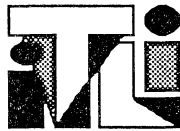


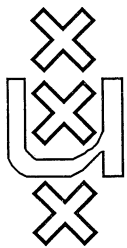
Institute for Language, Logic and Information



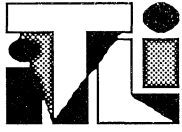
The Institute for Language, Logic and Information (ITLI)

ITLI Prepublication Series 86-01

October 1986



University of Amsterdam



Instituut voor Taal, Logica en Informatie

Faculteit der Wiskunde en Informatica, Roetersstraat 15, 1018WB Amsterdam, or
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The Institute for Language, Logic and Information (ITLI)

October 1986



Institute for Language, Logic and Information

Faculty of Mathematics and Computer Science, Roetersstraat 15, 1018WB Amsterdam, or
Faculty of Philosophy, Grimburgwal 10, 1012GA Amsterdam



THE INSTITUTE FOR LANGUAGE, LOGIC AND INFORMATION

In the spring of 1986, a group of philosophers, mathematicians and computer scientists at the University of Amsterdam (The Netherlands) have joined forces at the Institute for Language, Logic and Information (ITLI). This brochure provides some basic facts about its background and activities.

Background

In recent years, there has been a vigorous world-wide development in the area of Semantics, broadly conceived as the study of meaning and information for all languages, whether natural or artificial. This development is to a large extent interdisciplinary, being concerned with the natural languages of the linguists, but also with the formal languages of the mathematicians and with the programming languages of the computer scientists. Interesting common information structures have come to light, which are being explored these days, often using tools from the field of logic.

There is a special basis for such studies in The Netherlands, a country which has a strong tradition of innovative logical research, while harbouring flourishing communities of linguists and philosophers on the one hand, and theoretically minded computer scientists on the other. Many of these activities are centered in Amsterdam, which was also the location of the internationally reputed *Instituut voor Grondslagenonderzoek*, founded by E.W. Beth in the sixties as an interdisciplinary center for logic and philosophy.

ITLI is the direct successor of that institute, sponsored by the departments of Philosophy, Mathematics and Computer Science. Its aim is to provide a focussing point for fundamental research, strengthening the above interdisciplinary trends in semantics, while also providing theoretical support for practical projects in natural language processing, artificial intelligence and other related areas. These aims are also furthered through special teaching programs, as well as other scientific activities.

Research

Research at ITLI can be roughly divided into three clusters: Philosophy of Language/Theoretical Linguistics, Logic, and Theoretical Computer Science. The first cluster includes the well-known work of the Amsterdam *Montague-group* (Bartsch, Groenendijk & Stokhof, Janssen, Landman) engaged in both descriptive and theoretical semantics of natural language - including such topics as modality, quantification and questions, as well as methodological studies of compositionality and expressiveness. Within the second cluster falls the long-standing research on intensional logic (Van Benthem, De Jongh, Veltman) as well as more recent studies in the logic of natural language (generalized quantifiers, epistemic semantics, categorial grammar and type theory). Finally, the third cluster includes such topics as semantics in computer science, natural language processing and complexity theory (Janssen, Van Emde Boas).

Over the past decade, these research lines have often interacted, resulting in a collaboration of which ITLI's foundation is a natural outcome. For instance, there is common work in progress on such topics as epistemic semantics and pragmatics, Montague grammar and type theory, and semantics of programming languages. Moreover, the research of the Amsterdam group is embedded in a variety of national and international contacts.

A representative list of publications by the various participants in the enterprise will be found in the appendices to this brochure. ITLI has a prepublication series of its own, while also being the major partner in the GRASS publication series (Groningen-Amsterdam Studies in Semantics, Foris Publications, Dordrecht and Cinnaminson).

Teaching

One of the crucial tasks for the future of Semantics will be that of educating a group of talented students with the necessary combination of technical skills and broad scientific outlook. ITLI has initiated teaching programs toward this purpose at several levels. There is a program in Language, Logic and Information at the Master's level, which students from all three participating departments can enter. Moreover, a Ph.D. program is being developed - pending an application to the Dutch Ministry of Education for official support. At the moment, there are already six individual Ph.D. projects at ITLI, funded from various sources. Finally, so-called 'post-academic' courses in the area are offered as a service to people with related interests in education and industry.

