI), and the Journal of Logic, Language and Information. More about these structures and the role of the ILLC in them can be found in the next chapter.

The Parallels-project
Increasing interdisciplinary connections 1991-1995

The Parallels project, fully titled ‘Semantic Parallels in Natural Language and Computation’, was led by Jan van Eijck, and was funded by the Nationale Facilité Informatica (National Informatics Facility) as a way of boosting fundamental research in the information sciences.

This project started from the idea, developed at the ILLC over a decade by then, that the many striking syntactic, semantic, and even pragmatic parallels between the structure and functioning of natural languages and designed computer languages justified further research, and indeed joint development. Parallels was administered at the ILLC, but also involved other sites nation-wide, in particular, the University of Utrecht (Albert Visser, Michael Moortgat). It employed 2 postdocs and 2 PhD students, and equally importantly, it had an exceptionally generous budget for inviting foreign visitors, all of which resulted in a large number of (joint) publications and international scientific events.

The Parallels project played an important role in putting several interfaces between natural and formal languages on the map. One strand were analogies between dynamic semantics of natural language, logics of information flow, and the
At the time I greatly admired the generosity of Johan van Benthem who provided his Spinoza prize money for widening the scope of the institute and offering new opportunities for younger colleagues and students. Sijbolt Noorda

The project had a distinctly international flavour, leading to collaborations with colleagues in London (Dov Gabbay), Budapest (Hajnal Andréka and István Németi) and the US (Vaughan Pratt, Dexter Kozen), many of which have persisted until today.

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The Spinoza-project ‘Logic in Action’
Adding new research lines 1996-2001

A third key project, and a boost to the ILLC, had a different origin, namely, the Spinoza Award for Johan van Benthem. The Spinoza Awards are the highest awards in the Dutch science system, as a recognition of a lifetime oeuvre. Van Benthem used the award to start the project Logic in Action, that ran from 1996 to 2001, and that helped extend the range of ILLC research to include connections between logic and game theory, computational logic, and the design of new logic courses.
Logic in Action introduced two new research lines to the ILLC. One was interfaces between logic and games, a continuation of the dynamics research at the ILLC to include social interactions between agents that process information, pursue goals, take decisions, and act in the presence of others doing those same things. This new line, led by Paul Dekker and Yde Venema, led to lasting contacts with game theorists in economics, but also with linguists and computer scientists, since games are also a natural extension of the traditional notions of communication and computation.

A second new theme, led by Maarten de Rijke, was computational logic, the implementation of logical systems as working computer systems, and the design of new languages and algorithms for general computational tasks inspired by state-of-the-art ideas from logic.

Finally, a third project, led by Jan van Eijck, focused on didactic innovation, resulting eventually in the internet course ‘Logic in Action’ (cf., http://www.logicinaction.org) developed in Amsterdam and used in many places worldwide, including Beijing and Stanford.

A lasting legacy of the SPINOZA project was the granting of permanent positions to its project leaders, thanks to the generosity and vision of the Faculty of Science and the Faculty of Humanities.
A fourth important large project at the illc was based on a new opportunity provided by the European Union in the Marie Skłodowska-Curie programme as an Early Stage Research Training Host Fellowship (mest-ct-2005-020841). The heart of the GLoRiClass-project, initiated and led by Benedikt Löwe, which ran from 2006 to 2010, was a group of eighteen fellows and associated fellows who explored the illc-wide theme of games in many directions. This remarkable set of young talents, whose names can be found at http://projects.illc.uva.nl/GLoRiClass/, co-supervised by various illc professors and international colleagues, considerably pushed the boundary of the interface between logic, game theory, computer science, and other fields. The resulting dissertations explored new logics for reasoning about games and analysing fundamental game-theoretic results and extended the role of games in set theory and hence the foundations of mathematics.

In addition, these projects developed new theories about games as a generalised form of interactive computation, explored new uses of games in understanding the communicative function of natural language, and also created links with empirical fields such as cognitive science and computer games.

GLoRiClass produced researchers who were equally conversant in the basic dialects of game-based reasoning: model theory, computational complexity, language evolution, and social choice.  

Benedikt Löwe
a brief history
the ILLC as an organisational force
A striking feature of the ILLC right from the start was its role as initiator and participant in larger national and international organisational ventures. This reflects not only the scientific standing of the institute, but also a strong belief that cooperation and dissemination are key factors in making academic fields thrive and progress. The ILLC recognised the importance of this already at an early stage.
National
AIO-network and research school

In 1987, the Dutch Ministry of Education, acknowledging an increasing need for collaboration between Dutch universities, especially in areas that locally were rather small, announced funding for national networks for PhD-training. As described before, the tile jumped at the chance and started setting up such a network and organising the support from other universities.

The efforts resulted in the ‘AIO-Netwerk voor Taal, Logica, en Informatie’ (‘PhD Network for Language, Logic, and Information’), which was recognised and funded by the Dutch Ministry of Education for
a 4-year period (1988-1992). During that time the network organised and coordinated post-graduate teaching and research in semantics, logic, and theoretical computer science. The ILLC administered the network and provided the director.

