

Curriculum Vitae Tim Fernando

Address	Computer Science Department Trinity College, Dublin 2, Ireland	Born	1964 Manila, Philippines
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Education

- June 1991 Ph.D. in Logic, Stanford University (Stanford, California)
Thesis: Contributions to the foundations of situation theory
Committee: Solomon Feferman (chair), Jon Barwise, John Mitchell, Stanley Peters
- June 1985 B.S. in Mathematics, California Institute of Technology (Pasadena, California)
Senior thesis: Elementary induction on finite abelian groups
Supervisor: Alexander S. Kechris

Research interests

Applications of logic to natural and programming languages, and related cognitive issues.
Knowledge representation and reasoning with contexts.
Non-monotonic reasoning, probabilistic and modal methods.
Discourse: anaphora, underspecification, ambiguity and disambiguation.
Computational linguistics: formal semantics and pragmatics.

Professional service

Member, Managing Editorial Board, *Research on Language and Computation* (Kluwer).
Program Committee Local Co-Chair, 19th European Summer School in Logic, Language and Information, August 2007, Dublin, Ireland.
Member, Programme Committee, Mathematics of Language 2007 (UCLA); Formal Grammar 2007 (Dublin) and 2004 (Nancy); Sixth, Fifth, Fourth and Third International and Interdisciplinary Conference on Modeling and Using Context (CONTEXT 07, 05, 03, 01); 18th and 15th Irish Artificial Intelligence and Cognitive Science; Tbilisi Symposium on Language, Logic and Computation (1996).
Logic and Language Area Specialist, 16th European Summer School in Logic, Language and Information, August 2004, Nancy, France.
Program Co-Chair, 14th Irish Artificial Intelligence and Cognitive Science, September 2003, Dublin.
Workshop Organizer, Barwise and Situation Semantics (co-located with CONTEXT'03), 26 June 2003, Stanford, California; Temporality and Discourse Context (co-located with CONTEXT'01), 30 July 2001, Dundee, Scotland.
Referee: *Linguistics and Philosophy*, *Journal of Philosophical Logic*, *Journal of Semantics*, *Journal of Logic, Language and Information*, Center for the Study of Language and Information (CSLI) Lecture Notes, Computer Aided Verification (CAV), Logic in Computer Science (LICS), *Matematica Contemporanea*, and Semantics and Linguistic Theory (SALT).

Teaching interests

Artificial Intelligence, Cognitive Science and Formal Linguistics.
Computational and Applied Logic.

Employment

- Since May 2003 Fellow, Trinity College, University of Dublin, Ireland
- October 1999 Lecturer, Computer Science Department
– present Trinity College, University of Dublin, Ireland
- September 1998 Lecturer, Philosophy Department
– September 1999 University of Texas, Austin, Texas
- September 1997 Visiting Assistant Professor, Philosophy Dept and Language Technologies Institute
– May 1998 Carnegie Mellon University, Pittsburgh, Pennsylvania
- December 1993 Research Associate, Institut für maschinelle Sprachverarbeitung (IMS)
– September 1997 Universität Stuttgart, Azenbergstraße 12, 70174 Stuttgart, Germany
- July 1991 Post-Doctoral Researcher, Centre for Mathematics and Computer Science (CWI)
– August 1993 Kruislaan 413, 1098 SJ Amsterdam, The Netherlands

Visiting positions

- Summer 1999, Institut für maschinelle Sprachverarbeitung (IMS)
Summer 1998 Universität Stuttgart, Azenbergstraße 12, 70174 Stuttgart, Germany
- January Philosophy Department
– May 1996 University of Texas, Austin, Texas
- September ITK, Katholieke Universiteit Brabant
– November 1993 Hogeschoollaan 225, 5037 GC Tilburg, The Netherlands
- June 1992 Institut für Informatik, Universität Bern, Switzerland

During PhD studies

- October 1987 Research Assistant, Center for the Study of Language and Information
– June 1991 Stanford University, Stanford, California
- Summer 1990 Visiting Researcher, Institute for New Generation Computer Technology (ICOT)
Tokyo, Japan
- Summer 1987 Programming Research Assistant, Computer Science Laboratory
SRI International, Menlo Park, California
- October 1986 Research Assistant, Department of Computer Science
– June 1987 Stanford University, Stanford, California
- August 1985 Research Assistant, Department of Computer Science
– May 1986 Carnegie-Mellon University, Pittsburgh, Pennsylvania

Publications

Journal articles

Representing events and discourse: comments on Hamm, Kamp and van Lambalgen. *Theoretical Linguistics*, 32(1):57-64, 2006.

