30th Annual Meeting of the Association for Computational Linguistics

Proceedings of the Conference

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PREFACE

This volume contains the papers prepared for the 30th Annual Meeting of the Association for Computational Linguistics, held 28 June–2 July in Newark, Delaware. Following on from last year's innovation, papers presented at the separate student session are also to be found, gathered in a separate section at the end of this Proceedings.

In keeping with the prestigious nature of the meeting, and despite a number of alternative conferences in our area, the programme committee was once again confronted with a large number of very high quality submissions from around the world. Balancing our desire to accept as many as possible of those which merited inclusion with the need to present a conference programme which ordinary mortals could reasonably be expected to benefit from proved, as always, a difficult challenge. We hope the results, as represented by the conference itself and the papers collected here, will stand as a fair and representative cross-section of the best work in the field today.

Many people contributed to the success of this year's meeting, and I'm happy to have the opportunity of recording our thanks to them: to Martin Kay, Karen Sparck Jones and Don Walker, for the invited talks; to Bonnie Webber, for organising the excellent set of tutorial sessions; to Keith Devlin, William Gale, Joseph Kruskal, Mark Liberman, Mitch Marcus, Yves Schabes and Stuart Shieber for presenting the tutorials; to Sandra Carberry, Dan Chester and Kathleen McCoy, for handling the local arrangements; to David Traum and Lenhard Schubert for organising the Student Sessions; and finally to Don Walker and Betty Walker for their stalwart labours behind the scenes.

In a year when over seven hundred papers in the field were submitted for consideration by a number of meetings, reviewers' time and effort was at a premium, with many people being asked to read papers for several different meetings. My special thanks therefore to the programme committee members who read and diligently commented on large numbers of submissions, did so to a very tight timetable, and then participated in the traditional pressure cooker face-to-face programme committee meeting: Peter Brown, *IBM T. J. Watson Research Center*; Stephan Busemann, *German Research Center for Artificial Intelligence*; Nicoletta Calzolari, *University of Pisa*; Mary Dalrymple, *Xerox Palo Alto Research Center*; Hitoshi Iida, *ATR Interpreting Telephony Research Laboratories*; Johanna Moore, *University of Pittsburgh*; Klaus Netter, *German Research Center for Artificial Intelligence*; Nicholas Ostler, *Linguacubun Ltd.*; Jan Pedersen, *Xerox Palo Alto Research Center*; Steve Pulman, *SRI International (Cambridge)* and *University of Cambridge*; Yves Schabes, *University of Pennsylvania*; Donia Scott, *Brighton Polytechnic*; Ralph Weischedel, *BBN Systems and Technologies.* Special thanks to Steve Pulman, Brenda Scruby and SRI International in Cambridge for hosting the programme committee meeting.

Also this year we introduced a new approach to getting specialist reviews as an additional source of input into the programme selection process, making official the unofficial practice of previous years. Those listed on the reverse of this page were all recruited by the programme committee and contributed reviews. Their gracious acquiescence in a role thrust on them at short notice and the helpful and detailed response they produced merit our sincere thanks.

Henry S. Thompson, *University of Edinburgh*
Chair, Program Committee

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Annie Zaenen, *Xerox Palo Alto Research Center*

CONFERENCE PROGRAM

SUNDAY, 28 JUNE

2:00–5:30 **TUTORIAL SESSIONS**

Statistics for Computational Linguists
William A. Gale and Joseph B. Kruskal

Leading Issues in Tree Adjunction
Yves Schabes and Stuart Shieber

MONDAY, 29 JUNE

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Very Large Text Corpora: What You Can Do with Them, and How to Do It
Mark Liberman and Mitch Marcus

Situation Semantics
Keith Devlin

MONDAY, 29 JUNE – CLAYTON HALL ROOM 128

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Alex Lascarides, Nicholas Asher & Jon Oberlander

2:10–2:35 *An Algorithm for VP Ellipsis*
Daniel Hardt

2:35–3:00 *A Simple But Useful Approach to Conjunct Identification*
Rajeev Agarwal & Lois Boggess

3:30–3:55 *The Representation of Multimodal User Interface Dialogues Using Discourse Pegs*
Susann Luperfoy

3:55–4:20 *Monotonic Semantic Interpretation*
Hiyan Alshawi & Richard Crouch

4:20–4:45 *Efficiency, Robustness and Accuracy in Picky Chart Parsing*
David M. Magerman & Carl Weir