The temporary PhD-networks were precursors of what was intended as a more permanent way of organising post-graduate training and research, in so-called Landelijke Onderzoekscholen (‘National Research Schools’). The framework for these schools was developed by the Dutch Royal Academy of Sciences (KNAW), which was also in charge of the accreditation of the schools and of their periodic evaluation. The ILLC took the lead to transform the successful PhD-network into a research school. The Dutch Research School in Logic (OZSL) was accredited by the Dutch Royal Academy of Sciences in 1992. It was the first national research school in the humanities.

These organisational activities not only served the field internally, they also made it visible to the rest of the academic world: university boards, academies, and the Ministry of Education took notice and recognised the strong position of Dutch logic, nationally and internationally. This kind of recognition is only won by academic achievements in tandem with organisational and administrative exploits such as these, and for that reason the ILLC has always been a driving force behind such initiatives, at the national level, but also internationally, as the following shows.

**European FoLII and ESSLLI**

During the 1980s, scientific contacts between researchers at the ILLC and their counterparts in various other centres, in Europe and beyond, were intensified, and the ILLC became involved with all kinds of exchanges, from individual research visits to joint PhD supervision, workshops and conferences. Over time, this loosely knit community felt the need for a more formal organisation that would increase its visibility and influence.
Initially, the move to set up a container of the various activities was instigated by the desire to make sure that at the European administrative level the interdisciplinary nature of logical research would be recognised.

To that end, a number of key researchers and research institutes from all across Europe joined forces in creating the Foundation for Logic, Language, and Information (FOLLI). This foundation was to be a platform for training and dissemination, and for representing logic in the ILLC-spirit as a distinct field of research. It aimed to do so by coalescing existing activities, and by initiating and stimulating new ones. FOLLI started with a wide portfolio of activities including a series of outreach conferences on logic, language and information, held in Autrans, 1992, and Espinho, 1995, which were funded by the European Science Foundation.

An important initiative was the establishment of a new journal: in 1992, FOLLI initiated the *Journal of Logic, Language and Information*, with Peter Gärdenfors as its first editor-in-chief. The journal quickly became an important voice and is today regarded as one of the leading journals for interdisciplinary research in the field of logic.

A FOLLI book series was started, as well as a ‘clearing house’ for logic publications that was to turn later into Dov Gabbay’s well-known College Publications publishing service to the international logical community.

But FOLLI’s most important and most lasting activity is its adoption of an initiative by Frans Zwarts, who organised a summer school in Groningen in 1989. This proved an immediate success and showed that there was a community of international students and teachers for whom logic, language and information was a natural niche. The yearly European Summer School in Logic, Language and Information (ESSLLI) has travelled all over Europe, and has consistently engaged a large number of participants, also from outside Europe.

The summer schools consist of a mix of courses at various levels, workshops, and lectures. They provide graduate and
post-graduate students with unique opportunities to get basic instruction in fields that are new to them, and be updated with the latest trends and developments in their field of specialisation. The instructors get valuable feedback on the materials that they present from an engaged and high-level audience. And students and teachers can battle it out in a soccer match...

For many students at the ILLC these summer schools are an integral part of their socialisation into the international community.

Researchers from the ILLC have played a key role in shaping ESSLLI and setting up FOLLI. From its inception in 1991 to 2004 the FOLLI secretariat was located at the ILLC, and ILLC-researchers have consistently been present at the FOLLI-board. Many of them have given courses and workshops at various ESSLLI-instalments, and they have played a key role in the organisation of the summer schools: Paul Dekker chaired the standing committee of ESSLLI from 2007 to 2017.

And wider
NASSLLI, EASLLC

The success of the ESSLLI summer schools has spurred similar events in other parts of the world. The bi-annual North American Summer School in Logic, Language, and Information (NASSLLI) started at Stanford in 2002, with a similar goal and similar structure as ESSLLI. Since 2010, NASSLLI is organised under the auspices of FOLLI.

The East-Asian School on Logic, Language and Computation (EASLLC) started in 2010, and it, too, is organised under the FOLLI-umbrella.
research trends in the 1990s
Research themes following the founding of the ILLC were a consolidation and extension of what had worked well in the 1980s, with new approaches arising in various areas as well.
Logic, mathematics and computation

In the foundations of mathematics, linear logic entered as a new approach to constructivism, with broader links to substructural logics in the analysis of categorical grammars. Provability logic continued to expand in an extensive cooperation with Georgian and Russian colleagues, drawing in new local students who would later fan out over academia, such as Rineke Verbrugge. Another new influence was more general proof theory, not necessarily oriented toward intuitionistic logic, which would culminate in Troelstra’s book *Basic Proof Theory* with Helmut Schwichtenberg.

