

Logic and Algorithms in Computational Linguistics 2017 (LACompLing2017) Stockholm, August 16–19, 2017

Program

Day 1: Wednesday, 16 Aug, 2017

09:00-09:20 Registration

09:20-09:30 Opening

Chair: Roussanka Loukanova

09:30-10:30 Lars Hellan (Norwegian University of Science and Technology) Keynote Speaker

Large Scale ‘Deep’ Grammars — a success, and a long way to go (abstract)

10:30-10:50 Coffee Break

Chair: Joakim Nivre

10:50-11:50 Peter Pagin (Stockholm University) Invited Speaker

Switcher Semantics and Belief Sentences (abstract)

11:50-12:10 Maria Skeppstedt, Kostiantyn Kucher, Carita Paradis and Andreas Kerren, (Linnaeus University, Lund University)

Language Processing Components of the StaViCTA Project (abstract)

12:10-13:40 Lunch

Chair: Robin Cooper

13:40-14:40 Henriëtte de Swart (Utrecht University) Keynote Speaker

Time in Translation (abstract)

14:40-15:40 Joakim Nivre (Uppsala University) Invited Speaker

The Logic of Universal Dependencies (abstract)

15:40-16:00 Coffee Break

Chair: Lucas Champollion

16:00-17:00 Fredrik Engström (University of Gothenburg) Invited Speaker

Generalized Quantifiers and Team Semantics (abstract)

17:00-17:20 Justyna Grudzinska and Marek Zawadowski (University of Warsaw)

Relational Nouns, Inverse Linking and Haddock Descriptions: a unified dependent type account (abstract)

17:20-17:50 Stefan Evert, Philipp Heinrich, Klaus Henselmann, Ulrich Rabenstein, Elisabeth Scherr and Lutz Schröder (FAU Erlangen-Nürnberg)

Combining Machine Learning and Semantic Features in the Classification of Corporate Disclosures (abstract)

Day2: Thursday, 17 Aug, 2017

Chair: Lars Hellan

09:00-10:00 Ann Copestake (University of Cambridge) Keynote Speaker
Logical Forms in Broad-coverage Grammar Development ([abstract](#))

10:00-10:20 Coffee Break

10:20-11:10 Gleb Lobanov and Krasimir Angelov (Immanuel Kant Baltic Federal University, Chalmers University of Technology and University of Gothenburg)
Planning for Natural Language Generation in GF ([abstract](#))

11:10-12:10 Sam Sanders (Ludwig-Maximilians-University Munich) Invited Speaker
A Computable Solution to Partee's Temperature Puzzle (jww Kristina Liefke) ([abstract](#))

12:10-13:40 Lunch

Chair: Henriëtte de Swart

13:40-14:40 Valia Kordoni (Humboldt University Berlin) Keynote Speaker
Multiword Expressions and Collocations ([abstract](#))

14:40-15:40 Richard Moot (CNRS, France) Invited Speaker
First-order Linear Logic for Natural Language Analysis ([abstract](#))

15:40-16:00 Coffee Break

Chair: Wojciech Buszkowski

16:00-17:00 Rainer Osswald (Heinrich-Heine-Universität Düsseldorf) Invited Speaker
Frame-Semantic Composition at the Syntax-Semantics Interface ([abstract](#))

17:00-18:00 Nikola Kompa (Osnabrück University) Invited Speaker
Language Evolution: Gricean Intentions Meet Lewisian Conventions

Day3: Friday, 18 Aug, 2017

Chair: Peter Pagin

09:00-10:00 Chris Barker (New York University) Keynote Speaker
Parsing Sluicing ([abstract](#))

10:00-10:20 Coffee Break

10:20-11:20 Glyn Morrill (Universitat Politècnica de Catalunya) Invited Speaker
Parsing Logical Grammar: CatLog3 ([abstract](#))

11:20-11:40 Gijs Wijnholds and Mehrnoosh Sadrzadeh (Queen Mary University of London)
Vector Semantics for Lambek Calculus with Contraction ([abstract](#))

11:40-12:10 Yukiko Yana, Daisuke Bekki and Koji Mineshima (Ochanomizu University and CREST, Japan Science and Technology Agency)
Variable Handling in DRT and DTS ([abstract](#))

12:10-13:30 Lunch

Chair: Richard Moot

13:30-14:30 Wojciech Buszkowski (Adam Mickiewicz University) Keynote Speaker
On Involution Nonassociative Lambek Calculus ([abstract](#))

14:30-15:30 Markus Werning (Ruhr University Bochum) Invited Speaker
Compositionality in a World Without Synonyms — Existence and Uniqueness of a Similarity-based Semantics ([abstract](#))

15:30-15:50 Coffee Break

Chair: Nikola Kompa

15:50-16:50 Louise McNally (Universitat Pompeu Fabra) Invited Speaker
On the Relation between Descriptive Content and Reference and its Implications for Computational Modeling ([abstract](#))

16:50-17:50 Mila Vulchanova (Norwegian University of Science and Technology) Invited Speaker
Figurative Language Processing: a bottleneck in developmental deficits and NLP ([abstract](#))

Day4: Saturday, 19 Aug, 2017

Chair: Chris Barker

9:30-10:30 Robin Cooper (University of Gothenburg) Keynote Speaker
Neural TTR (Type Theory with Records) ([abstract](#))

10:30-10:50 Coffee Break

10:50-11:50 Staffan Larsson (University of Gothenburg) Invited Speaker
Modeling Intentions as Classifiers ([abstract](#))

12:00-13:30 Lunch

Chair: Ann Copestake

13:30-14:30 Gerald Penn (University of Toronto) Invited Speaker
What Does it Mean to Parse with Categorical Grammar? ([abstract](#))