Further activities

ITLI also actively maintains broader scientific contacts. For several years already, its bi-weekly *Montague Colloquium* has served as a forum for the Dutch semanticists - and its bi-annual *Amsterdam Colloquia* (started in 1976) have become important gatherings of the international community.

At present, contacts are also developing with like-minded industrial research environments. Several ITLI-members have ties with IBM Uithoorn (logical data bases) and Philips Eindhoven (Rosetta automatic translation project).

Cooperation

In Amsterdam itself, through various joint appointments, ITLI has an official collaboration with its sponsoring departments, as well as with the Faculty of Humanities (linguistics, 'alpha-informatica') and the Centre for Mathematics and Computer Science (CWI).

At national level, there is an official collaboration with semantic research groups at the universities of Groningen, Utrecht and Tilburg.

Internationally, ITLI-members have lively contacts with such centers of semantic research as the Center for the Study of Language and Information (Stanford University), the Department of Linguistics at Amherst (University of Massachusetts), the Cognitive Science Center at Austin (University of Texas), the School of Epistemics at Edinburgh (University of Edinburgh), the Department of Mathematics at Oslo (University of Oslo) and the Department of Romanistik (University of Stuttgart) / Forschungsstelle für natür-sprächliche Systeme (University of Tübingen). The intention is to turn these contacts into a somewhat more formal international 'semantic network'.

Organization

ITLI started as a free association of the following people from the permanent staff of the University of Amsterdam.

- *Department of Mathematics*

Johan van Benthem (chair of Mathematical Logic)

Dick de Jongh

- *Department of Philosophy*
 Renate Bartsch (chair of Philosophy of Language)
 Jeroen Groenendijk
 Martin Stokhof
 Frank Veltman
 Roel de Vrijer
- *Department of Computer Science*
 Peter van Emde Boas (chair of Theoretical Computer Science)
 Theo Janssen

In addition, there are six research assistants directly involved. There is a larger group of 'interested close colleagues', including Anne Troelstra (intuitionism and constructive mechanics), Kees Doets (set theory) and Jan Bergstra (software engineering).

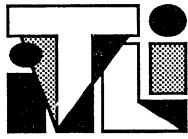
In the meantime, the ITLI initiative has been supported officially by its three mother departments. Moreover, the University of Amsterdam has put it on its list of 'post-doctoral institutes' for which funding is being asked with the Ministry of Education.

At present, ITLI has the following board: Renate Bartsch, Johan van Benthem, Peter van Emde Boas.

Correspondence can be addressed to the acting directors:

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 Johan van Benthem
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A survey of activities I. RESEARCH

I.1. Current research at ITLI has three main streams:

• Semantics of natural language

This area is a mixture of more descriptive and more theoretical work.

- descriptive topics include: quantifier phrases and determiners generally, modal and epistemic expressions, conditional sentences, comparatives and temporal expressions;
- in addition to indicative speech acts, questions and answers are studied (both semantically and pragmatically);
- also, the scope of description is presently being widened from the sentence level to that of texts.

Special attention is given to Montague grammar, as a unifying (yet liberal) semantic framework, and congenial syntactic theories, such as categorial grammar and generalized phrase structure grammar. Specific topics are:

- syntactic power, especially in flexible versions with changing categories and shifting types;
- the mechanism of interpretation, especially questions of compositionality and semantic constraints on Montague grammar;
- extensions and refinements of the paradigm: such as the prospects of discourse representation, and the dynamic role of context;
- the integration of lexical semantics into sentence and text semantics and pragmatics.

Another major line is the development of a general theory toward a significant set of 'semantic universals', in the spirit of linguistic universal grammar. In particular, there is ongoing research into general constraints on possible meanings for expressions in natural language.

• Logic and semantics

There is a long tradition of intensional logic in Amsterdam. Current special issues are

- modal logic (including provability logic);
- temporal logic;
- conditional logic.

Research includes both classical theoretical questions and the development of new modellings. One special development is a more epistemically oriented 'data semantics', employing partial models and assertability conditions.

Moreover, all standard branches of mathematical logic are represented. There is a special interest in semantic applications of

- (finite) model theory;
- lambda calculus and type theory.