Research in modal logic considerably extended its agenda by incorporating interfaces with algebraic logic in the work of Yde Venema, Maarten Marx, and others, in a long-standing cooperation with colleagues in London and Budapest. It also acquired new interfaces with computer science in the work of Maarten de Rijke on richer modal formalisms for applications, the work of Edith Spaan on complexity of modal logics, and that of Van Eijck, Van Benthem and other colleagues on contacts with programming languages and process algebra.

But newer interfaces of logic and computer science emerged also during this period. The ILLC saw an active collaboration on the foundations of logic programming between Krzysztof Apt and Kees Doets, witness their companion books *From Logic to Logic Programming* and *From Logic Programming to Prolog*. There was also a vigorous development of structural complexity theory in the work of Leen Torenvliet, and of the broad field of Kolmogorov complexity in the work of Paul Vitányi, including connections with information theory. The latter line led to one of the most widely cited ILLC publications over the last decades: *An Introduction to Kolmogorov Complexity and its Applications* by Paul Vitányi and Ming Li. This work also fit very well with the foundational interests in information, computation and learning introduced by Pieter...
Adriaans, entrepreneur and graduate student, who would later become a professor of Learning Systems. A final landmark from this period is Michiel van Lambalgen’s philosophical and logical analysis of algorithmic randomness, resulting in some of the basic tools of this field of research in between computability theory and probability theory.

Logic and language

Intensive work was done on a wide range of topics in the Logic and Language project of the ILLC in 1990s, including traditional strengths from the 1980s such as categorial grammar, now linked more closely to algebraic logic and substructural logics. Two lines with a significant influence today, both within the ILLC and elsewhere, are dynamic semantics and data-oriented parsing.

Dynamic semantics

Veltman, Groenendijk, Stokhof and Dekker, along with a number of PhD-students and postdocs (Aloni, Mastop), worked throughout the 1990s on the further development of dynamic semantics as a new way of thinking about natural language meaning, bringing together the initially different strands of information update and dynamic predicate logic. Dynamic semantics turned out to have repercussions, not just at a theoretical-conceptual level, but also from an empirical-descriptive point of view. Integrating elements of semantics and pragmatics as traditionally conceived in its conception of meaning as conveying information, the main function of natural language use, it showed that logic provides adequate tools to deal with a wide range of phenomena in natural language in an integrated way. This perspective bridged discourse and conversation studies on the one hand, and logics of social interaction on the other.

After the dyana-project, the ILLC-research in dynamic semantics continued in the project ‘Sources and Streams of Information: Towards a Logical Analysis of the Dynamics of Discourse’. It was funded
by the Dutch Science Foundation (nwo),
and had as its partners the Department of
Philosophy, Utrecht University (Albert
Visser and Cees Vermeulen) and the
Department of Linguistics, Katholieke
Universiteit Brabant (Reinhard Muskens).
The programme employed various post-
docs (among whom David Beaver) and
PhD students, and ran from 1997-2001.
It was the first large scale project in the
humanities ever to be funded by nwo, and
served as a model for the development of
the nwo funding portfolio in this area.

But semantics research at the ILLC also
contained other internationally influential
strands. The categorial grammar and nat-
ural language tradition from the 1980s
was continued by Victor Sánchez Valencia
in the program of developing a ‘natural
logic’ for reasoning directly with linguis-
tic forms, and by Herman Hendriks on
flexible categorial semantics and type
theory. Another prominent line, then and
now, is the central methodological role of
compositionality in designing semantics
for natural and formal languages, champi-
oned at the ILLC by Theo Janssen, and
returning in ever new settings.

Data-oriented parsing
A major innovative feature of logic and
language research at the ILLC in the 1990s
was the development of data-oriented
parsing (DOP). This was one of the first
approaches in computational linguistics
that abandoned the then prevailing rule-
based paradigm, where computational
linguists basically implemented and
tweaked the kind of grammars that lin-
guists produced in their study of natural
languages. Although that paradigm had
produced interesting results and applica-
tions, it faced a fundamental problem of
scaling.

The DOP-approach was radically different:
instead of taking rules as basic elements of
a computational natural language system,
it proposed to analyse linguistic material
in terms of the probabilities of words and
phrases co-occurring, where traditional
grammatical tree structures played an
auxiliary role in setting up the data struc-
tures. Those probabilities can be deter-
mined only on the basis of a large amount
of data, of actual linguistic material.

Based on hierarchically structured
representations in the brain, DOP inspired
work in statistical language processing,
but also in computational musicology,
and other digital humanities. Rens Bod
This puts large corpora at the centre of natural language processing. But there is also an important more cognitive interpretation of the DOP-paradigm shift. Expert language users do not just use rules anew every time, but can first, or simultaneously, do memory-based pattern recognition: that is, their past experience is as important as their skills in current rules or strategies. This memory-based perspective applies widely, not just to language; reasoning seems to work this way as well, and when all is said and done, so do the professional practices of logic researchers...