Schedules in a temporal interpretation of modals. *Journal of Semantics*, 22: 211-229, 2005.

Abstract. Eventualities and worlds are analyzed uniformly as *schedules* of certain descriptions of eventuality-types (reversing the reduction of eventuality-types to eventualities). The temporal interpretation of modals in Condoravdi 2002 is reformulated to bring out what it is about eventualities and worlds that is essential to the account. What is essential, it is claimed, can be recovered from schedules that may or may not include worlds.

A finite-state approach to events in natural language semantics. *Journal of Logic and Computation*, 14(1), 79-92, 2004.

Abstract. Events in natural language semantics are characterized in terms of regular languages, each string in which can be regarded as a temporal sequence of observations. The usual regular constructs (concatenation, etc) are supplemented with superposition, inducing a useful notion of entailment, distinct from that given by models of predicate logic.

A type reduction from proof-conditional to dynamic semantics. *Journal of Philosophical Logic*, 30 (2), 121-153, 2001.

Abstract. Dynamic and proof-conditional approaches to discourse (exemplified by Discourse Representation Theory and Type-Theoretical Grammar, respectively) are related through translations and transitions labeled by first-order formulas with anaphoric twists. Type-theoretic contexts are defined relative to a signature and instantiated model-theoretically, subject to change.

Ambiguous discourse in a compositional context: An operational perspective. *Journal of Logic, Language and Information*, 10 (1), 63-86, 2001.

Abstract. The processing of sequences of (English) sentences is analyzed compositionally through transitions that merge sentences, rather than *decomposing* them. Transitions that are in a precise sense inertial are related to disjunctive and non-deterministic approaches to ambiguity. Modal interpretations are investigated, inducing various equivalences on sequences.

A modal logic for non-deterministic discourse processing. *Journal of Logic, Language and Information*, 8 (4), 445-468, 1999. (An earlier version was presented in the *Eleventh Amsterdam Colloquium*, Universiteit van Amsterdam, 1997.)

Abstract. A modal logic for translating a sequence of English sentences to a sequence of logical forms is presented, characterized by Kripke models with points formed from input/output sequences, and valuations determined by entailment relations. Previous approaches based (to one degree or another) on Quantified Dynamic Logic are embeddable within it. Applications to presupposition and ambiguity are described, and decision procedures and axiomatizations supplied.

In conjunction with qualitative probability. *Annals of Pure and Applied Logic*, 92 (3), 217-234, 1998.

Abstract. Numerical probabilities (associated with propositions) are eliminated in favor of qualitative notions, with an eye to isolating what it is about probabilities that is essential to judgments of acceptability. A basic choice point is whether the conjunction of two propositions, each (separately) acceptable, must be deemed acceptable. Concepts of acceptability closed under conjunction are analyzed within Keisler's weak logic for generalized quantifiers — or more specifically, filter quantifiers. In a different direction, the notion of a filter is generalized so as to allow sets with probability non-infinitesimally below 1 to be acceptable.

Ambiguity under changing contexts. *Linguistics and Philosophy*, 20 (6), 575-606, December 1997.

Abstract. Notions of disambiguation supporting a compositional interpretation of ambiguous expressions and reflecting intuitions about how sentences combine in discourse are investigated. Expressions are analyzed both inductively by breaking them apart, and co-inductively by embedding them within larger contexts.

Bisimulations and predicate logic. *Journal of Symbolic Logic*, 59 (3), 924-944, September 1994.