But also proof theory has turned out relevant, e.g., in the foundations of categorial grammar.

• **Semantics, computation and complexity**

Computer science as practiced in Amsterdam has various research lines complementing the above:

- semantics of programming languages, including Montague semantics for 'intensional' phenomena, dynamic logic and minimal-model semantics of logic programming;
- mathematical complexity theory, both theoretical and applied;
- theory of databases, including the development of query languages and knowledge representation.
- theoretical foundations of machine translation between natural languages.

• **Interfaces**

In practice, many cross-connections exist between the above projects, because of various unifying research interests. Some examples are listed here:

Questions and query languages

The study of the semantics and pragmatics of interrogative structures in natural language has obvious connections with the design and implementation of question-answering systems and query languages. In trying to develop 'user-friendly' man-machine interfaces a natural language front-end is in a sense an optimal choice. But also on a less grandiose scheme a data-base should be designed keeping in mind the way in which information is

retrieved from it, i.e. the way in which requests for information can be formulated and satisfied. In order to be able to do so, however, we need some fundamental insight into the way in which interrogative structures in natural language carry meaning and ask for information. An abstract, not (too) language-specific, theory of questions and answers should be able to cast some light on this, and thus may be expected to have important practical consequences.

The development of such a theory also interacts with various other research areas. Within the semantics of natural language proper the main focus has always been on indicative structures. It can be argued that this has caused the oversight of some important phenomena which arise from the interaction of indicatives and interrogatives in actual language use. E.g. a theory about ambiguity might be expected to gain from a widening of perspective, simply because the way in which indicative structures are ambiguous is determined partly by the functioning of such structures in an interactive ('question-answer') environment. Also, it is becoming more widely recognized that an adequate theory of topic and focus will need to take interrogative structures and their meaning into account.

Finally, there is an important and obvious connection between work on the semantics and pragmatics of interrogatives and that on partial interpretation, data semantics and so forth. For example, the distinction between complete and partial answers, especially when relativized to the information that speech participants possess, requires a theoretical framework in which notions of partial interpretation and reasoning on the basis of incomplete evidence can be formulated.

Data semantics

The central notion in data semantics is not 'truth' simpliciter, as in ordinary modeltheoretic semantics, but 'truth on the basis of available evidence'. Data semantics claims that this relative notion is better suited to the analysis of language than the absolute notion, and it underpins this claim by showing how the meaning of many natural language expressions is bound up with the restricted knowledge that speakers have of the world. This is pretty obvious for the so-called epistemic modalities like *may*, *might*, and *might have been*, but *conditionals* are to be understood in evidential terms too: they impose constraints on the various ways in which evidence can grow.

Many classical distinctions- like that between specific and nonspecific terms, or that between distinguishable and indistinguishable objects- find a natural explanation within the data semantic scheme. Besides these, data semantics draws some distinctions of its own: it appears that not all sentences are *stable* in the sense that their truth value, once established, is established for good. Some kinds of sentences, and conditionals are a case in point, are *unstable*.

Their truth values are not invariant under growth of evidence, and that is the main reason why their logical behaviour is so capricious. Another distinction is the one between *direct* and *indirect* evidence, which is vital to the understanding of the epistemic *must* .

At the moment, research in data semantics focusses on two topics: (i) tense and aspect; and (ii) default reasoning. The first is related to linguistics; it is hoped that it will not only shed some new light on some old riddles (like for instance the imperfective paradox), but also clarify the relation between Kamp's discourse representation theory and data semantics. The second project should show that data semantics is relevant to computer science, as it is in particular in the field of artificial intelligence that a workable default logic is needed.

Compositional interpretation

In philosophy the principle of compositionality has a long tradition and is called *Frege's principle*. It plays a role in explanations of how it is that humans can understand utterances they have never heard before. Linguists working in the tradition of Montague, nowadays take the principle not as an empirical hypothesis, but as a methodological principle for the design and evaluation of grammars. A formalisation of the principle is then given by the algebraic framework given by Montague in his *Universal Grammar*.