DOP was originally developed by Scha. Further development was taken up and continued by Rens Bod, Khalil Sima’an and others. It has played a major role in changing the nature of research in computational linguistics, opening up new interfaces between logic and probability, which over time have become a major presence at the ILLC, where research had been more purely qualitatively-oriented before. Core elements of the DOP-approach were also applied in the analysis of music, and in modelling expert cognitive practices.

**Social themes**

Another new development in the 1990s with later repercussions was the joining of the ILLC by the group of Michael Masuch and Rob Mokken (the author of a classic graph-theoretic study of social power networks in the Netherlands) from the Faculty of Behavioural and Social Sciences, which studied the high-level principles of behaviour of social organisations such as firms with tools from logic. While this project ended in 2004 with the retirement of Masuch, it brought in a number of excellent staff with a new kind of background, such as Maarten Marx and Jeroen Bruggeman, and Jaap Kamps, who still represents this topic at the ILLC. Together with the game-theoretic interests that were put on the map in Van Benthem’s SPINOZA-project, it prepared the ground for the developing social, multi-agent interests in research at the ILLC.
education

a brief history
Research at the ILLC has always been pursued in tandem with teaching, the way things go in all good university environments. As it developed, the ILLC expanded the regular courses taught by its staff, but also developed a number of new initiatives along with its research development.
The initiative to start a dedicated programme as the master’s level in logic was motivated by these concerns and was coupled with the realisation that the opportunity to study logic in the broad sense in which it is conceived at the ILLC might be attractive, especially for international students. Thus 1996 saw the start of a one-year master programme in logic. Its first director was Dick de Jongh, who would continue to play that role until the summer of 2004, with Ingrid van Loon in charge of the administration. Later directors were Benedikt Löwe (2004-2010), Ulle Endriss (2010-2015), Maria Aloni (2015-2020), and Paul Dekker (2020-present), with Tanja Kassenaar fulfilling the important role of administrator of the programme. The first years attracted a modest number of students. The programme continued to grow over the years, and thus an international community started to form of students coming from all over the world to Amsterdam to study logic ‘ILLC-style’. Initially, the Master of Logic (MoL) programme awarded an MSc degree that was recognised separately by the University of Amsterdam. With the implementation of the Bologna agreements, under which master programmes in the natural sciences all had to become two-year programmes, the MoL-programme also had to be re-conceived. The transition, which was
executed in 2003, turned out to be a success: enrollment grew further and has been steady over the last years at 35-40 students per year on average.

The MoL-programme consists of a number of core courses that introduce the students to the broad view on logic that forms the identity of the ILLC and that also give them an opportunity to get in touch, right from the start of the programme, with the research that is being conducted and with the people who carry it out. After this introduction students specialise in one of four streams: Logic & Computation, Logic & Language, Logic & Mathematics, Logic & Philosophy.

Each track has two or three core courses which define its special nature. These core courses are required for students who are in that track, but they are also open as electives for students from other tracks. Via the choice of electives and through individual, small-scale research projects, students can pursue all kinds of cross-connections.

The MoL-programme is demanding, but a remarkable number of students complete the programme in a timely manner. The quality of the programme has been recognised by a sequence of independent evaluation committees. It received one of the highest grades of all programmes across all disciplines in the country in the 2008 formal accreditation procedure. And in 2014 the MoL-programme was awarded the qualification ‘excellent’, the highest qualification a study programme in the Netherlands can earn, which is given only very rarely: only two master-programmes in the Netherlands obtained this distinction.

**PhD training and PhD supervision**

As was, and to some extent still is, customary in humanities disciplines, but also in such areas as mathematics and theoretical computer science, PhD training at the ILLC for a long time was a highly individual affair. In the early years PhD projects were often tuned to the specific profile of the students, and so was their
training, which usually consisted of a few courses to fill in specific deficits, and for the rest was mostly ‘training on the job’. This was the ‘master-apprentice’ model that only gradually gave way to a more structured PhD programme.

From the 1990s onwards a PhD training model emerged that consists of a mix of courses in a national (OZST) and international (ESSLLI) context, combined with university-wide compulsory skills-courses, and training focussed on the specifics of the PhD project. This change co-occurred with a shift from purely individual PhD projects to projects that are part of larger, externally funded projects, such as those supported by NWO and the ERC. Less customary, but very characteristic of the ILLC-environment has been the fact that, almost right from the beginning, joint PhD-supervision has been the rule rather than the exception. This reflects the nature of the research that was being conducted: investigating problems at the interface of different disciplines and approaches. The model has been very successful and continues to be the norm.

One thing that many students note in evaluations is that an essential part of their PhD training at the ILLC comes from their peers. This involvement of PhD students reflects a community bond that is characteristic for the ILLC and that is of great value at all sort of levels.

