"A lucid, lively, and informed exposition of leading ideas in the contemporary study of language and mind by one of the pioneers in the field." –NOAM CHOMSKY, M.I.T.

"An animated survey—virtually a conversation—about language and mind led by one of today's most interesting and informed cognitive scientists." —HOWARD GARDNER, Harvard University

"The author is that rare creature, an academic who can convey his fascination with his field to the general reader. Highly recommended." —Library Journal

"Recommended to all those who have wanted to know what modern linguistics is about but didn't like to ask." —FRANCIS H. C. CRICK

At bookstores or from BasicBooks A Division of HarperCollinsPublishers 10 E. 33rd St., New York, NY 10022 Toll-free with credit card 1-800-331-3761 Available in Canada from HarperCollingComadaLtb





MIT's Computational Linguistics

PARTICIPATING IN EXPLANATORY DIALOGUES Interpreting and Responding to Questions in Context

Johanna D. Moore Johanna Moore's book is one of the first to tackle modeling the complex dynamics of explanatory dialogues. It describes an explanation-planning architecture that enables a computational system to participate in an interactive dialogue with its users, focusing on the knowledge structures that a system must build in order to elaborate or clarify prior utterances, or to answer follow-up questions in the context of an ongoing dialogue. ACL-MIT Press Series in Natural Language Processing A Bradford Book 350 pp.,55 illus. \$47.50

NATURAL LANGUAGE PROCESSING

edited by Fernando C. N. Pereira and Barbara J. Grosz These ten contributions describe the major technical ideas underlying many of the significant advances in natural-language processing over the last decade, focusing in particular on the challenges in areas such as knowledge representation, reasoning, planning, and integration of multiple knowledge sources, where NLP and AI research intersect.

Special Issues of Artificial Intelligence A Bradford Book 500 pp. \$35.00 paperback

STATISTICAL LANGUAGE LEARNING

Eugene Charniak Charniak breaks new ground in artificial intelligence research by presenting statistical language processing from an artificial intelligence point of view in a text for researchers and scientists with a traditional computer science background.

Language, Speech, Computation, and Communication Program A Bradford Book 208 pp, 80 illus. \$25.00

LOGIC AND INFORMATION FLOW

edited by Jan van Eijck and Albert Visser 200 pp. \$35.00

THINKING BETWEEN THE LINES Computers and the Comprehension of Causal

Descriptions Gary C. Borchardt Artificial Intelligence series 320 pp. \$35,00

ARTIFICIAL INTELLIGENCE IN PERSPECTIVE

edited by Daniel G. Bobrow Special Issues of Artificial Intelligence A Bradford Book 472 pp. \$35.00 paperback

Original in Paperback

LANGUAGE ACQUISITION Core Readings

edited by Paul Bloom A Bradford Book 624 pp. \$22.50 paper

INDICES AND IDENTITY

Robert Fiengo and Robert May "The authors theoretical proposal ranks with the most interesting work on ellipsis done in the past decade, and a good deal of empirical ground is broken."— Mats Rooth, University at Tübingen

Linguistic Inquiry Monograph No. 24 400 pp. \$22.50 paper

CONTEMPLATING MINDS A Forum for Artificial Intelligence

edited by William J. Clancey, Stephen W. Smoliar, and Mark J. Stefik Artificial Intelligence series 540 pp. \$32.95

Now Available in Paperback

EVENTS IN THE SEMANTICS OF ENGLISH A Study in Subatomic Semantics

Terence Parsons Current Studies in Linguistics No.19 352 pp. \$18.95 paper

To order call toll-free 1-800-356-0343 (US & Canada) or (617) 625-8569. MasterCard & VISA accepted. Prices will be higher outside the U.S and are subject to change without notice.

The MIT Press 55 Hayward Street Cambridge, MA 02142 & Fitzroy House 11 Chenies Street London WC1E 7ET ENGLAND

Special Offer - Save 20%

The Cambridge/ACL Series

STUDIES IN NATURAL LANGUAGE PROCESSING

Aravind Joshi, Series Editor

This series of monographs, texts, and edited volumes is published in cooperation with the Association for Computational Linguistics.