Abstract. Elementary (first-order) and non-elementary (set-theoretic) aspects of the largest bisimulation are considered, with a view towards analyzing operational semantics from the perspective of predicate logic. The notion of a bisimulation is employed in two distinct ways: (i) as an extensional notion of equivalence on programs (or processes) generalizing input/output equivalence (at a cost exceeding Π_1^1 over certain transition predicates computable in *log* space), and (ii) as a tool for analyzing the dependence of transitions on data (which can be shown to be elementary or non-elementary, depending on the formulation of the transitions).

Meager and replete failures of relative completeness, with Daniel Leivant, *Journal of the ACM*, 35 (4), 953-964, October 1988.

Abstract. The nature of programming languages that fail to have a relatively complete proof formalism is discussed. First, it is shown that such failures may be due to the meagerness of the programming language, rather than to the presence of complex control structures as in the cases studied so far. The failure of relative completeness is then derived for two languages with a rich control structure, using simple simulations of general recursive functions by procedure call mechanisms.

Book chapters

Compositionality inductively, co-inductively and contextually. In *The Compositionality of Meaning and Content*, M. Werning, E. Machery, and G. Schurz, eds., Volume 1: Foundational Issues, Ontos Verlag, 2005, pp 87-96.

Are context change potentials functions? In *Context-dependence in the Analysis of Linguistic Meaning*, H. Kamp and B. Partee, eds., Current Research in the Semantics/Pragmatics Interface, Volume 11, Elsevier, 2004, pp 117-136.

Abstract. Answers to the question posed by the title are reconciled under the hypothesis that context change potentials can be defined at various levels, with functionality linked to those levels that can be characterized syntactically (that is, without appealing to the notion of a first-order model). An example is provided by the completeness theorem of first-order logic, under which non-functional (model-theoretic) and functional (syntactic) accounts of an elementary fragment of “dynamic semantics” can be equated. Updates with consistency tests (as analyzed in Veltman’s construct **might**) and presuppositions lead to extensions of that fragment in two directions, involving (respectively) higher-order logic and non-classical reasoning. The question of functional context change potentials is considered in those cases as well, with special attention paid to pragmatic considerations revolving around ambiguity.

Three processes in natural language interpretation. In *Reflections on the Foundations of Mathematics: Essays in Honor of Solomon Feferman*, W. Sieg, R. Sommer and C. Talcott, eds., Association for Symbolic Logic, Lecture Notes in Logic 15, Massachusetts, 2002, pp 208-227.

Abstract. To address complications involving ambiguity, presupposition and implicature, three processes underlying natural language interpretation are isolated: translation, entailment and attunement. A meta-language integrating these processes is outlined, elaborating on a proof-theoretic approach to presupposition.

Towards a many-dimensional modal logic for semantic processing. In *Advances in Modal Logic*, Volume 3, F. Wolter, H. Wansing, M. de Rijke and M. Zakharyashev, eds. World Scientific, Singapore, 2002, pp 139-151.

Abstract. Notions of context for natural language are factored in terms of three processes: translation, entailment and attunement. The processes are linked by accessibility relations of the kind studied in many-dimensional modal logic, modulo complications from constraints between translation and entailment (violations in which may trigger re-attunement) and from refinement and underspecification.

Labeled representations, underspecification and disambiguation, with Nicholas Asher. In *Computing Meaning*, H. Bunt and R. Muskens, eds., Kluwer Academic Press, Dordrecht, 1999, pp 73-94.

Abstract. The effects of discourse on disambiguating (sub)expressions and the problem of computing those effects are treated formally by imposing a labeling structure over discourse representation structures, leading to barebones forms of Segmented and Underspecified Discourse Representation Theory.

A persistent notion of truth in dynamic semantics. In *Logic, Language and Computation*, J. Seligman and D. Westerståhl, eds. CSLI Lecture Notes Number 58, Stanford, 1996, pp 199-219.