5:15–5:40 *A Functional Approach to Generation with TAG*
Kathleen F. McCoy, K. Vijay-Shanker & Gijoo Yang

5:40–6:05 *Integrating Multiple Knowledge Sources for Detection & Correction of Repairs in Human-Computer Dialog*
John Bear, John Dowding & Elizabeth Shriberg

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Nancy Green & Sandra Carberry

9:25–9:50 *Reasoning with Descriptions of Trees*
James Rogers & K. Vijay-Shanker

9:50–10:15 *Comparing Two Grammar-Based Generation Algorithms: A Case Study*
Miroslav Martinovic & Tomek Strzalkowski

10:45–11:10 *Recognition of Linear Context-Free Rewriting Systems*
Giorgio Satta

11:10–12:15 **Natural Language Processing, Information Retrieval, and All That ***INVITED TALK*****
Karen Sparck Jones, *University of Cambridge*
Martin Kay, *Xerox PARC and Stanford University*

1:45–2:10 *Accommodating Context Change*
Bonnie L. Webber & Breck Baldwin

2:10–2:35 *Information Retrieval Using Robust Natural Language Processing*
Tomek Strzalkowski & Barbara Vauthey

2:35–3:00 *Prosodic Aids to Syntactic and Semantic Analysis of Spoken English*
Chris Rowles & Xiuming Huang

3:30–3:55 *Understanding Natural Language Instructions: The Case of Purpose Clauses*
Barbara Di Eugenio

3:55–4:20 *Inside-Outside Reestimation from Partially Bracketed Corpora*
Fernando Pereira & Yves Schabes

4:20–4:45 *Linear Context-Free Rewriting Systems and Deterministic Tree-Walking Transducers*
David J. Weir

4:45–5:10 *A Connectionist Parser for Structure Unification Grammar*
James Henderson

WEDNESDAY, 1 JULY – CLAYTON HALL ROOM 128

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Carl Gutwin & Gordon McCalla

9:25–9:50 *Lattice-Based Word Identification in CLARE*
David M. Carter

9:50–10:15 *An Alternative Conception of Tree-Adjoining Derivation*
Yves Schabes & Stuart M. Shieber

10:45–11:10 *GPSM: A Generalised Probabilistic Semantic Model for Ambiguity Resolution*
Jing-Shin Chang, Yih-Fen Luo & Keh-Yih Su

11:10–11:35 *Development and Evaluation of a Broad-Coverage Probabilistic Grammar of English-Language Computer Manuals*
Ezra Black, John Lafferty & Salim Roukos

2:00–3:30: **STUDENT SESSION 1**

Correcting Illegal NP Omissions Using Local Focus
Linda Z. Suri, University of Delaware

Some Problematic Cases of VP Ellipsis
Daniel Hardt, University of Pennsylvania

Understanding Repetition in Natural Language Instructions – the Semantics of Extent
Sheila Rock, University of Edinburgh

On the Intonation of Mono- and Di-Syllabic Words within the Discourse Framework of Conversational Games
Jacqueline C. Kowtko, University of Edinburgh

2:00–3:30: **STUDENT SESSION 2**

Right Association Revisited
Michael Niv, University of Pennsylvania

An LR Category-Neutral Parser with Left Corner Prediction
Paola G. Merlo, University of Maryland and Université de Genève

Incremental Dependency Parsing
Vincenzo Lombardo, Universitá di Torino

Documentation Parser to Extract Software Test Conditions
Patricia Lutsky, Brandeis University

3:30–4:40: **STUDENT SESSION 3**

A Linguistic and Computational Analysis of the German Third Construction
Owen Rambow, University of Pennsylvania

A CCG Approach to Free Word Order Languages
Beryl Hoffman, University of Pennsylvania

Information States as First Class Citizens
Jørgen Villadsen, University of Copenhagen

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Spatial Lexicalization in the Translation of Prepositional Phrases
Arturo Trujillo, University of Cambridge

Metonymy: Reassessment, Survey of Acceptability, and Its Treatment in a Machine Translation System
Shin-ichiro Kamei & Takahiro Wakao, New Mexico State University

A Basis for a Formalization of Linguistic Style
Stephen Green, University of Waterloo

4:40–5:45: **STUDENT SESSION 5**

Elaboration in Object Descriptions through Examples
Vibhu O. Mittal, University of Southern California and USC/ISI

The Expression of Local Rhetorical Relations in Instructional Text
Keith Vander Linden, University of Colorado