14:30-15:30 Gintare Grigonyte (Stockholm University) Invited Speaker
Hybrid Way. Experience from organising domain language into knowledge bases, language acquisition and language evolution ([abstract](#))

15:30-15:50 Coffee Break

Chair: Glyn Morrill

15:50-16:50 Lucas Champollion (New York University) Invited Speaker
Two Switches in the Theory of Counterfactuals: a study of truth conditionality and minimal change (jww Ivano Ciardelli and Linmin Zhang) ([abstract](#))

16:50-17:50 Roussanka Loukanova (Stockholm University) Invited Speaker
Type Theory of Situated Algorithms and Information ([abstract](#))

Abstracts and Short Biographies

Chris Barker New York University, New York, USA

Keynote Speaker

Parsing Sluicing

Abstract: Sluicing — common in English and cross-linguistically — involves anaphora to an incomplete constituent. For example, in "John called someone yesterday, but I don't know who @", the silent anaphoric element @ is interpreted as [John called __ yesterday], a constituent from which the indefinite "someone" has been scoped out (abstracted). I present a concrete substructural logic for sluicing that clarifies why parsing sluicing is more computationally costly than required by scope and anaphora alone.

Short Biography: Chris Barker has degrees in English literature, computer science, and theoretical linguistics. Since his 1991 PhD at the University of California Santa Cruz, he has worked on possessives, vagueness, and scope. In 2014 he published an OUP monograph with Chung-chieh Shan, "Continuations in Natural Language". Recent research topics include concealed questions, and negative polarity. He is Professor of Linguistics at New York University, where he serves as Vice Dean for the College of Arts and Science.

Wojciech Buszkowski Adam Mickiewicz University, Poland

Keynote Speaker

On Involutive Nonassociative Lambek Calculus

Abstract: Noncommutative Linear Logic is widely recognized as a logic closely related to type logics of categorial grammars, usually different versions of the Lambek calculus (Moot and Retore 2012, Casadio and Lambek 2002, Morrill 1995). Here we study a non-commutative and nonassociative linear logic, admitting two negations but no multiplicative constants. This logic is called Involutive Nonassociative Lambek Calculus (InNL), which follows the terminology in substructural logics. We focus on phase spaces for InNL and their applications, e.g. in a proof of cut elimination and P-TIME complexity. We also show that the languages generated by InNL-grammars are context-free.

Short Biography: Wojciech Buszkowski is Full Professor at the Faculty of Mathematics and Computer Science, Adam Mickiewicz University. He holds degree Dr. hab. in Mathematics (1988). In brief, his professional activities are represented as follows. Specialities: Mathematical Logic, Mathematical Linguistics, Computation Theory Research topics: Type grammars, Lambek calculi, Substructural logics, Learning algorithms, Knowledge representation, Modal logics, Tree automata Committees: a member of Editorial Board in *Studia Logica*, *J. of Applied Logic*, *Logic J. of IGPL*, *Studies in Logic*; a member of PC of several editions of *LACL*, *MoL*, *FG*. Associations: The Polish Association of Logic and Philosophy of Science (President 1993-1996); FoLLI (a member of The Committee of E.W. Beth Dissertation Award (2008-2016, chair 2010-2013)

Lucas Champollion New York University, USA

Invited Speaker

Two Switches in the Theory of Counterfactuals: a study of truth conditionality and minimal change (joint work with Ivano Ciardelli and Linmin Zhang)

Abstract: Based on a crowdsourced truth-value judgment experiment, we provide empirical evidence challenging two classical views in semantics, and we develop a novel account of counterfactuals that combines ideas from inquisitive semantics and causal reasoning. First, we show that two truth-conditionally equivalent clauses can make different semantic contributions when embedded in a counterfactual antecedent. Assuming compositionality, this means that the meaning of these clauses is not fully determined by their truth conditions.

This finding has a clear explanation in inquisitive semantics: truth-conditionally equivalent clauses may be associated with different propositional alternatives, each of which counts as a separate counterfactual assumption. Second, we show that our results contradict the common idea that the interpretation of a counterfactual involves minimizing change with respect to the actual state of affairs. Building on techniques from causal reasoning, we propose to replace the idea of minimal change by a distinction between foreground and background for a given counterfactual assumption: the background is held fixed in the counterfactual situation, while the foreground can be varied without any minimality constraint. (Joint work with Ivano Ciardelli and Linmin Zhang)

Short biography: Lucas Champollion is Assistant Professor of Linguistics at New York University. He holds a Ph.D. in Linguistics (2010) and a M.Sc. in Computer and Information Science (2007), both from the University of Pennsylvania. Before joining New York University in 2012, he worked as a postdoctoral researcher at the Eberhard Karls Universität Tübingen in Germany. His work has appeared in journals such as *Theoretical Linguistics*, *Linguistics and Philosophy*, the *Journal of Semantics*, as well as *Semantics and Pragmatics*.

Robin Cooper University of Gothenburg, Sweden

Keynote Speaker

Neural TTR

Abstract: One of the claims of TTR (Type Theory with Records) is that it can be used to model types learned by agents in order to classify objects and events in the world, including speech events. That is, the types can be represented by patterns of neural activation in the brain. Of course, this claim would be empty if it turns out that the types are in principle impossible to represent on a finite network of neurons. In this talk we will discuss how to represent types in terms of neural events on a network and present a preliminary implementation that maps types to events on a network. The kind of networks we will use are closely related to the transparent neural networks (TNN) discussed by Strannegård. In particular we will discuss:

1. the binding problem – making sure one can distinguish between the type of events where a hugs b, $\text{hug}(a,b)$, and the type of events where b hugs a, $\text{hug}(b,a)$).
2. the recursion problem – making sure that one can allow for types to be embedded within types to an arbitrary depth: $\text{believe}(c, \text{hug}(a,b))$, $\text{know}(d, \text{believe}(c, \text{hug}(a,b)))$ and so on.
3. dealing with quantification – our solution involves generalized quantifiers rather than quantifiers from first-order logic.
4. memory – if a type corresponds to an event on a neural system, rather than an architectural feature of the neural system, as seems necessary to handle 1-3, what can it mean to have a memory that some object/event is of a type? Our proposed solution uses an idea from TNN where a single neuron can, when activated, trigger an occurrence of the neural event corresponding to a type judgement.