Abstract. For a certain interpretation of first-order formulas A as binary input/output relations $[A]$ on a set S of states specifying the transitions induced by A , a notion $|A| \subseteq S$ of truth for A is investigated, arising from a so-called double (intuitionistic) negation translation of the domain of $[A]$ (or of, equivalently, as it turns out, the fixed points of $[A]$). A global, Boolean-valued analysis is presented alongside a local, three-valued non-compositional approximation of it. Complications with existence and identity are exposed and explored, and suitable generic models constructed.

Comparative transition system semantics. In *Computer Science Logic: Selected Papers from CSL '92*, E. Börger et al., eds. Lecture Notes in Computer Science 702, Springer-Verlag, Berlin, 1993, pp 149-166.

Abstract. Employing the notion of a transition system, programs, conceived as binary (transition) relations on states, are related to processes, viewed as dynamic states. The comparative study is carried out syntactically over rules for transitions, and semantically in terms of bisimulation equivalence. A certain form of transitions is studied, and a “logical” approach to the notion of a bisimulation is taken that are somewhat non-standard (but, it is hoped, illuminating). Sequential composition, non-deterministic choice, iteration, and interleaving are analyzed alongside a notion of data. Atomization and synchronization are also considered.

Transition systems and dynamic semantics. In *Logics in AI*, D. Pearce and G. Wagner, eds. Lecture Notes in Computer Science 633 (subseries LNAI), Springer-Verlag, Berlin, 1992, pp 232-251.

Abstract. Transition systems over first-order models, first-order theories, and families of first-order models are constructed and examined in relation to dynamic semantics (more specifically, DPL, DRT and Update logic). Going the other direction, first-order models are extracted from transition systems, bringing full circle the connection between static and dynamic notions. Only states computationally accessible from an initial state (with minimal information content) are considered, motivating the introduction of an internal notion of proposition on which the concept of an update is analyzed.

A primitive recursive set theory and AFA: on the logical complexity of the largest bisimulation, in *Computer Science Logic '91*, E. Börger et al., eds. Lecture Notes in Computer Science 626, Springer-Verlag, Berlin, 1992, pp 96-110.

Abstract. A subsystem of Kripke-Platek set theory proof-theoretically equivalent to primitive recursive arithmetic is isolated; Aczel’s (relative) consistency argument for the Anti-Foundation Axiom is adapted to a (related) weak setting; and the logical complexity of the largest bisimulation is investigated.

On the logic of situation theory. In *Situation theory and its applications*, R. Cooper et al., eds. CSLI Lecture Notes Number 22, Stanford 1990, pp 97-116.

Conference proceedings (refereed)

Finite-state temporal projection. In *Proceedings, 11th International Conference on Implementation and Application of Automata* (Oscar Ibarra and Hsu-Chun Yen, eds.), LNCS 4094, 2006, pp 230-241.

Abstract. Finite-state methods are applied to determine the consequences of events, represented as strings of sets of fluents. Developed to flesh out events used in natural language semantics, the approach supports reasoning about action in AI, including the frame problem and inertia. Representational and inferential aspects of the approach are explored, centering on conciseness of language, context update and constraint application with bias.

Situations as strings. In *Proceedings, 13th Workshop on Logic, Language, Information and Computation*, Electronic Notes in Theoretical Computer Science Volume 165 , 22 November 2006, pp 23-36

Abstract. Situations serving as worlds as well as events in linguistic semantics are formulated as strings recording observations over discrete time. This formulation is applied to Priorean tense logic, in line with L. Schubert’s distinction between described and characterized situations. The distinction is developed topologically and computationally, and linked to the opposition between truth-conditional and proof-conditional semantics. For a finitary handle on quantification, the conception of situations-as-strings is extended from observation to derivation.

Comic relief for anankastic conditionals. In *Proceedings, Fifteenth Amsterdam Colloquium*, Universiteit van Amsterdam, 2005, pp 71-76.

Abstract. Anankastic conditionals are analyzed in terms of events conceived as sequences of snapshots – roughly, comics. Quantification is applied not to worlds (sets of which are customarily identified with propositions) but to strings that record observations of actions. The account generalizes to other types of conditionals, sidestepping certain well-known problems that beset possible worlds treatments, such as logical omniscience and irrelevance. A refinement for anankastic conditionals is considered, incorporating action relations.