Generating a Specific Class of Metaphors
Mark Alan Jones, University of Delaware

4:40–5:45: **STUDENT SESSION 6**

SEXTANT: Exploring Unexplored Contexts for Semantic Extraction from Syntactic Analysis
Gregory Grefenstette, University of Pittsburgh

A Class-Based Approach to Lexical Discovery
Philip Resnik, University of Pennsylvania

Sense-Linking in a Machine Readable Dictionary
Robert Krovetz, University of Massachusetts

THURSDAY, 2 JULY – CLAYTON HALL ROOM 128

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Lynn Lambert & Sandra Carberry

9:25–9:50 *Handling Linear Precedence Constraints by Unification*
Judith Engelkamp, Gregor Erbach & Hans Uszkoreit

9:50–10:15 *A Unification-Based Semantic Interpretation for Coordinate Constructs*
Jong C. Park

10:45–11:10 *Corpus-Based Acquisition of Relative Pronoun Disambiguation Heuristics*
Claire Cardie

11:10–12:15 **Reflections and Projections ***INVITED TALK*****
Don Walker, *Bellcore and ACL*

1:45–2:10 *Association-Based Natural Language Processing with Neural Networks*
Kazuhiro Kimura, Takashi Suzuoka & Sin-ya Amano

2:10–2:35 *Tense Trees as the "Fine Structure" of Discourse*
Chung Hee Hwang & Lenhart K. Schubert

2:35–3:00 *Connection Relations and Quantifier Scope*
Longin Latecki

3:30–3:55 *Estimating Upper and Lower Bounds on the Performance of Word-Sense Disambiguation Programs*
William Gale, Kenneth Church & David Yarowsky

3:55–4:20 *A Parameterized Approach to Integrating Aspect with Lexical-Semantics for Machine Translation*
Bonnie J. Dorr

4:20–4:45 *Using Classification to Generate Text*
Ehud Reiter & Chris Mellish

TUTORIALS

Statistics for Computational Linguists

William A. Gale and Joseph B. Kruskal, *AT&T Bell Laboratories*

As linguistic corpora get larger, computational linguists are turning increasingly to statistical techniques. This tutorial focusses on statistical techniques that have been useful in linguistic research, being careful to avoid those that have not been. For each method we review its strengths and weaknesses, and the conditions under which it it may or may not be used. The tutorial provides references to statistical texts, but does NOT include mathematical derivations. Graphical displays are used where possible to show the qualitative behavior of methods.

The review starts with some very basic tools, such as methods for estimating the frequency of a token (word or n-gram), especially in the important but subtle case when the token has not occurred in the training sample. We emphasize the sometimes underappreciated importance of uncertainty (variability, standard deviation) of estimates. The foundations of the Bayesian approach to statistics are reviewed, because the approach has been found useful in such widely different contexts as author identification, information retrieval, and sense disambiguation. A general orientation to such broadly useful tools as clustering, factor analysis/principal components analysis, and multidimensional scaling is included.

Leading Issues in Tree Adjunction

Yves Schabes, *University of Pennsylvania* and Stuart Shieber, *Harvard University*

The use of an adjunction operation on elementary trees as the primitive operation of a grammar formalism was first proposed by Joshi, Levy, and Takahashi in the mid 1970's. Since then, a series of formalisms based on tree adjunction, under the name tree-adjoining grammars (TAG), have been defined and their properties explored. Certain attractive properties of tree-adjoining grammars have led to their being proposed as solutions to a wide variety of natural-language-processing problems.

In this tutorial, we will focus on leading issues in the use of tree adjunction and tree-adjoining grammars for computational linguistic applications. After reviewing the basic concepts of TAGs and some standard grammatical analyses making use of the mechanisms, the tutorial will focus on the following issues of currency in the TAG research community (and on the associated formalisms and methods): (1) lexicalization of TAGS (lexicalized TAGs); (2) mechanisms for specifying grammatical constraints (adjoining constraints and feature-based TAGs); (3) relation between syntactic and semantic structure (synchronous TAGs); (4) statistical modeling with TAGs (stochastic TAGs); (5) TAG parsing algorithms. We will describe how these issues bear on several computational applications of TAGs, including: grammatical analysis, semantic interpretation, tactical generation, machine translation, and statistical language modeling.