Independently of the philosophical tradition, the principle also arose in computer science. For instance, it is claimed to provide an underpinning for automated correctness checks for computer programs. For many classical concepts of programming languages such compositional semantics have been given (witness the denotational semantics of Scott/Strachey, and the algebraic semantics of Goguen and Thatcher). It turned out that the mathematical framework of this approach is about the same as the framework of Montague. A recent development in computer science are computers with several processors, and the connected theory of parallel computation. Some researchers aim at obtaining a correctness proof for parallel processes in a compositional way: from correctness proofs for the separate processes.

The compositionality principle also plays a role in the field of machine translation. Both the Philips translation project Rosetta and the EEC translation project Eurotra produce the translation of a compound expression from the translations of its parts. Since translation has to be meaning preserving, this is again a variant of the principle of compositionality of meaning.

Computational semantics

In traditional semantics, meanings are static entities in some Platonic world of propositions, objects and models. But many linguistic expressions can also be viewed dynamically, as instructions for performing some kind of mental or real computation on models. Examples are quantifiers, conditionals as well as other 'functional' expressions. This more dynamic computational view of semantic meanings can be developed systematically, using concepts from automata theory, operating both on linear and tree-like representation structures. As a result, one can study relative complexity of natural language expressions in a precise manner, but also issues of learnability and efficiency. Moreover, a new principled parallel arises between linguistics and computer science: in a sense, natural languages are also programming languages for mental computation.

1.2. A list of representative publications by ITLI staff.

Renate Bartsch

1. 'The structure of Word Meanings: Polysemy, Metaphor, Metonymy'. In: F. Landman and F. Veltman (eds.), *Varieties of Formal Semantics*. Foris Publications, Dordrecht, 1984, pp. 25-54.
2. 'On Aspectual Properties of Dutch and German Nominalizations'. In: C. Vet and V. Lo Cascio (eds.), *Temporal Structure in Sentence and Discourse*. Foris Publications, Dordrecht, 1986.
3. 'Context-Dependent Interpretation of Lexical Items'. In: J. Groenendijk, D. de Jongh, M. Stokhof (eds.), *Foundations of Pragmatics and Lexical Semantics*. Foris Publications, Dordrecht, 1986.

Johan van Benthem

1. *The Logic of Time*. Reidel, Dordrecht (Synthese Library, vol. 156), 1983.
2. 'Questions about Quantifiers'. In: *Journal of Symbolic Logic*.
3. *Modal Logic and Classical Logic*. Bibliopolis, Napoli (Indices, vol. 3), 1985.
4. *Essays in Logical Semantics*. Reidel, Dordrecht (Studies in Linguistics and Philosophy, vol. 29), 1986.
5. *Categorial Grammar* (co-edited with W. Buszkowski and W. Marciszewski). John Benjamin, Amsterdam and Philadelphia, 1987.

Peter van Emde Boas

1. 'The Conway Paradox: its Solution in an Epistemic Framework' (with J. Groenendijk and M. Stokhof). In: J. Groenendijk, T.M.V. Janssen and M. Stokhof (eds.), *Truth, Interpretation and Information. Selected Papers from the Third Amsterdam Colloquium*. Foris Publications, Dordrecht (GRASS 2), 1984, pp. 159-182.
2. 'Compositionality and Concurrent Networks; Soundness and Completeness of a Proof system' (with J. Zwiers and W.P. de Roever). Proc. ICALP 12, Nauplion, July 1985. Springer Lecture Notes in Computer Science 194. Springer, Berlin, 1985, pp. 509-519. Preprint KUN-84-57.
3. 'The Second Machine Class'. In: J.K. Lenstra and J. van Leeuwen (eds.), *Parallel Computers and Computations*. CWI Syllabi 9, 1985, pp. 133-161.
4. 'Storing and Evaluating Horn-Clause Rules in a Relational Database' (with H. van Emde Boas-Lubsen). *IBM Journal of Research and Development* 30, 1986, pp. 80-92. Preprint IBM Research RJ 4776 (50635) 7/24/85.

Jeroen Groenendijk and Martin Stokhof

1. 'Semantic analysis of wh-complements'. In: *Linguistics & Philosophy*, 5:2, 1982, pp. 175-233.
2. 'On the semantics of questions and the pragmatics of answers', in: F. Landman & F. Veltman (eds.), *Varieties of Formal Semantics*, Foris, Dordrecht, 1984, pp. 143-170.
3. *Studies on the Semantics of Questions and the Pragmatics of Answers*, dissertation, Centrale Interfaculteit, Universiteit van Amsterdam, 1984, x+569p.