Another element of the PhD environment that the ILLC offers is monitoring of both the progress made by the PhD students and the quality of the supervision, in order to signal problems at an early stage and help address them. This monitoring is done on a yearly basis by an independent committee, the ‘Promotievoortgangscommissie’ (‘PhD progress committee’, PVC), that interviews PhD students, talks to supervisors when it deems it relevant to do so, and writes a report with its findings and recommendations that is presented to the ILLC scientific director and distributed
within the IllC-community. The work of the PVC has been vital for maintaining the quality of PhD supervision.

The IllC PhD program has consistently pursued a broad international outlook, training researchers for the world. This shows in the many collaborations with external colleagues on thesis committees, joint dissertations between the IllC and universities elsewhere, and in recent years, the establishment of joint graduate programs with the University of St. Andrews and Tsinghua University.

Further Educational Activities

Besides the Master of Logic programme and PhD training, members of the IllC are active participants in other regular teaching programmes. They contribute to curricula in computer science, artificial intelligence, mathematics, linguistics, philosophy and cognitive science on a structural basis, and incidentally they also teach in other programmes.

Apart from regular teaching, staff have been frequent contributors of courses and lectures to the international ESSLLI, NASSLLI, and EASLLC summer schools, occasionally also to the summer schools of research schools in linguistics and philosophy; they have given tutorials and seminars in the context of conferences such as EACL, ACL, and so on.

As for broader outreach, as early as 1996, the IllC offered an internet course on dynamic semantics which was designed by Paul Dekker. Well before the age of video-conferencing and social media, it used email and chatrooms to simultaneously teach students on three different continents. A more recent outreach effort is the internet course ‘Logic in Action’, whose development was subsidised by the Dutch Ministry of Economic Affairs as part of a national infrastructure initia-
Textbooks written by ILLC members

devative. Developed around 2010 by Van Eijck, Jaspars, Van Ditmarsch and Van Benthem, it has come into use at Tsinghua Beijing, Stanford, and other universities worldwide.

But also, in more traditional style, some widely used textbooks in university curricula were written at the ILLC. These include the two-volume Gamut Logic, Language and Meaning (Introduction to Logic and Montague Grammar); Stokhof’s Taal en Betekenis (‘Language and Meaning’), a widely-used Dutch language textbook on philosophy of language; Logic for Informatics by Van Benthem and Van Ditmarsch;

Modal Logic by Blackburn, De Rijke and Venema. And there was also outreach beyond academia: Van Eijck, Jaspars and Visser wrote books on proofs and computation in mathematics and logic that target high school students.
from upstart to role model
Stability must be won and re-won...
Organisation is important, but it does not provide a safe haven once and for all.
The professionalisation of the ILLC as an institute around 2000 called for yearly planning and internal evaluation cycles, and forced the scientific director and the management to regularly explain to outside administrators, such as faculty deans and the university board, why such an administrative outlier – a research institute that crossed faculty borders – needed to exist. This was not just a challenge, it also helped forge a strong sense of identity and an awareness of accountability to the outside world.

Throughout, the ILLC operated, as it still does, in between two large organisations: the Faculty of Science and the Faculty of Humanities. And even worse, for a while this balancing act involved three major partners: the research group of Masuch and Mokken, which was part of the ILLC between 1996 and 2004, belonged to the Faculty of Behavioural and Social Sciences.

And these faculties themselves were not always stable, continuous entities: over time the ILLC has witnessed many reorganisations at university and faculty levels and has had to maintain its position through various administrative and financial changes.

That the ILLC has managed to do so successfully is due to several factors. First of all, there is content and visible output. The research dynamics of the ILLC community remained strong, with high levels of publications, large numbers of successful PhD projects, and there was also the success of the Master of Logic programme, in terms of both numbers and average completion time.

Internal organisation also played a role. The flexibility and planning cycles of the ILLC research programmes allowed the institute to take advantages of new opportunities, which manifested itself in increasing acquisition of external funding.

And the human factor is important in running an institute as well. A series of highly competent managers has supported the scientific directors from the start: Erik-Jan van der Linden, Peter Blok, Ingrid van
Loon, and Jenny Batson. They have been essential factors in the ILLC’s long-term success by providing continuity and focus internally, by representing the institute in a plethora of external administrative processes, and by supporting the ongoing professionalisation of the ILLC.

Quality assessments

The quality of research, teaching and management at the ILLC has been subjected to various external evaluations over the years. The Master of Logic programme is evaluated separately, and the results have already been mentioned.

Research, including PhD training, at Dutch universities has known external evaluation since 1993, in a five, later six year cycle. These evaluations are carried out by an independent committee of mostly foreign experts and run by a professional organisation. Initially, the different parts of the ILLC were evaluated on a disciplinary- and/or faculty-defined basis. The researchers based in the Faculty of Humanities in the period 1994-1998 obtained a grade of excellence as part of a national philosophy research evaluation. The researchers based in the Faculty of Sciences in the period 1996-2001 also obtained that grade in a national evaluation of computer science research.