Very Large Text Corpora: What You Can Do with Them, and How to Do It

Mark Liberman and Mitch Marcus, *University of Pennsylvania*

This tutorial aims to give researchers who are interested in working with large text corpora the information and the resources they need to get started. We will discuss: (1) what corpora are available, and how to get them; (2) practical, legal and technical issues in getting new material; (3) availability of annotated corpora; (4) software for simple linguistic annotation of unrestricted text – lemmatizers, taggers, parsers – what is available, and how to create your own; (5) how to do efficient machine-aided annotation; (6) how to index and search large (annotated or plain) corpora efficiently; (7) examples of research based on large corpora.

Discussion of the design and implementation of a sample of useful and available software will be featured. We will provide a bibliography and a guide to available corpora and software.

Situation Semantics

Keith Devlin, *Colby College*

Situation semantics is a mathematically-based semantics, grounded in situation theory. Introduced by Barwise and Perry in the early 1980s, both situation theory and situation semantics have developed considerably since the appearance of their 1983 book *Situations and Attitudes*. The current "standard text" is my own book *Logic and Information*, published by Cambridge University Press in 1991. The tutorial will be based on that reference.

I will begin with a brief overview of situation theory, explaining how it provides a framework for a general theory of information. Although situation theory is a mathematical theory, it does not presuppose any substantial mathematical prerequisites, though some mathematical sophistication enables a greater appreciation of various parts of the situation-theoretic ontology. This will be followed by an introduction to situation semantics, covering the relational theory of word and sentence meaning. Specific topics to be covered in addition to the basic framework are definite descriptions and conditionals. Time permitting we will also look at how situation theory can be used to handle the way speaker and listener make use of social knowledge in natural language interaction, and possible applications of situation theory to the design of interactive information systems.

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PREFACE TO THE STUDENT SESSION PAPERS

Once again, these proceedings conclude with the papers accepted for short presentations at the student sessions of the *Annual Meeting of the Association for Computational Linguistics*. The student sessions differ from the main conference in their emphasis on work *in progress*, judged on the basis of insight, creativity and promise.

The first ACL student sessions were held in 1991 at the 29th ACL Meeting, under the stewardship of Bonnie Lynn Webber and Philip Resnik. The stated goals were (1) to allow student members to hone their presentation skills in a conference setting; (2) to provide student members with reactions to their research from the community at large at a point where such reactions could make a significant difference; and (3) to act as "ice breakers", giving student members an opportunity to talk with each other and with more senior researchers. The success of the 1991 sessions in meeting these goals provided the incentive for again including student sessions in 1992.

The response to the call for papers was quite gratifying, eliciting 48 submissions (a 26% increase over last year). Our thanks go to all the authors, and to the members of the Student Session Committee, who participated in planning the session organization: Tilman Becker, *University of Saarbruecken*; Alan Black, *University of Edinburgh*; Barbara Di Eugenio, *University of Pennsylvania*; Eric Iverson, *New Mexico State University*; Lynn Lambert, *University of Delaware*; Karen Lochbaum, *Harvard University*; and Cameron Shelley, *University of Waterloo*. The student sessions were made possible by the initiative and support of the ACL Executive Committee and the 1992 Program and Local Arrangements Committees. We would also like to thank Sandra Carberry, Philip Resnik, and especially Don Walker for their advice and guidance thoughout the planning of the student sessions.

Our thanks also to the Student Session Program Committee. The thoroughness, helpfulness, and expeditiousness of the reviewing were truly exemplary. The reviewing team included the Student Session Committee members (above) as well as the following regular ACL members: Dan Fass, *Simon Fraser University*; Julia Hirschberg, *AT&T Bell Laboratories*; Graeme Hirst, *University of Toronto*; Ed Hovy, *USC/ISI*; James Martin, *University of Colorado*; Chris Mellish, *University of Edinburgh*; Carl Pollard, *Ohio State University*; Graeme Ritchie, *University of Edinburgh*; Candy Sidner, *Digital Equipment Corporation*; Mark Steedman, *University of Pennsylvania*; and Wolfgang Wahlster, *University of Saarbruecken*. We gratefully acknowledge additional reviews provided by Eric Brill, *University of Pennsylvania*; Bob Carpenter, *Carnegie Mellon University*; Ted Dunning, *New Mexico State University*; Stephen Helmreich, *New Mexico State University*; Donald Hindle, *AT&T Bell Labs*; Bob Kaspar, *Ohio State University*; Graham Katz, *University of Rochester*; Marc Light, *University of Rochester*; Massimo Poesio, *University of Rochester*; and Kent Wittenburg, *Bellcore*.

Lenhart Schubert and David Traum, *University of Rochester*
Student Session Co-Chairs

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