THE LINGUISTIC BASIS OF TEXT GENERATION

 Laurence Danlos

 232 pp.
 Line diagrams

 32938-8 Hc
 List: \$64.95
 Discount: \$51.96

NATURAL LANGUAGE PARSING

Psychological, Computational and Theoretical Perspectives

David R. Dowty, Lauri Karttunenand Arnold M. Zwicky, Editors432 pp.10 tables/20 diagrams26203-8 HcList: \$84.95Discount: \$67.96

RELATIONAL MODELS OF THE LEXICON

Representing Knowledge in Semantic Networks

Martha Walton Evens, Editor400 pp.Tables/line diagrams36300-4 HcList: \$59.95Discount: \$47.96

COMPUTATIONAL LINGUISTICS

An Introduction **Ralph Grishman** 208 pp. Many line diagrams 31038-5 Pb List: \$21.95 **Discount: \$17.56**

REFERENCE AND COMPUTATION

An Essay in Applied Philosophy of Language *Amichai Kronfeld* 207 pp. 36636-4 Hc List: \$64.95 Discount: \$51.96 39982-3 Pb List: \$17.95 Discount: \$14.36

SEMANTIC PROCESSING FOR FINITE DOMAINS

Martha Stone Palmer 208 pp. 36226-1 Hc List: \$64.95 Discount: \$51.96

SYSTEMIC TEXT GENERATION AS PROBLEM SOLVING

Terry Patten

 240 pp.
 Some line diagrams

 35076-X Hc
 List: \$44.95
 Discount: \$35.96

Now in paper...

PLANNING ENGLISH SENTENCES

 Douglas E. Appelt

 192 pp.
 Many line diagrams

 43803-9 Pb
 List: \$18.95
 Discount: \$15.16

TEXT GENERATION

 Kathleen R. McKeown

 256 pp.
 34 line diagrams

 43802-0 Pb
 List: \$19.95
 Discount: \$15.96

SEMANTIC INTERPRETATION AND THE RESOLUTION OF AMBIGUITY

Graeme Hirst

 275 pp.
 15 tables/25 diagrams

 42898-X Pb
 List: \$27.95
 Discount: \$22.36

In North America, order from Cambridge, Dept GLH, 40 West 20th Street, New York, NY 10011-4211. All orders must be prepaid by check or charged on VISA or MasterCard. Residents of NY and CA add sales tax; Canadian residents add 7% GST. Shipping charges in the U.S. and Canada are \$2.00 for the first book and \$0.75 for each additional book.



Discount offer available to ACL members only.

LANGUAGE AND COMPUTERS

Vol. 12: CORPUS-BASED RESEARCH INTO LANGUAGE. In honour of Jan Aarts

Edited by Nelleke Oostdijk and Pieter de Haan

Amsterdam/Atlanta, GA 1994. VII,279 pp.

ISBN: 90–5183–588–4 Hfl. 85,–/US–\$ 50.–

For over two decades Jan Aarts has been actively involved in corpus linguistic research. He was the instigator of a large number of projects, and he was responsible for what has become known as "the Nijmegen approach" to corpus linguistics. It is thanks to him that words like TOSCA and LDB have become household names in the corpus linguistic community.

The present volume has been collected in his honour. The contributions in it cover a wide range of topics in the field of corpus linguistic research, especially those in which Jan Aarts takes a keen interest: corpus encoding and tagging, parsing and databases, and the linguistic exploration of corpus data. The contributions in this volume discuss work done in this field outside Nijmegen, for the obvious reason that we do not wish to present him with a report on work in which he is himself involved.



USA/Canada: Editions Rodopi, 233 Peachtree Street, N.E., Suite 404, Atlanta, GA 30303-1504, Telephone (404) 523-1964, Call toll-free 1-800-225-3998 (U.S. only), Fax (404) 522-7116

And Others: Editions Rodopi B.V., Keizersgracht 302–304, 1016 EX Amsterdam, The Netherlands. Telephone ++ (0) 20 622 75 07, Fax ++ (0) 20 638 09 48