The discussion will be based on a preliminary Python implementation using the Python implementation of TTR (`pyttr`).

Short Biography: Robin Cooper is Senior Professor at the University of Gothenburg, where he was previously Professor of Computational Linguistics. He is currently conducting research within the Centre for Linguistic Theory and Studies in Probability (CLASP) at Gothenburg. He has an undergraduate degree from the University of Cambridge and a PhD in Linguistics from the University of Massachusetts at Amherst. He has taught previously at the following universities: Universität Freiburg, University of Texas at Austin, University of Massachusetts at Amherst, University of Wisconsin at Madison, Stanford University, Lund

University and Edinburgh University. He has held a Mellon Postdoctoral Fellowship and a Guggenheim Fellowship and has been a fellow at the Centre for Advanced Study in the Behavioral Sciences at Stanford. He is a Fellow of the British Academy and the Royal Society of Arts and Sciences in Gothenburg and a member of Academia Europaea. He holds an honorary doctorate from Uppsala. His main research interests are semantics (both theoretical and computational), dialogue semantics and computational dialogue systems. Currently he is working on a type theoretical approach to language and cognition.

Ann Copestake University of Cambridge, UK

Keynote Speaker

Logical Forms in Broad-coverage Grammar Development

Abstract: I will outline some of the work on compositional semantics with large-scale computational grammars and in particular work using Minimal Recursion Semantics (MRS) in DELPH-IN. There are grammar fragments for which MRS can be converted into a logical form with a model-theoretic interpretation but I will argue that attempting to use model theory to justify the MRS structures in general is inconsistent with the goals of grammar engineering. I will outline some alternative approaches to integrating distributional semantics with this framework and show that this also causes theoretical difficulties. In both cases, we could consider inferentialism as an alternative theoretical grounding whereby classical logical properties are treated as secondary rather than primary. In this view, it is important that our approaches to compositional and lexical semantics are consistent with uses of language in logical reasoning, but it is not necessary to try and reduce all aspects of semantics to logic.

Short Biography: Ann Copestake started doing research in Computational Linguistics at the University of Cambridge in 1985. From 1994 to 2000 she worked at CSLI, Stanford, where she became part of the LinGO project, building broad-coverage grammars using HPSG. She returned to Cambridge in 2000 and is now a Professor there.

Henriëtte de Swart Utrecht Institute of Linguistics OTS - Language, logic and information, The Netherlands

Keynote Speaker

Time in Translation

Abstract: Linguists and philosophers have long been interested in ways languages refer to time. With today's large corpora, computational linguists have started to apply these insights to improve automatic translation programmes, but that proves to be quite a challenge. Purely statistical approaches are insufficient: languages like English, Dutch, German, French and Spanish all have past (e.g. broke), present (breaks) and perfect (has broken) verb forms in their grammar, but they don't use them under the same (sentential/discourse) conditions. The perfect is the bottleneck: has broken reports on a past event of breaking that has current relevance, so it shares features of the past as well as the present tense.

We hypothesize that the use of the perfect in a particular language depends on how the grammar distributes past and present meanings over the various verb forms. Accordingly, we do not study the perfect in isolation, but focus on its competition with past and present. Instead of avoiding the cross-linguistic variation, we embrace it to unveil the meaning of the perfect through parallel corpus research (Europarl, Open Subtitles, literary translations).

Translation equivalents provide us with form variation across languages in contexts where the meaning is stable. Our method of Translation Mining extracts verb forms from one language and aligns them with verb forms in other languages. Language specific tense annotations constitute the input to a dissimilarity matrix, so we can use multidimensional

scaling to draw temporal maps. A user-friendly interface that connects the maps to the underlying data reveals how tense choice is sensitive to lexical semantics, compositional semantics, discourse and pragmatics. The talk will present early results that show how our data challenge established ideas in linguistic theory and generate new hypotheses.

In this way computational techniques enable us to ground linguistic theory in a usage-based approach. Beyond temporal reference, the investigation of meaning in translation provides a new methodology for cross-linguistic semantic research.

Short Biography: After she obtained her PhD at Groningen University in 1991, Henriette de Swart taught at Groningen University and Stanford University until she became a full professor in French linguistics and semantics at Utrecht University. Her research focuses on cross-linguistic variation in meaning. She published journal articles and books/book chapters on tense and aspect, negation, bare nominals and indefinites, as well as an introductory textbook in semantics. She also investigated the role of semantics in language evolution, and was closely involved in the development of bidirectional optimality theory. She teaches courses in the bachelor programme French language and culture, the bachelor programme Artificial Intelligence, and the research master Linguistics. She has been director of the national graduate school in linguistics (LOT) and the director of the Utrecht Institute of Linguistics (LOT). Since 2013, she is a member of the Royal Netherlands Academy of Sciences (KNAW).

Fredrik Engström University of Gothenburg, Sweden

Invited Speaker

Generalized Quantifiers and team Semantics

Abstract: Dependence logic is an elegant way of introducing dependencies between variables into the object language. Generalized quantifiers can be introduced in this setting, but a satisfying account can only be given for monotone increasing generalized quantifiers. In this talk I will build a new logic on the same framework as dependence logic, team semantics, that allows handling of any generalized quantifier in a natural way. I will show how to interpret Dependence logic into the logic and give a characterization of its logical strength.