Theo Janssen

1. 'On Intensionality in Programming Languages' (with P. van Emde Boas). In: F. Heny (ed.), *Ambiguities in Intensional Contexts*. Reidel, Dordrecht (Synthese Library), 1981, pp. 253-269. Also: Report ZN 94, Mathematical Centre, Amsterdam 1979.
2. 'Compositionality of Meaning in Logic and Computer Science' (with P. Van Emde Boas). Proceedings of the 2nd Frege Memorial Conference, Schwerin, September 1984. G. Wechsung (ed.), Akademie Verlag, *Mathematische Forschung* 20, 1984, pp. 401-407. Preprint MI-UvA-84-13.
3. 'Scope Ambiguities of Tense, Aspect and Negation'. In: F. Heny and B. Richards (eds.), *Syntactic Categories: Auxiliaries and Related Puzzles*. Reidel, Dordrecht (Synthese Language Library 20), 1983, pp. 55-99.
4. 'Individual Concepts are Useful'. In: F. Landman and F. Veltman (eds.), *Varieties of Formal Semantics*. Foris, Dordrecht (GRASS 3), 1984, pp. 171-192.

Dick de Jongh

1. 'A class of Intuitionistic Connectives'. In: J. Barwise, H.J. Keisler and K. Kunen (eds.), *The Kleene Symposium*. North Holland, 1980, pp. 103-111.
2. 'Formulas of one Propositional Variable in Intuitionistic Arithmetic'. In: A. Troelstra and D. van Dalen (eds.), *The L.E.J. Brouwer Centenary Symposium*. North Holland, 1982, pp. 51-64.
3. 'A Simplification of a Completeness Proof of Guaspari and Solovay'. To appear in: *Studia Logica* 1987.2.

Frank Veltman

1. 'Data Semantics'. In: J. Groenendijk, T. Janssen and M. Stokhof (eds), *Truth, Interpretation and Information* , Foris, Dordrecht, 1984.
2. *Logics for Conditionals*, dissertation, Department of Philosophy, University of Amsterdam, 1985.
3. 'Data Semantics and the Pragmatics of Indicative Conditionals'. In: E. Traugott e.a. (eds.), *On Conditionals* . , Cambridge University Press, 1986.

Roel de Vrijer

1. 'A Direct Proof of the Finite Developments Theorem'. *Journal of Symbolic Logic* , 1985, Vol. 50:2, pp. 339-343.

1.3. Current Ph.D. research projects at ITLI

1. Karen Kwast (UvA, FVI)
Non-Classical Logics for the Semantics of Databases.
2. Michiel van Lambalgen (ZWO, MI)
Randomness in Lattice-Valued Models.
3. Sjaak van Leeuwen (ZWO, CI)
Ontological Necessity and Formal Semantics.
4. Reinhard Muskens (ZWO, CI/MI)
Relativization in the Theory of Types, and its Applications in the Semantics of Natural English.
5. Leonoor Oversteegen (ZWO, MI)
Time-in-Language. Phenomena at the Border of Logic and Linguistics.
6. Victor Sanchez (ZWO, CI/MI)
Traditional Logic and Modern Semantics: Distribution and Monotonicity.

In 1987, two additions are expected:

7. Herman Hendriks
Flexibility in Syntax and Semantics.
8. Michael Morreau (ZWO, MI)
Non-Monotonic Reasoning. Its Sources and Logical Structure.

Finally, there are some joint projects with other institutes:

9. Joop Houtman (ZWO, University of Groningen)
Functional Composition and Type-Raising.
10. Elias Thijsse (University of Tilburg)
Knowledge Representation and Epistemic Logic.
11. Kees van Deemter (Institute for Perception Research, Eindhoven)
Knowledge Representation and Natural Language Processing.

I.4. Recent dissertations supervised by ITLI staff

1983 • Theo Janssen

Foundations and Applications of Montague Grammar.

Mathematical Center, Amsterdam.