Events from temporal logic to regular languages with branching. In *Proceedings, 10th conference on Formal Grammar and 9th Meeting on Mathematics of Language (FG-MoL 2005)*, Edinburgh, 2005 pp 27–38

Abstract. Events in natural language semantics, conceived as strings of observations, are extracted from formulas of linear temporal logic, and collected in regular languages. Infinite strings of sets of atomic formulas (fully specifying truth) are truncated and partialized, in line with the bounded temporal extent and descriptive content of events. Branching from that line, counterfactual events are analyzed as b(ranching)-strings accepted by finite b-automata. These structures are compared and contrasted to those of Computational Tree Logic.

Entailments in finite-state temporality, with Rowan Nairn. In *Proceedings, Sixth International Workshop on Computational Semantics (IWCS 6)*, Tilburg University, 2005, pp 128–138.

Inertia in temporal modification. In *Proceedings, Fourteenth Semantic and Linguistic Theory conference (SALT XIV)*, Northwestern/Cornell University, 2004, pp 56–73.

Causation and inertia over strings. In *Proceedings, Fourteenth Amsterdam Colloquium*, Universiteit van Amsterdam, 2003, pp 111–116.

Abstract. Notions of causation and inertia in lexical and temporal semantics are studied relative to a conception of events as strings of observations (e.g. movies). Causation is defined in a temporalized forcing framework, with worlds constructed from generic sets against an inertial background of superposed strings.

Reichenbach’s E, R and S in a finite-state setting. In *Proceedings, Sinn und Bedeutung 2003 (SuB VIII)*, Frankfurt University, 29 September - 1 October 2003.

Abstract. Reichenbach’s event, reference and speech times are interpreted semantically by stringing and superposing sets of temporal formulae, structured within regular languages. Notions of continuation branches and of inertia, bound (in a precise sense) by reference time, are developed and applied to the progressive and the perfect.

Finite-state descriptions for temporal semantics. In *Proceedings, Fifth International Workshop on Computational Semantics (IWCS-5)*, Tilburg University, January 2003, pp 122-136.

Abstract. Finite-state descriptions for temporal semantics are outlined that distinguish “soft” inferences, reflecting manners of conceptualization, from more robust semantic entailments defined over models. Precisely how descriptions are grounded in models explains, upon examination, why some inferences are soft.

Between events and worlds under historical necessity. In *Proceedings, Seventh Symposium on Logic and Language (Pecs, Hungary)*, August 2002, pp 27-36.

Abstract. Events and worlds under historical necessity are re-analyzed as *schedules* of eventuality-types. The perfect and non-root modals in Condoravdi 2002 are reformulated, reproducing over schedules the backward time shift in the perfect and the forward time expansion in modals.

A finite-state approach to event semantics. In *Proceedings, Ninth International Symposium on Temporal Representation and Reasoning (TIME-02, Manchester)*, IEEE Computer Society Press, 2002, pp 124-131.

Abstract. Events employed in natural language semantics are characterized in terms of regular languages, each string in which can be regarded as a motion picture. The relevant finite automata then amount to movie cameras/projectors, or more formally, to finite Kripke structures with partial valuations. The usual regular constructs (concatenation, choice, etc) are supplemented with superposition of strings/automata/languages, realized model-theoretically as conjunction.

Conservative generalized quantifiers and presupposition. In *Proceedings, Eleventh Semantic and Linguistic Theory conference (SALT XI)*, New York/Cornell University, 2001, pp 172-191.

Abstract. Conservativity in generalized quantifiers is linked to presupposition filtering, under a *propositions-as-types* analysis extended with *dependent quantifiers*. That analysis is underpinned by model-theoretically interpretable proofs which inhabit propositions they prove, thereby providing objects for quantification and hooks for anaphora.