Short Biography: Fredrik Engström is a researcher of logic at the Department of Philosophy, Linguistics and Theory of science of the University of Gothenburg. He did his PhD in Mathematics at the University of Birmingham and Chalmers University of Technology in 2004 with a thesis on mathematical logic and models of Peano's arithmetic, under supervision of Richard W. Kaye. After which he worked as an associate professor at the Mid Sweden University in Sundsvall before starting at the University of Gothenburg in 2006. His research is now mainly focused on Dependence logic and the framework of team semantics that underlies the development of logics that are able to express dependences between variables.

Stefan Evert, Philipp Heinrich, Klaus Henselmann, Ulrich Rabenstein, Elisabeth Scherr, and Lutz Schröder FAU Erlangen-Nürnberg

Combining Machine Learning and Semantic Features in the Classification of Corporate Disclosures

Abstract: We investigate an approach of improving statistical text classification by combining machine learners with an ontology-based identification of domain-specific topic categories. We apply this approach to ad hoc disclosures by public companies. This form of obligatory publicity concerns all information that might affect the stock price; relevant topic categories are governed by stringent regulations. Our goal is to classify disclosures according

to their effect on stock prices (negative, neutral, positive). In the feasibility study reported here, we combine natural language parsing with a formal background ontology to recognize disclosures concerning a particular topic, viz. retirement of key personnel. The semantic analysis identifies such disclosures with high precision and recall. We then demonstrate that machine learners benefit from the additional ontology-based information in different prediction tasks.

Gintare Grigonyte Stockholm University, Sweden

Invited Speaker

Hybrid Way. Experience from organising domain language into knowledge bases, language acquisition and language evolution

Abstract: The unifying perspective of this talk is hybridisation between corpus linguistics and computational linguistics. The first facet of the talk discerns how corpus linguistics' methods can be wielded for making the knowledge in raw text accessible; and organizing it for specific domains like computer science or medicine in terms of terminology extraction and tracking language change. The second facet of the talk is about how methods from computational linguistics can extend corpus linguistics research in areas like first and second language acquisition.

Short Biography: Gintare Grigonyte is a researcher at the Department of Linguistics, Stockholm University. Her research aims at providing insight into the nature and structure of natural human language by applying computational techniques. Her research up to date has focused on several topics: automatic extraction of domain terminologies and semantic relationships, multilingual lexicography through information retrieval, biomedical NLP and language evolution, and NLP for first and second language acquisition.

Justyna Grudzińska and Marek Zawadowski University of Warsaw, Poland

Relational Nouns, Inverse Linking and Haddock Descriptions: a unified dependent type account

Abstract: In this talk, we argue for a unified dependent type analysis of two puzzling phenomena: inverse linking and Haddock descriptions. Inverse linking constructions (ILCs) refer to the syntactic environments in which the embedded quantifier phrase (QP) takes scope over the embedding one. For example, sentence (1) *A representative of every country missed a meeting* can be understood to mean that a different representative of each country missed a potentially different meeting in each case, i.e., it allows a reading in which *every country* outscopes *a representative*. This poses a puzzle for standard scope-assignment strategies, for there is independent evidence that scoping out of DP islands should be disallowed. For example, sentence (2) *Two politicians spy on someone from every city* cannot be understood to mean that for every city c , there are two politicians who spy on someone from c , i.e., it does not have a reading in which *two politicians* takes scope in between the two nested QPs. The second phenomenon to be discussed in our talk relates to the so-called Haddock descriptions. Haddock (relative) descriptions, e.g. *the rabbit in the hat*, pose a difficulty for standard presuppositional accounts of definite descriptions, for they carry a kind of 'polyadic presupposition' that there is a single pair $\langle x, y \rangle$ such that x is a hat, y is a rabbit, and y is in x , rather than the standard presuppositions that there be a unique rabbit and a unique hat. Thus *the rabbit in the hat* can be used felicitously in the context with multiple salient hats and multiple salient rabbits, as long as there is exactly one pair of a rabbit and a hat such that the rabbit is in the hat.

Lars Hellan Norwegian University of Science and Technology, Norway

Keynote Speaker

Large Scale ‘Deep’ Grammars — a success, and a long way to go

Abstract: Grammars with more or less complete lexical and morpho-syntactic coverage now exist, with mapping to semantic representations akin to representations in standard predicate logic (like MRS). With the ability to design such grammars, the goals of as well classical generative grammar as Montague grammar may be said to have been realized, an achievement also not possible without the various types of computational backbones sustaining these grammars. Multi-word expressions, a longstanding ‘black hole’ of structurally-driven grammar modeling, are now getting due attention, helping to consolidate the grammars as ‘grammars of the language’. Dimensions of further research and development relate to the circumstance that every large scale grammar is linked to its developer, and to the language represented. The latter link manifests itself in two facts, for a given pair of languages L1 and L2 : (i) There is no facility yet for systematically reading off from their grammars what L1 and L2 have in common (or relate to each other in any larger perspective). (ii) In the (rather normal) case where L1 and L2 have different syntax and different strategies of lexical encoding, semantically equivalent expressions in L1 and L2 yet do not receive the same representation (MRS, for instance, reflecting the wording of the language). The link to the developer is not personal, but resides in the circumstance that a grammar of such a complexity is the product of a totality of solutions to a very large number of parameters, a totality that most likely can be traced to only one person. How can such a system be sustainable? A solution to the latter link may possibly be found only if we make progress on the former link.

Short Biography: Having been ‘raised’ in generative grammar and formal semantics, I’ve invested some effort over the last decades in the construction of a large Norwegian HPSG grammar. At the same time having been involved in typological and documentary projects especially in Africa, I am interested in the development of resources for facilitating systematic comparative studies and language particular resource building, such as valency databases.