(Also CWI Tracts 19 & 20, Centre for Mathematics and Computer Science, 1986)

1984 • Jeroen Groenendijk and Martin Stokhof

Studies in the Semantics of Questions and the Pragmatics of Answers.

Philosophical Institute, University of Amsterdam.

(To appear with Oxford University Press, Oxford, 1987.)

• Netteke Koene

De eigen semantische systematiek van de natuurlijke taal.

Philosophical Institute, University of Amsterdam.

1985 • Jan van Eijck

Aspects of Quantification in Natural Language.

Philosophical Institute, State University of Groningen.

(To appear in *Studies in Linguistics and Philosophy*, Reidel, Dordrecht, 1987.)

• Jack Hoeksema

Categorial Morphology.

Institute of Dutch Language, State University of Groningen.

(To appear in *Outstanding Dissertations in Linguistics*.)

• Frank Veltman

Logics for Conditionals.

Philosophical Institute, University of Amsterdam.

(To appear with Cambridge University Press, Cambridge, 1988)

1986 • Fred Landman

Towards a Theory of Partial Information. The Status of Partial Objects in Semantics.

Philosophical Institute, University of Amsterdam.

(Also in GRASS-series, vol. 6, Foris, Dordrecht, 1986.)

• Piet Rodenburg

Intuitionistic Correspondence Theory.

Mathematical Institute, University of Amsterdam.

• Leen Torenvliet

Structural Concepts in Relativised Hierarchies.

Department of Computer Science, University of Amsterdam.

• Roel de Vrijer

Surjective Pairing and Strong Normalization: Two Themes in Lambda Calculus.

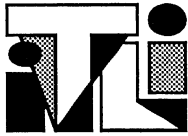
Mathematical Institute, University of Amsterdam / Department of Computer Science, University of Nijmegen

• Frans Zwarts

Categorial Grammar and Algebraic Semantics.

Institute of Dutch Language, State University of Groningen.

(To appear in *Studies in Linguistics and Philosophy*, Reidel, Dordrecht, 1987.)



A survey of activities

II. TEACHING

II.1. Current courses.

The following list of current courses is an indication of the training which degree students at ITLI are supposed to acquire.

Philosophy

Philosophy of language: an introduction

Logic, language and meaning: historical and systematic

Recent Developments in the semantics of natural language

Logic: an introduction

Metalogic

Philosophical logic: a survey

Intensional logic

Mathematics

Sets and models

Recursion theory

Lambda calculus and theory of types

Computer science

Formal languages and automata

Complexity theory

Semantics of programming languages

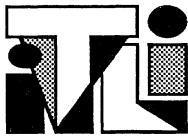
In addition, various selected topics courses are given, such as:

Theory of automatic translation

Parallels in the semantics of programming languages and natural language

II.2. The ITLI curriculum lies in a wider environment of related courses in the Faculty of Humanities (general linguistics, 'alpha-informatica') and the Faculty of Mathematics and Computer Science (mathematical logic and foundations; software development; process algebra and abstract data types).

An official collaboration exists with both the group in Alpha-Informatics and the Department of Computer Science. In addition, ITLI will participate in the proposed national program for 'post-academic education' in philosophy.



A survey of activities
III. MISCELLANEOUS

The following list of activities may give a more concrete picture of ITLI's functioning as a scientific center.

III.1. The Amsterdam Colloquia in Formal Semantics.

Five of these biannual international conferences have taken place now, the most recent one in 1984, with one hundred visitors from Europe and the United States. The next congress will take place this academic year. Funding has been obtained from the Royal Dutch Academy of Sciences. Within Europe, this is certainly the oldest continuous meeting place for the colleagues in the area, whose Proceedings have become well-known.

January 1976

First Amsterdam Colloquium on Montague Grammar and Related Topics.

January 1978

Second Amsterdam Colloquium on Montague Grammar and Related Topics.

September 1980

Third Amsterdam Colloquium: Formal Methods in the Study of Language.

September 1982

Fourth Amsterdam Colloquium: Frontiers of Intensional Semantics.

August 1984

Fifth Amsterdam Colloquium: Information, Interpretation and Inference.

April 1987

Sixth Amsterdam Colloquium.

III.2. Montague Colloquia.