Non-monotonicity from constructing semantic representations. In *Proceedings, Twelfth Amsterdam Colloquium*, Universiteit van Amsterdam, 1999, pp 7-12.

Abstract. A standard approach to non-monotonicity locates the phenomenon in preferences between models, against which certain well-formed formulas or semantic representations (SRs) are interpreted. Such an approach assumes a construction of suitable SRs for natural language discourse — arguably the main challenge from the perspective of formal linguistics (computational or otherwise). The present work focusses on this assumption, tracing complications of presupposition and ambiguity to it. A family of modal logics is outlined, under which non-monotonicity can be analyzed as the failure of a sentence-by-sentence translation of a sequence of natural language sentences to persist; that is, the SR associated with a sentence may, in light of further natural language input, need to be revised. This revision may involve adjustments to background assumptions, implicated in presupposition accommodation.

Ambiguous propositions typed. In *Proceedings, Ninth Conference of the European Chapter of the Association for Computational Linguistics '99*, Bergen, 1999, pp 86-93.

Abstract. Ambiguous propositions are analyzed in a type system where disambiguation is effected during assembly (i.e. by coercion). Ambiguity is introduced through a layer of types that are underspecified relative to a pre-existing collection of dependent types, construed as unambiguous propositions. A simple system of reasoning directly with such underspecification is described, and shown to be sound and complete for the full range of disambiguations. Beyond erasing types, the system supports constraints on disambiguations, including co-variation.

Expecting Many, with Hans Kamp. In *Proceedings, Sixth Semantic and Linguistic Theory conference (SALT VI)*, New Brunswick, New Jersey, April 1996, pp 53-68.

Abstract. The determiner *many* is analyzed relative to a notion of expectation that is introduced into contexts employed in the theory of generalized quantifiers. Issues concerning intensionality, vagueness, ambiguity and context change are considered along the way.

Non-monotonic consequences of preferential contextual disambiguation. In *Proceedings, Tenth Amsterdam Colloquium*, Universiteit van Amsterdam, 1995.

Abstract. A system of “preferential contextual disambiguation” is related to rules for non-monotonic consequence relations \vdash . On the one hand, the system provides a representation of \vdash based on an ambiguous expression of the background conditions underlying the entailment. On the other hand, rules for \vdash suggest requirements on disambiguations and on preferences between them.

Generalized quantifiers as second-order programs — “dynamically” speaking, naturally. In *Proceedings, Ninth Amsterdam Colloquium*, Universiteit van Amsterdam, 1993.

Abstract. Generalized quantifiers (understood as functions Q mapping a set M to a binary relation Q_M on $\text{Power}(M)$) are analyzed within the so-called “dynamic” approach to natural language semantics. Under that approach, the meaning of a formula is taken to be the set of input/output transitions it induces, according to a particular translation into programs from some formalism, such as that of (quantified) dynamic logic. The concrete problem addressed here is that variables bound by generalized quantifiers must introduce discourse markers for pronouns (that are typically plural). The solution adopted builds heavily on the “duality” between non-determinism and parallelism by interpreting programs as binary relations on non-empty subsets of states from dynamic logic, thereby accommodating the conjunctive branching in *and-or* computation graphs (which can then be weakened relative to a generalized quantifier). (The distinction between definite and indefinite noun phrases is linked to that between deterministic and non-deterministic programs.) The underlying notion of computation is argued to require a global (as opposed to a local) interpretation, complementing the uniformity in a generalized quantifier. The subsets of interest are hypothesized to have a “determinate” character (i.e., to be first-order definable), in accordance with so-called E-type pronouns. An alternative “indeterminate” reading is also formulated within the framework, as are readings that are weak or strong, and distributive or collective.

The donkey strikes back: extending the dynamic interpretation “constructively.” In *Proceedings, Sixth Conference of the European Chapter of the Association for Computational Linguistics '93*, Utrecht, 1993.

Abstract. The dynamic interpretation of a formula as a binary relation (inducing transitions) on states is extended by alternative treatments of implication, universal quantification, negation and disjunction that are more “dynamic” (in a precise sense) than the usual reductions to tests from quantified dynamic logic (which, nonetheless, can be recovered from the new connectives). An analysis of the “donkey” sentence followed by the assertion “It will kick back” is provided.