Valia Kordoni Humboldt University Berlin, Germany

Keynote Speaker

Multiword Expressions and Collocations

Abstract: Deep learning has recently shown much promise for NLP applications. Traditionally, in most NLP approaches, documents or sentences are represented by a sparse bag-of-words representation. There is now a lot of work going beyond this by adopting a distributed representation of words, by constructing a so-called neural embedding or vector space representation of each word or document. This talk will go beyond the learning of word vectors. It will present methods for learning vector representations for Multiword Expressions and bilingual phrase pairs. All of these techniques, especially when integrated, are useful for various NLP applications.

Short Biography: Valia Kordoni joined the faculty of the Department of English and American Studies of the Humboldt-Universität zu Berlin (Germany) in November 2012. Her research interests include Computational Semantics, Deep Learning, and Machine Translation. She is the author of many refereed journal and conference publications and she has served as guest editor of many scientific journals. She was the Local Chair of ACL 2016 — The 54th Annual Meeting of the Association for Computational Linguistics. She has been the coordinator of many national-, EU- and industry-funded projects in Language Technology. Currently, she is the coordinator of “TraMOOC: Translation for Massive Open Online

Courses” (<http://tramoooc.eu>), which is a Horizon 2020 collaborative project aiming at providing reliable Machine Translation for Massive Open Online Courses (MOOCs). She has taught many invited tutorials, e.g., on “Robust Automated Natural Language Processing with Multiword Expressions and Collocations” in ACL 2013, on “Robust Semantic Analysis of Multiword Expressions with FrameNet” in EMNLP 2015, and very recently on “Deep Learning for Multiword Expressions and Collocations” in ACL 2017. Finally, she is also the author of “Multiword Expressions - From Linguistic Analysis to Language Technology Applications” (to appear in Springer).

Nikola Kompa Osnabrück University, Germany

Invited Speaker

Language Evolution: Gricean Intentions meet Lewisian Conventions

Abstract: How might language have evolved? The question will be addressed by first exploring differences between human language and animal communication systems; the difference between natural signs, signals and symbols will be elaborated on. I will then claim that in order to explain how symbolic language emerged, it might prove helpful to combine Paul Grice’s idea of non-natural meaning with David Lewis’ game-theoretic model of conventions. More specifically, I will argue that a certain level of cooperation is needed if non-natural signs are to be interpretable at all; that iconicity helps with the problem of equilibrium selection; and that the idea of signaling problems as a type of coordination problem can explain how signs acquire specific yet stable meanings.

Short Biography: Nikola Kompa is a Professor of Theoretical Philosophy at the Institute of Philosophy, Osnabrück University, Germany. She works on a variety of topics within philosophy of language and epistemology. She is particularly interested in theories of language comprehension, the relation between language and cognition, metaphor and vagueness on the one hand and epistemic contextualism and relativism on the other.

Staffan Larsson University of Gothenburg, Sweden

Invited Speaker

Modeling Intentions as Classifiers

Abstract: Knowing the perceptual meaning of an expression allows an agent to identify perceived objects and situations falling under the meaning of the expression. We present work towards a formal semantics for perceptual aspects of meaning, connecting these to logical-inferential aspects of meaning. The key ideas are (1) to model perceptual meanings as classifiers of perceptual input, (2) to regard classifiers in formal semantics as (parts of) the intensions of linguistic expressions, and (3) that speakers interactively train classifiers to arrive at shared meanings. We cast these ideas in Type Theory with Records. (TTR) and sketch how they relate to neural activity in (semi-)transparent neural networks.

Short Biography: I am Professor of Computational Linguistics at the Department of Philosophy, Linguistics and Theory of Science at the University of Gothenburg. I am also co-director of the Dialogue Technology Lab at the Centre for Language Technology (CLT), as well as CTO and co-founder and Chief Science Officer of Talkamatic AB. I am a member of the Editorial Board of the Journal Dialogue and Discourse. My areas of interest include Dialogue, dialogue systems, language and cognition, pragmatics, formal semantics, semantic coordination, in-vehicle dialogue systems, philosophy of language.

Gleb Lobanov¹ and Krasimir Angelov²

¹Immanuel Kant Baltic Federal University, ²Chalmers University of Technology and University of Gothenburg

Planning for Natural Language Generation in GF

Abstract: In this paper we present a minimalistic approach to document planning in natural language generation which is specifically targeted to the Grammatical Framework (GF) system but it also generalizes to other formalisms with a type theoretical abstract syntax. The advantage of type theory is that it already has in place enough mechanisms to constrain the set of possible alternatives for planning the document. It turns out that document planning is easy to describe as a type theoretical proof search under a linear context. We present the method and demonstrate it within the use case of weather report generation.

Roussanka Loukanova Stockholm University, Sweden

Invited Speaker

Type Theory of Situated Algorithms and Information

Abstract: We develop mathematical structures, which are type-theoretical models of situations, algorithms, and entities that carry, process, and memorize information in memory cells. The structures are computational, by modelling algorithms that have capacities for computing and storing information. We call these structures Typed Models of Situated Algorithms and Information. Concurrently, we develop respective formal languages having denotational and algorithmic semantics in such situated structures. Collectively, we call the classes of such formal languages, along with their semantics in algorithmic, situated structures, Type-Theory of Situated Algorithms and Information (TTofSAI). Formal languages of TTofSAI, with associated calculi, are essential for applications in computational approaches to language phenomena, including in Computational Linguistics. Prominently, TTofSAI opens new directions to algorithmic syntax-semantics interfaces. The talk will present the development of TTofSAI and its existing and potential applications to Computational Linguistics.