The Montague Colloquia serve as a biweekly forum for semanticists in Amsterdam and Holland generally (as well as for visitors from abroad). Speakers this year are (chronologically):

Gerard Renardel (Department of Philosophy, State University of Utrecht);
Gert van der Steen (Computer department Faculty of Humanities, University of Amsterdam);
Jeroen Groenendijk (Department of Philosophy, University of Amsterdam);
Karin Donhauser (University of Passau, Germany);
Frank Veltman (Department of Philosophy, University of Amsterdam);
Frans Zwarts (Institute for Dutch Language, State University of Groningen);
Peter van Emde Boas (FVI/IIW, University of Amsterdam);
Frank van Eijnde (Department of Linguistics, University of Leuven, Belgium);
Reinhard Muskens (ZWO, Department of Philosophy, University of Amsterdam);
Rob v.d. Sandt (Philosophical Institute, University of Nijmegen);
Karel Lambert (Department of Philosophy, University of California, Irvine);
Franciska de Jong (Philips Laboratorium, Eindhoven);
Ton van der Wouden (Institute for Dutch Lexicology, Rijksuniversiteit Leiden).

III.3. Workshops.

ITLI is also preparing a program of specialized workshops. Next year, the first meeting will be on 'categorial grammar and theory of types', in cooperation with the Groningen colleagues. Prominent foreign researchers will be invited to discuss with the Dutch community in this area.

III.4. GRASS book series.

ITLI staff runs the GRASS book series (Groningen–Amsterdam Studies in Semantics, Foris, Dordrecht), in collaboration with colleagues in Seattle, Groningen and Utrecht. At present the following volumes have appeared:

1. Alice ter Meulen (ed.), *Studies in Modeltheoretic Semantics*. 1983.
2. Jeroen Groenendijk, Theo M.V. Janssen and Martin Stokhof, *Selected Papers of the 3rd Amsterdam Colloquium*. 1984.
3. Fred Landman and Frank Veltman, *Varieties of Formal Semantics*. 1985.

4. Johan van Benthem and Alice ter Meulen (eds.), *Generalized Quantifiers in Natural Language*. 1985.
5. C. Vet and V. Lo Cascio (eds.), *Temporal Structure in Sentence and Discourse*. 1986
6. Fred Landman, *Towards a Theory of Information. The Status of Partial Objects in Semantics*. 1986.

Moreover, the following volumes are to appear:

7. Jeroen Groenendijk, Dick de Jongh and Martin Stokhof (eds.), *Foundations of Pragmatics and Lexical Semantics*.
8. Jeroen Groenendijk, Dick de Jongh and Martin Stokhof (eds.), *Studies in Discourse Representation Theory and the Theory of Generalized Quantifiers*.

III.5. Prepublication series.

There is also an ITLI prepublication series, whose first titles are:

1. *The Institute for Language, Logic and Information (ITLI)*.
2. Peter van Emde Boas, *A Semantical Model for Integration and Modularization of Rules*.
3. Johan van Benthem, *Categorial Grammar and Lambda Calculus*.
4. Jeroen Groenendijk and Martin Stokhof, *The Right Type? Or, Type-Shifting and the Semantics of Interrogatives*
5. Reinhard Muskens, *A Relational Formulation of the Theory of Types*.
6. Dick de Jongh, *Complete Logics for Well-Founded Branched Time*.
7. Frank Veltman and Reinhard Muskens, *Another Solution to the Sorites*.
8. Dick de Jongh, Frank Veltman and Rieneke Verbrugge, *All Logics for Discrete and Dense Time*.
9. Johan van Benthem, *Logical Syntax*.

III.6. External contacts.

ITLI is presently engaged in establishing official contacts elsewhere. One existing cooperation is that with Philips Eindhoven - resulting this year in contract research on discourse representation and text semantics, supporting the ROSETTA translation machine. First contacts have also been made with the Institute for Perception Research at Eindhoven, which runs a follow-up project to PHLIQA.

Another line is the organisation of a national network of Dutch semanticists, to create a national Ph.D. program, while also joining forces in other ways.

At present, ways and means are being discussed with colleagues in Groningen, Nijmegen, Tilburg and Utrecht.

Finally, possibilities are being explored for setting up an international network, on the basis of existing contacts with similar centers elsewhere in Europe and the United States.