As an institute in its own right, the ILLC had already organised a critical look at itself in 1996 by inviting a number of researchers from outside to visit and evaluate its results. Officially, the institute was first externally evaluated in 2006, covering the period 2000-2005. This evaluation recognised the special position of the ILLC, the high level of the research carried out there, and the quality of the management: on each of the parameters quality, productivity and relevance, the ILLC was given the highest mark.

The success was repeated in 2012, and then again in 2019: in each case the performance of the ILLC was rated as
excellent, in terms of quality, output and management.

The committee that performed the 2012 evaluation made a special note of the efficient and successful way in which the ILLC had achieved the transition from the ‘founder generation’ to the next one: a feat unthinkable without the strong and effective support of the management.

These assessments of the ILLC have also influenced the way in which it is perceived and valued within the University of Amsterdam. From an unusual and provocative upstart, it has become something of a role model. For example, in the Faculty of Humanities, the ILLC has inspired the genesis of a number of institutes. But outside the University of Amsterdam, too, one may discern traces of the ILLC philosophy at work, either by distant example or through explicit alliances. And in various places institutes have been started that have followed the ILLC in some respects. All this shows that in order to be a success a research institute needs to have not only great research but also high levels of managerial competence and strategic talent to operate in different administrative cultures.

International alliances
Stanford
One long-standing collaboration for the ILLC has been that with the Center for the Study of Language and Information (CSLI) at Stanford University. Founded a bit earlier than the ILLC by a group of renowned researchers including the logician Jon Barwise, the philosopher John Perry and the linguist Stanley Peters, CSLI brought and brings together researchers at the interface of linguistics, logic, philosophy, computer science, and in recent years increasingly also cognitive science.

Over the years, contacts with CSLI, and with Stanford University more generally, have been close in terms of working visits by professors and students, workshop series, and publications. The contact was

The distinctive ILLC-style has had an indelible cross-disciplinary influence in the US, – from modal logic to the ‘dynamic turn’ –, and for American logicians spending time at the ILLC is a rite of passage. Thomas Icard

General managers of the ILLC
from left to right:
Jenny Batson (2011-present)
Ingrid van Loon (2001-2011)
Peter Blok (1998-2001)
Erik-Jan van der Linden (1992-1998)
Following the Chinese saying ‘Keep the company of good people and you shall be of their number’ we have created a joint research centre to introduce new ideas from the ILLC to China. 

Liu Fenrong

and is embodied in the appointment of Van Benthem as a tenured professor, and the two institutes form a natural coalition as research themes and opportunities keep mutating. Along this channel also, several ILLC alumni, such as Martin van den Berg and Balder ten Cate, have found their way into the vibrant industrial world of Silicon Valley.

Tsinghua

A recent offshoot of the ILLC approach is the Joint Research Center in Logic (JRC) at Tsinghua University in Beijing. This centre, a first of its kind, is co-directed by Van Benthem and Fenrong Liu and brings together Chinese researchers with colleagues from the ILLC and elsewhere.

They cooperate on a number of research projects in logic, philosophy, computation and social agency, and also generate new research lines such as the history of logical thought in China.

Through various outreach efforts in events and publications, the centre is becoming a force for logic in China and East Asia, building on its historical connection to Jin Yuelin, the founder of modern logic in China. The centre is still expanding, and a recent development is another first, viz., the institution by Tsinghua University of the Jin Yuelin chair in Logic, held jointly by a group of four international colleagues, including Van Benthem and Stokhof from the ILLC.
topics and trends since 2000
Chopping up history into fixed periods is of course just a form of bookkeeping: things need not change when entering a new decade, or even a new century. So, the distinction between ‘the ILLC prior to and after 2000’ is artificial to some extent.
Even so, looking back one can discern certain research trends that started in the late nineties come to fruition from 2000 onwards. However, as the ILLC expanded fast in this period qua themes and participants, a few lines must suffice, since there is no historical distance yet for a grand narrative.

**Research lines**

As the ILLC kept growing in terms of academic personnel, its intellectual span extended apace. Research in the decades since 2000 has partly followed earlier programs, though with a great variety of new themes. Mathematical logic fanned out from its strengths in constructivism to proof theory and category theory, consolidated with the appointment of Benno van den Berg. Entirely new lines sprung up as well, such as the research on descriptive set theory by Benedikt Löwe, and on generalised quantifiers and game techniques by Jouko Väänänen, who also initiated a fundamental study of the logic of dependency, a crucial notion across mathematics, game theory, probability and, increasingly, artificial intelligence.

Likewise, the modal logic agenda at the ILLC became much broader. Under the leadership of Yde Venema, it came to include new connections with computer science in the work on fixed-point logics of computation and their game semantics, but also with co-algebra, a new paradigm for finite and infinite computations re-thinking the mathematical foundations of computing. At the same time, new connections with algebraic logic and topology have emerged, accelerated by the appointment of Nick Bezhanishvili, while modal techniques are also used increasingly in the study of weak logics and ‘deep inference’ by Dick de Jongh and his collaborators.