Short Biography: Roussanka Loukanova has master degrees in mathematics, from Sofia University (Bulgaria), and in computer science, from Indiana University Bloomington (US), and PhD degree in mathematics from Moscow State University (Russia). She has been teaching at Sofia University (Bulgaria), Indiana University Bloomington (US), University of Minnesota (US), Illinois Wesleyan University (US), and Uppsala University (Sweden). Her research is in the areas of Typed Theory of Situated Information, Type Theory of Algorithms, Computational Syntax, Computational Semantics, Computational Syntax-Semantics Interface, Generalized computational grammar that includes lexicon and syntax-semantics interface, Type-Theoretic Grammars, Constraint Based Lexicalized Grammar (CBLG). The focus of her research is on development of type theory of information, language, and algorithms, for modeling phenomena of partiality, underspecification, and context dependency. She is a researcher at Stockholm University, Sweden.

Louise McNally Universitat Pompeu Fabra, Spain

Invited Speaker

On the Relation between Descriptive Content and Reference and its Implications for Computational Modeling

Abstract: Although many formal models of natural language adhere to the hypothesis that natural language is compositional and that constituent structure mirrors semantic composition, there are well-known challenges to this hypothesis, such as the seeming non-

compositionality of certain types of idiomatic expressions (e.g. pull some/many/no strings for someone). In this talk, based on joint work with Berit Gehrke, I argue that some of these problematic data support the development of language models in which the composition of complex descriptive contents should be able to proceed (though need not proceed) unmediated by reference. I further argue that the separation of descriptive content and reference on linguistically principled grounds should, serve as a guide in developing equally principled combinations of statistical and symbolic approaches to computational modeling of language.

Short Biography: Louise McNally has Ph.D. University of California, Santa Cruz, 1992. She is Professor of Linguistics at Universitat Pompeu Fabra, Barcelona, Spain. Her research primarily concerns the interaction of lexical and compositional semantics, with particular focus on the syntax and semantics of modification. In recent years, she has collaborated with computational linguists in exploring distributional models of nominal phrases. She is currently working on integrating symbolic and statistical approaches to language modeling in order to develop a better understanding of how reference and conceptual knowledge interact in the construction of meaning.

Richard Moot CNRS, France

Invited Speaker

First-order Linear Logic for Natural Language Analysis

Abstract: First-order linear logic is a proof-theoretically simple system which has many interesting applications in computational linguistics. I will show first-order linear logic provides a very general “machine language” underlying other formalisms, such as the Lambek calculus and lambda grammars. Using first-order linear logic as an underlying framework allows us to compare the analyses of different grammatical systems. The current implementation provides a theorem prover for all these grammatical systems, allowing grammar writers to specify grammars and to see the resulting analyses in their own framework, yet using first-order linear logic underneath as a simple and effective computational device.

Short Biography: Richard Moot has a PhD in computational linguistics for Utrecht University. He is currently a CNRS research scientist at LIRMM in Montpellier studying type-logical grammars, proof theory, and the syntax-semantics interface. He has written the Grail family of theorem provers for type-logical grammars and is the author, with Christian Retor of the textbook “The Logic of Categorical Grammars”

Glyn Morrill Universitat Politècnica de Catalunya, Spain

Invited Speaker

Parsing Logical Grammar: CatLog3

Abstract: CatLog3 is a Prolog parser/theorem-prover for (type) logical (categorical) grammar. In such logical grammar, grammar is *reduced* to logic: a string of words is grammatical iff an associated logical statement is a theorem. CalLog3 implements a logic extending displacement calculus, a sublinear fragment including as primitive connectives the continuous (Lambek) and discontinuous wrapping connectives of the displacement calculus, additives, 1st order quantifiers, normal modalities, bracket modalities and subexponentials. In this paper we survey how CatLog3 is implemented on the principles of Andreoli’s focusing and a generalisation of van Benthem’s count-invariance.

Short Biography: I received my degree, in Computer Science, from Cambridge in 1984 and my masters and doctorate, in Cognitive Science, from Edinburgh in 1985 and 1988. During a two year postdoc in Edinburgh I was struck by the notion of grammar as logic which I have pursued ever since. Following a visiting scientist position at the University of Utrecht

and CWI Amsterdam 1990-91, I went to the UPC, Barcelona, where I have remained. My books are *Type Logical Grammar: Categorical Logic of Signs* (Kluwer Academic Press, 1994), *Lógica de primer ordre* (Edicions UPC, 2001), and *Categorical Grammar: Logical Syntax, Semantics and Processing* (Oxford, 2011). I have been awarded an ICREA Academia 2012 by the Catalan Institute for Research and Advanced Studies.

Joakim Nivre Uppsala University, Sweden

Invited Speaker

The Logic of Universal Dependencies

Abstract: Universal Dependencies (UD) is a framework for cross-linguistically consistent treebank annotation that has so far been applied to over 50 languages. A basic design principle of UD is to give priority to grammatical relations between content words, which are more likely to be parallel across languages, and to treat function words essentially as features of content words, functionally similar to but structurally distinct from morphological inflection. This principle has been questioned on the grounds that it gives rise to representations that are suboptimal for dependency parsing, where higher accuracy has often been observed when function words are treated as syntactic heads. In this talk, I will defend this principle from three different perspectives. First, I will show how it allows us to capture linguistic universals, similarities in grammatical constructions across structurally different languages, and thereby gives us a solid basis for contrastive linguistic studies. Second, I will illustrate how it provides a natural interface to semantic interpretation, and thereby serves the needs of downstream language understanding tasks, especially in multilingual settings. Finally, I will review recent work on UD parsing, suggesting that the suboptimal nature of the representations has been greatly exaggerated.