Provably recursive programs and program extraction. In *Proceedings, ICALP '91*, J. Leach Albert et al., eds. Lecture Notes in Computer Science 510, Springer-Verlag, Berlin, 1991, pp 303-313.

Abstract. There is clearly more to a program than the function it computes. Nevertheless, the relationship between notions of computation and deduction is commonly made precise over a formal theory by isolating that theory’s class of *provably recursive functions* — i.e., the recursive functions the theory proves total. Replacing the “function” in “provably recursive function” by “program”, the present paper investigates the notion of a *provably recursive program*, uncovering certain holes and complexities that the concept of a provably recursive function abstracts away.

On substitutional recursion over non-well-founded sets, in *Fourth Annual Symposium on Logic in Computer Science*, IEEE, Computer Science Press, Washington D.C., 1989.

Technical reports and workshop proceedings

Compositionality and Context. Two and a half 90-minute lectures. Thirteenth European Summer School in Logic, Language and Information (ESSLLI '01), University of Helsinki. August 2001.

Between proofs and models: presuppositions. Inference in Computational Semantics (ICoS-2), Dagstuhl, Germany. July 2000.

Abstract. The opposition between proofs and models is investigated in analyses of presuppositions within type-theoretic and dynamic semantics. Three levels of representations are isolated, bringing out a role for translations over and beyond entailments, be they conceived proof-theoretically or model-theoretically.

Relating two theories of meaning relations. Workshop on Theoretical Bases for Semantics and Pragmatics in NLP, in conjunction with the TALN'99 conference on Natural Language Processing, Institut d'Etudes Scientifiques de Cargese (Corsica), 12-16 July 1999.

Abstract. Constraints between utterances and described situations central to the *situation-theoretic* conception of meaning are expressed in a modal framework that factors in context changes at the heart of *dynamic semantics*. Three inter-related but distinct processes shaping meaning are brought out in the framework: translation, entailment and anchoring. Applications of intuitionistic type theory are discussed briefly.

A logical connective for ambiguity requiring disambiguation. In *Ellipsis, Underspecification, Events and More in Dynamic Semantics*, J. Groenendijk, ed. Dyana deliverable R2.2.B. September 1995.

Computational foundations for dynamic accounts of presuppositions. Workshop on Computational Logic for Natural Language Processing (Edinburgh), April 1995.

What is a DRS? In *Integrating Semantic Theories II*, R. Cooper and J. Groenendijk, eds. Dyana deliverable R2.1.B, September 1994. Also in the proceedings of a workshop on Computational Semantics (Tilburg, The Netherlands), December 1994.

Abstract. Discourse representation structures (DRSs) are characterized by the transitions they induce on states. Just as first-order logic can be presented either model-theoretically or proof-theoretically, DRS transitions can be described in either semantic or syntactic terms. A semantic conception of states formed from first-order models and variable assignments (or so-called embeddings) is related (through a determinization of the transitions and the notion of a bisimulation) to a syntactic conception of states given by the DRSs themselves.

On the computational significance of consistency: from ordinary to generalized recursion theory. Meeting on Proof Theory, Provability Logic and Computation (Berne) March 1994.

Abstract. The logical character of a transition-based notion of computation is explored in relation to Turing's ordinal logics and certain subsequent developments. The addition of Π_1^0 -statements of consistency in ordinal logics is portrayed as an attempt to extract fast programs computing a theory's provably recursive functions, and is noted to require (for the attempt to succeed) ordinal notations coding computations extraneous to the ordinal named. This motivates a richer semantic conception of computation based on transitions that include input/output transitions as special cases. In this regard, the equivalence underlying the construction of the next admissible set from trees is linked with the notion of a bisimulation, subsuming both input/output equivalence of programs and equivalence between ordinal notations naming the same ordinals. Complications introduced by non-well-foundedness (reflecting, for instance, non-termination of computational systems) are investigated, including $\Sigma_1^1 - \Pi_1^1$ quotients of r.e. transition predicates. Π_1^1 -paths through the Church-Kleene system \mathcal{O} of ordinal notations are employed to analyze this leap from syntactic Π_1^0 -consistency statements to a semantic Σ_1^1 notion of a computational process.