Conspicuous in many of these developments was the same sort of entanglement of logic and computation that had already been so characteristic for ILLC research in the 1980s. Maarten de Rijke opened up new interfaces of logic and information retrieval, theorem proving, and other applied themes.
These research topics eventually moved to the Institute of Informatics when de Rijke became a full professor there.

A more theoretical instance of the entanglement with computation is the research on dynamic-epistemic logic by Alexandru Baltag, Johan van Benthem and Sonja Smets and their students which combined ideas from philosophical and computational logic to develop a broad theory of information flow, communication and information and goal-driven agency under the heading of logical dynamics, a program for putting actions and events at centre stage in designing logical systems. Dynamic-epistemic logic in a variety of formats, and applied to philosophy, multi-agent systems, game theory, and social network theory, has become one more ILLC trademark research line.

At the interface of logic and language, too, the ILLC has seen seminal new developments. Traditional strengths in the semantics of intensional predication and quantification continued in the work of Maria Aloni and Paul Dekker. In addition, Frank Veltman kept broadening the scope of his update semantics to also include generic expressions, and default reasoning in artificial intelligence.

The agenda also broadened to include several new descriptive areas, such as the study of epistemic modals, intensional quantification, vagueness, and of exhaustive meanings in natural language.

The period since 2000 was also one of methodological innovation. Jeroen Groenendijk and Floris Roelofsen developed dynamic semantics into a new paradigm, called ‘inquisitive semantics’, that highlights the role of questions and issues in directing discourse, and explores its repercussions in linguistics, philosophy, and even the foundations of logic itself.

Other new methodologies were the use of signalling games by Robert van Rooij to throw new light on the genesis of language and fundamental issues in pragmatics.

A conspicuous new trend in recent years has been the causal paradigm for natural language developed by Van Rooij and
The ILLC provides a fertile ground for developing a computational semantics and pragmatics that integrates formal semantics with empirical methods from psycholinguistics and machine learning techniques from AI. Raquel Fernández

Katrin Schulz, which connects up with both classical themes in the philosophy of science and current developments in artificial intelligence, while introducing probabilistic methods at the heart of semantics.

On the more applied side, the ILLC saw a fast expansion into the realm of computational linguistics. In the hands of Khalil Sima’an, Raquel Fernández, Ivan Titov and others, ideas from the 1990s now became available on an applicable scale: for parsing, but also for discourse interpretation and discourse pragmatics.

Beyond the bounds of already existing themes and trends, the two decades of the ILLC since 2000 have also opened up new interfaces with several disciplines, increasing the outreach of the institute. Quantum computing has become a major research line, in the work of Harry Buhrman on quantum algorithms and complexity of quantum computations, and later also by Christian Schaffner on quantum cryptography, all in collaboration with the CWI and the Institute of Physics and the Korteweg de Vries Institute for Mathematics in Amsterdam. Another noticeable interface is that with cognitive science. Research into natural language processing has come to include general cognition in the work of Rens Bod, and music entered as an independent research theme with the appointment of Henkjan Honing. Close collaborations with cognitive scientists are also much in evidence in the ongoing work of Michiel van Lambalgen on the psychology of reasoning pursued with the help of logic programming methods, and in that of Jakub Szymanik on learnability of linguistic expressions and logical inference patterns. Finally, cognitive research on semantics and discourse reaching out to newer machine learning and other data-processing techniques in AI has started flourishing in the groups of Jelle Zuidema and Raquel Fernández.

A third new interface in the ILLC today is with the social sciences. Supported by an ERC Starting grant, Sonja Smets and collaborators created a group studying infor-
A logical law for dynamic-epistemic belief update

\[
[\alpha] \Box_a P \leftrightarrow pre_\alpha \rightarrow \bigwedge \beta >_a \alpha K_a[\beta] P \land \bigwedge \gamma \simeq_a \alpha \Box_a[\gamma] P
\]

Like energy, meaning is transformed from one form to another. Physics studies how energy is preserved during a transformation. In machine translation our primary task is to develop models for how meaning is preserved in human translation.

Khalil Sima’an

A logical law for dynamic-epistemic belief update

This return is not surprising. Research is dynamic, and old friends can easily become new ones. But unlike in the old days, this philosophy-oriented research, too, is now a collaborative effort, often carried out in large, thematic, externally funded projects.

Internal growth, outside orientation

This all too brief summary of current research lines and the people involved in them is by no means complete. New appointments are extending and transforming the landscape of research on logic, language and computation at the ILLC at an increasing pace, as befits a large institution with its own dynamics. Given this ongoing transformation and scale-up a set of aggregated facts probably does more justice to what is going on now than a narrative constructed without proper temporal distance. A list of permanent appointments at the ILLC throughout its history is included at the end of this
Formal epistemology, epistemic logic, and learning theory are merging and ILLC researchers take the lead, combining different methodologies and systematic investigations with a focus on social group dynamics.  