Short Biography: Joakim Nivre is Professor of Computational Linguistics at Uppsala University. He holds a Ph.D. in General Linguistics from the University of Gothenburg and a Ph.D. in Computer Science from Växjö University. His research focuses on data-driven methods for natural language processing, in particular for syntactic and semantic analysis. He is one of the main developers of the transition-based approach to syntactic dependency parsing, described in his 2006 book *Inductive Dependency Parsing* and implemented in the widely used MaltParser system, and one of the founders of the Universal Dependencies project, which aims to develop cross-linguistically consistent treebank annotation for many languages and currently involves over 100 researchers around the world. He has produced over 200 scientific publications and has more than 10,000 citations according to Google Scholar (May, 2017). He is currently the president of the Association for Computational Linguistics.

Rainer Osswald Heinrich-Heine-Universität Düsseldorf, Germany

Invited Speaker

Frame-Semantic Composition at the Syntax-Semantics Interface

Abstract: Frames, understood as labeled attribute-value structures with types and relations, have recently gained new attention as representational structures in linguistic semantics. The topic of the talk is the use of frames for the modeling of verb semantics and semantic composition in a number of verb-based constructions. The proposed model of the syntax-semantics interface combines semantic frames with syntactic trees, leaning on the formalism of Lexicalized Tree Adjoining Grammars. In this model, semantic composition is guided by syntactic operations and is basically realized via frame unification under constraints. A special focus of the talk will be on the logical description of frame representations.

Short Biography: Rainer Osswald is a senior researcher at the Collaborative Research Center "The Structure of Representations in Language, Cognition, and Science" located at Heinrich Heine University Düsseldorf, Germany. He received a PhD in Computer Science from the University of Hagen (2002). The title of his thesis was "A Logic of Classification - with Applications to Linguistic Theory". Rainer Osswald is a member of the DIN/ISO standards committee on language resource management and he is currently the speaker of the Special Interest Group on Computational Linguistics of the German Linguistic Society. The focus of his current research is on the formal modeling of the syntax-semantics interface of verb-based constructions by means of decompositional frame semantics, Role and Reference Grammar and Tree Adjoining Grammars.

Peter Pagin Stockholm University, Sweden

Invited Speaker

Switcher Semantics and Belief Sentences

Abstract: Switcher semantics is a framework characterized by allowing that the semantic function that applies to an occurrence of a complex expression e is switched to another function as we move to a subexpression e' of e . A historical example is Frege's idea of indirect reference in indirect contexts. When such a function switch takes place, the semantics is no longer standard compositional, but it can still be compositional in a more general sense, which will be explained. A switcher semantics for belief sentences will also be presented, where structured meanings are the values relevant in belief contexts.

Short Biography: Peter Pagin is professor of theoretical philosophy at Stockholm University. He got his PhD in 1987 with Dag Prawitz as supervisor. He works mainly in the philosophy of language and formal semantics. He has worked on compositionality, non-extensional contexts, vagueness, assertion, holism, among other topics. His most frequent co-authors are Dag Westerståhl and Kathrin Glüer.

Gerald Penn University of Toronto, Canada

Invited Speaker

What Does it Mean to Parse with Categorical Grammar?

Abstract: There are many kinds of categorical grammar, but in practice there is very little variation in how categorical grammars are being used in practice by computational linguists. This talk will reassess the several arguments that have been offered in defense of the status quo in light of research on CG membership algorithms and corpora over the last 10 years.

Michael Richter and Roeland van Hout Radboud University, Nijmegen

How WIE 'how' as Intensifier Co-occurs with other Intensifiers in German Sentences

Abstract: In this paper we state that (1) in exclamative sentences such as *wie cool war das denn!* 'how cool was that', *wie* (degree related adverbial wh-exclamatives, Nouwen and Chernilovskaya 2015) is an intensifier of the gradable adjective *cool* (see Rett 2015, on degrees within exclamatives) and that (2) *wie* how can co-occur with (gradable adjectival) intensifiers of similar semantic properties, while it cannot with intensifiers with different properties.

Maria Skeppstedt¹, Kostiantyn Kucher¹, Carita Paradis², Andreas Kerren¹

¹Linnaeus University, Växjö, ²Lund University, Sweden

Language Processing Components of the StaViCTA Project

Abstract: The StaViCTA project is concerned with visualising the expression of stance in written text, and is therefore dependent on components for stance detection. These components are to (i) download and extract text from any HTML page and segment it into

sentences, (ii) classify each sentence with respect to twelve different, notionally motivated, stance categories, and (iii) provide a RESTful HTTP API for communication with the visualisation components. The stance categories are certainty, uncertainty, contrast, recommendation, volition, prediction, agreement, disagreement, tact, rudeness, hypotheticality, and source of knowledge.

Sam Sanders Ludwig-Maximilians-University of Munich, Germany

Invited Speaker

A Computable Solution to Partee's Temperature Puzzle (joint work with Kristina Liefke)

Abstract: We present a computable solution to Partee's temperature puzzle which uses one of the standard tools of mathematics and the exact sciences: countable approximation. Our solution improves upon the standard Montagovian solution to the puzzle (i) by providing computable natural language interpretations for this solution, (ii) by lowering the complexity of the types in the puzzle's interpretation, and (iii) by acknowledging the role of linguistic and communicative context in this interpretation. These improvements are made possible by interpreting natural language in a model that is inspired by the Kleene-Kreisel model of countable-continuous functionals. In this model, continuous functionals are represented by lower-type objects, called the associates of these functionals, which only contain countable information.

Short Biography: Sam Sanders obtained a PhD in mathematics at Ghent University (Belgium) in May 2010. His current research interests are centered around computability, broadly construed, and are at the intersection of logic, philosophy, linguistics, and computer science.

Mila Vulchanova Norwegian University of Science and Technology, Norway

Invited Speaker

Figurative Language Processing: a bottleneck in developmental deficits and NLP

Abstract: It is now common to employ evidence from human behaviour (e.g., child development) for the creation of computational models of this behaviour with a variety of applications (e.g., in developmental robotics). This talk will report comprehensive research in the comprehension and processing of figurative (non-literal) language in highly verbal individuals with autism in comparison with age- and language level-matched neuro-typical individuals. Based on this evidence we will outline the strategies used by human language users in understanding non-literal/non-compositional expressions and proceed to identify possible solutions for automated language systems in the domain of idiomatic expressions.