A higher-order extension of constraint programming in discourse analysis. Principles and Practice of Constraint Programming (PPCP'93), Newport, Rhode Island, 1993.

Operational semantics, bisimulations and logical complexity. Technical Report CS-R9355, Centrum voor Wiskunde en Informatica, Amsterdam, August 1993.

Recent invited lectures

Representing events and situations as strings. Philosophy of Language and Linguistics Workshop, University College Dublin, 14 December 2006.

Situations from events to proofs. Kyoto University, 14-16 August 2006.

Compositionality from above, below and sideways. Frankfurt University, 16 December 2005.

"The proper treatment of events" in comics with branching. Frankfurt University, 13 December 2005.

Propositions-as-types and regular languages for natural language semantics. Joint NLIP and L&S Seminar, Computer Laboratory, Cambridge University, 22 March 2005.

What is an inertia world? Language under uncertainty, Kyoto University, 21-23 January 2005.

Compositionality inductively, co-inductively and contextually. New Aspects of Compositionality. Paris, 18 June 2004.

Forces versus worlds and propositions. Gothenburg University, 16 April 2004.

Types and events in natural language semantics. Semantics, Pragmatics and Rhetoric (SPR-03), Donostia/San Sebastian (Spain), 6-8 November 2003.

Instantiating event-types and branching time, King's College, London, 13 December 2002.

Finite-state descriptions for event semantics, King's College, London, 12 December 2002.

Events drawn from types and situations. University of Amsterdam, 22 March 2002.

Events from situations to constructions. Semantics, Pragmatics and Rhetoric (SPR-01), Donostia/San Sebastian (Spain), 22-24 November 2001.

Situations and Alternatives. Dublin City University, 20 May 2001.

Objects and proofs: DRT, TTG and GQs. Southeast semantics meeting, London, 3 November 2000.

Towards a logical framework for discourse. Gothenburg University, 5 April 2000.

Relating two theories of meaning relations. Gothenburg University, 4 April 2000.

Three processes in discourse interpretation. King's College, London, 13 March 2000.

Teaching experience

- Aug 2005 *Natural Language Semantic Representations as Types*
17th European Summer School in Logic, Language and Information (ESSLLI '05), Edinburgh
- June 2004 North American Summer School in Logic, Language and Information (3rd NASSLLI), UCLA
- Aug 2001 *Compositionality and Context* (co-taught)
Thirteenth European Summer School in Logic, Language and Information (ESSLLI '01)
University of Helsinki
- Fall 1999 *Artificial Intelligence* (third and fourth year undergraduate computer science and
– present computational linguistics) Trinity College Dublin
- Fall 1998 *Logic, sets and functions* (undergraduate course, required of computer science majors)
– Spring 1999 University of Texas
- Spring 1998 *Introduction to Linguistic Analysis* (undergraduate course on Syntactic Theory)
Seminar on propositional attitudes and dynamic semantics (co-taught)
Carnegie Mellon University
- Fall 1997 *Language and Thought* (undergraduate course in the Philosophy Department)
Formal Semantics (graduate course in the Language Technologies Institute)
Carnegie Mellon University
- August *Logical Aspects of the Semantics-Pragmatics Interface* (co-taught)
1997 Ninth European Summer School in Logic, Language and Information (ESSLLI '97)
- January-May *Logic, sets and functions* (undergraduate course)
1996 University of Texas
- April-June *Transition systems and logic* (Logic Seminar)
1994 Universität Stuttgart
- May-June *Dynamic semantics and discourse representation* (co-taught)
1993 Utrecht University
- Fall 1989 Graduate course on Model Theory (Mathematics 290A/Philosophy 390A)
Stanford University

References available upon request.