Alexandru Baltag

More institutionally, the ILLC also takes a lead as the opportunity arises. The GLoRiClass project was a typical example in the 2000s, and later on, the institute also took the lead in new kinds of projects. The ILLC played a key role in designing and executing the LOGICCC program (‘Modelling Intelligent Interaction: Logic in the Humanities, Social and Computational Sciences, 2008-2011), a EuroCores programme of the European Science Foundation, which brought together researchers in logic, computer science, and the social sciences from across a broad academic and geographical spectrum. Currently, the ILLC is a founding node in the national Zwaartekracht project ‘Language in Formal epistemology, epistemic logic, and learning theory are merging and ILLC researchers take the lead, combining different methodologies and systematic investigations with a focus on social group dynamics.  

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Interaction’ (2013-2023), in collaboration with psychologists, linguists and neuro-scientists.

**New challenges**

Despite its expansion and continued influence, the ILLC today operates in a changing environment, which also brings major new intellectual challenges. Logic is definitely not the only game in town in many of the areas where the institute operates, and there are major paradigms that are either neutral or even active competitors. Probability is a major alternative methodology in many fields, and its mathematical connections to logic raise fundamental questions. Non-representational paradigms like neural networks and machine learning bypass basic assumptions of logical approaches to information and knowledge. Cognitive psychology has brought to light the limitations of logical reasoning by actual human agents. And finally, big data pose yet other challenges, replacing philosophical intuition and mathematical finesse by pattern matching and sheer weight of accumulated facts.

While none of these developments threaten the viability, content and elegance of logic in the broad sense pursued at the ILLC, they do pose serious questions to an institute that wants to be avant-garde. The new challenges raise new deep issues for fundamental research, but also offer opportunities for making logic, language and computation in the Amsterdam style relevant in new ways in current areas like cognition and artificial intelligence that are transforming our world. It will be exciting to see where the current young ILLC community will move in the decades to come.
One more thing that has changed is public scrutiny. The ILLC has always been an institute for experts, appreciated by an international elite of colleagues and visiting committees. What it is all about is much harder to see for a broader audience, which, of course, has a perfect right to insist on transparency and accountability.

The institute is showing awareness of this by undertaking new outreach initiatives toward high schools, offering master classes to both students and teachers. And at another level, it has been the home base for highly visible public outreach in the work of Rens Bod on a global history of the humanities across cultures, and that of Henkjan Honing on the origins of musicality. Here, too, it will be interesting to see what public voices will be heard from the ILLC community in the years to come.
ILLC alumni all over the world
conclusion

a brief history
The ILLC started out as a grassroots association of congenial researchers and students interested in logic, language, information, and communication. As this short history has shown, from these beginnings a large and diverse institute has sprung up, with its own organisational structures and practices.
There are also some features that have remained unchanged from the start. The ILLC is still a research community that serves as a factory of new ideas. Those ideas come from a broad range of disciplines but they fit and cohere, and researchers grow up in an atmosphere of mutual respect. Moreover, the community continues to strive to be agenda-setting, and, while doing so, the ILLC still provides an intellectual home for academic free spirits, from professors to new generations of students. In fact, its students, and their skills and attitudes, are a major product of the ILLC as much as its ideas and publications, and by now, ILLC alumni form a dense and influential network around the globe.

Of course, as any living organisation, the ILLC faces its challenges. Its culture of coherence and cross-fertilisation is not a given once and for all, it needs careful cultivation drawing on its tradition of integrating perspectives from mathematics, philosophy, linguistics, and other fields. The agenda-setting role of the ILLC can only flourish by keeping its sights at the cross-roads of major new developments, for instance, from AI and cognitive science. Also, the ILLC is currently working toward broader responsibilities toward society. It offers pilot master classes for students and teachers from high schools, and its internet course offerings, too, offer ample scope for greater ambition and expansion.

Finally, the ILLC is still mostly a place for connoisseurs, one of the hot-spots of the profession worldwide. It is not well-known to a general public with intellectual interests, and its visibility with university administrators needs constant care. The crown jewel is seldom on display. The institute is aware of this, and is trying to make ‘spreading the word’ broadly a habit to be engrained in its staff and students.

Keeping the humanities and sciences together at the ILLC comes naturally. We attract logicians who are active in epistemology and artificial intelligence, computer scientists who write poetry, philosophers who work in linguistics and game theory, and mathematicians who love philosophy. This is just who we are and how we work.  

Sonja Smets
Whether in its historical achievements or its current position at the university, the ILLC is a remarkable place and its success defies easy mono-causal explanations. In this booklet we have sketched in broad strokes what has happened and identified some of the many factors (including that most important one of all: a bit of luck...) that have resulted in a unique institution that has served and will continue to serve its academic community, the university, and the public at large.
new generation
Left: Vendelstraat, right: new building LA824
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The ILLC is a research institute in the interdisciplinary area between the humanities, the behavioural and the natural sciences.