Short Biography: Prof. Mila Vulchanova is the Director of the Language Acquisition and Language Processing Lab and the Scientific Director of the Norwegian Graduate School of Linguistics and Philology. She has expertise in theoretical linguistics, language and cognition, language learning and language comprehension across the life-span, and language and cognition in developmental deficits. She has published in *Psychological Science*, *PLoS ONE*, *Cognitive Neuropsychology*, *Learning and Individual Differences*, *Frontiers in Human Neuroscience*, and has edited a number of volumes with Oxford University Press, John Benjamins and as guest editor for journals. She has both coordinated and participates in big-scale EU projects, such as *Language & Perception (LanPercept)*, *Decitic Communication (DCOMM)* and a number of *COST Actions*. She is an elected member of the Norwegian Royal Academy for Science and Letters (DKNVS) since 2002.

Markus Werning Ruhr University Bochum, Germany

Invited Speaker

Compositionality in a World Without Synonyms — Existence and Uniqueness of Similarity-based Semantics

Abstract: Compositionality is the principle that the meaning of a complex expression is determined by the meanings of its syntactic parts and the way these parts are combined. Under a standard formalization it is equivalent to the proposition that, if there are pairs of synonyms in a language, the paired expressions are simultaneously interchangeable in any complex meaningful expression without changing the meaning of that expression. It has been argued on various grounds, though, that there are strictly speaking no two expressions (at least in languages like English or German) that fulfil this condition. To avoid the vacuity of the principle, it would hence make sense to formulate an analogous principle that is not based on strict synonymy, but on meaning similarity. Leitgeb (2008), however, has proved that, under reasonable assumptions, such a notion of meaning similarity is not tenable for a bi-valued propositional system. In the paper to be presented we lift the requirement of bi-valuedness and prove an existence and uniqueness theorem for a similarity based compositional semantics in a many-valued propositional system.

Short Biography: Markus Werning’s agenda as a philosopher is deeply rooted in a naturalistic understanding of philosophy. The overarching goal of his research is to approach questions in the philosophy of language and mind and related areas (epistemology, descriptive metaphysics, etc.) (i) with exact theoretical methods — e.g. logic, formal semantics, and probability theory —, (ii) with advanced empirical methods such as EEG and fMRI and (iii) by computational modelling. He views those areas of philosophy in continuity with the cognitive sciences where, in philosophy, emphasis is put on theoretical rigor as well as meta- and cross-disciplinary aspects. His naturalistic attitude towards philosophy arises from a general skepticism with regard to apriori reasoning such as conceptual analysis, intuition and introspection as a privileged source of knowledge.

Gijs Wijnholds and Mehrnoosh Sadrzadeh Queen Mary University of London

Vector Semantics for Lambek Calculus with Contraction

Abstract: (For the references, see the paper in the Proceedings of LACompLing2017)

There are linguistic phenomena that, next to the movement of constituents, involve a specific form of copying and/or deletion of information, as argued for in [2, 6, 7]. Notable examples are pronoun relativisation [5, 6] and parasitic gaps [6], iterated coordination [7] and ellipsis [2]. Whether the burden of such phenomena should lie on the lexicon or on the syntactic process depends on the particularities of the phenomenon in question and the language in which it manifests itself. For instance, there are cases of pronoun relativisation that exemplify a form of derivational ambiguity (mannen die vrouwen haten in Dutch) whereas the English equivalent does not occur as an ambiguity but rather comes with a long distance dependency dealt with by different lexical instances (viz. compare men who hate women and men whom women hate). The case of (verb) ellipsis traditionally has been approached both as a syntactic problem as well as a semantic one [4]. Recent work in distributional semantics has shown that Frobenius algebras over vector spaces can deal with ellipsis [3] and relative pronouns [1]. However, they are introduced as meaning postulates which means that they can arise only through lexical semantics and not as part of the syntactic process. Similar to the approaches of [2, 6, 7], we argue for the use of controlled forms of copying in a type logical system, so that we regain the balance between derivational and lexical ambiguity, in the presence of these complex semantic operations. In order to facilitate a controlled form of copying, we define an enrichment of the Lambek Calculus with

control modalities that facilitates contraction on modally decorated formulas. The presence of such a structural rule in an uncontrolled/global version would obliterate the distinguishing power of the original calculus, whereas the use of modalities gives explicit control over when these operators are licensed. We show how the Frobenius algebras used in previous work [1, 3] provide vector semantic counterparts for the proof theoretic copying rule of our system. Moreover, we show how our system related to the systems of [2, 6, 7]. The vector space semantics is given in the style of a Curry-Howard annotation: words are interpreted as vectors, proofs as linear maps between vector spaces. Semantic content is obtained from big data (not even limited to textual data) on top of which we describe the meaning of phrases beyond words by compositional interpretation from syntax into semantics. We illustrate with vector computations for ellipsis cases like Mary writes Prolog and Gary does too and Gary loves his car and Bill too.

Yukiko Yana¹, **Koji Mineshima**^{1,2} and **Daisuke Bekki**^{1,2}

¹Ochanomizu University, Japan; ²CREST, Japan Science and Technology Agency, Japan
Variable Handling in DRT and DTS

Abstract: This paper discusses the differences in the behaviours of Discourse Representation Theory (DRT) and Dependent Type Semantics (DTS) with respect to variable handling. Since substitution in DRT is only partially defined, so is β -reduction and α -conversion, which brings about the overwrite problem (it is also called destructive update) and the duplication problem. We also compare the status of DRT with that of DTS and show that these two problems do not arise in DTS.