ARTIFICIAL INTELLIGENCE

EDITORS

Editor-in-Chief: Daniel G. Bobrow, Xerox Corporation, Palo Alto Research Center, 3333 Coyote Hill Road, Palo Alto, CA 94304, USA Associate Editor: Michael Brady, Department of Engineering Science, Oxford University, Parks Road, Oxford OX1 3PJ, UK Review Editor: Mark J. Stefik, Xerox Corporation, Palo Alto, CA, USA Associate Review Editor: Stephen W. Smoliar, Institute of Systems Science, Singapore Research Notes Editor: Wolfgang Bibel, Technische Hochschule, Darmstadt, Germany Editorial Board: L.C. Aiello, Universitá di Roma "La Sapienza", Rome, Italy, S. Amarel, Rutgers University, New Brunswick, NJ, USA, Y. Anzai, Kelo University, Yokohama, Japan, H.G. Barrow, University of Sussex, Brighton, UK, H.J. Berliner, Carnegie-Mellon University, Pittsburgh, PA, USA, R.S. Boyer, Computational Logic, Inc., Austin, TX, USA, R. Brachman, AT&T Bell Laboratories, Murray Hill, NJ, USA, B.G. Buchanan, University of Pittsburgh, PA, USA, A. Bundy, University of Edinburgh, UK, J.G. Carbonell, Carnegie-Mellon University, Pittsburgh, PA, USA, W.J. Clancey, Institute for Research on Learning, Palo Alto, CA, USA, R. Davis, Massachusetts Institute of Technology, Cambridge, MA, USA, R. Dechter, University of California, Irvine, CA, USA, J. de Kleer, Xerox Corporation, Palo Alto, CA, USA, L. Erman, Cimilex-Tecknowledge, Inc., Palo Alto, CA, USA, M.R. Genesereth, Stanford University, CA, USA, B. Grosz, Harvard University, Cambridge, MA, USA, P.J. Hayes, Beckmann Institute, Urbana, IL, USA, G. Hinton, University of Toronto, Ontario, Canada, W.G. Lehnert, University of Massachusetts, Amherst, MA, USA, H.J. Levesque, University of Toronto, Ontario, Canada, V. Litschitz, University of Texas at Austin, TX, USA, A. Mackworth, University of British Columbia, Vancouver, BC, Canada, J. McCarthy, Stanford University, CA, USA, J. mcCartny, Stanford University, CA, USA, D. McDermott, Yale University, New Haven, CT, USA, T.M. Mitchell, Carnegie-Mellon University, Pittsburgh, PA, USA, F. Mizoguchi, Science University of Tokyo, Chiba, Japan, R. Moore, SRI International, Menio Park, CA, USA, H.-H. Nagel, Fraunboler-Institut für Informations und Determocheturg. (USC) Informations und Datenverabeitung (IITB), Karlsruhe, Germany, N.J. Nilsson, Stanford California, Los Angeles, CA, USA, C.R. Perrautt, SRI International, Menlo Park,

ARTIFICIAL INTELLIGENCE

Please send this order form or a photocopy to your regular supplier or to: ELSEVIER SCIENCE B.V. Attn: Petra van der Meer P.O. Box 103, 1000 AC Amsterdam The Netherlands

Customers in the USA/Canada, send to: ELSEVIER JOURNAL INFORMATION CENTER P.O. Box 945, Madison Square Station New York, NY 10159-0945

Please send me a FREE inspection copy
 Please enter my 1994 subscription

An International Journal



CA, USA, Z.W. Pylyshyn, University of Western Ontario, London, Ontario, Canada, J.R. Quinlan, University of Sydney, Australia, R. Reiter, University of Toronto, Ontario, Canada, E. Sandewall, University of Linkoping, Sweden, Y. Shoham, Stanlord University, CA, USA, H. Tanaka, Tokyo Institute of Technology, Japan, W. Wahlster, Universität des Saarlandes, Saarbrücken, Germany, D. Walker, Bell Communications Research, Morristown, NJ, USA, Y. Wilks, New Mexico State University, Las Cruces, NM, USA and W.A. Woods, Sun Microsystems Laboratories, Inc., Chelmsford, MA, USA



ELSEVIER An Imprint of Elsevier Science

✦AUDIENCE

Antificial Intelligence Specialists, Computer Scientists, Cognitive Scientists, Psychologists, Linguists - all both 'pure' and 'applied'.

AIMS AND SCOPE

Artificial intelligence, which commenced publication in 1970, is now the generally accepted international forum for the publication of results of current research in this field. The journal welcomes basic and applied papers describing mature work involving computational accounts of aspects of intelligence.

Specifically, it welcomes papers on:

- · automated reasoning
- · computational theories of learning
- heuristic search
- knowledge representation
- qualitative physics
- signal, image and speech understanding
- robotics
- natural language understanding

 software and hardware architectures for Al. The journal reports results achieved; proposals for new ways of looking at Al problems must include demonstrations of effectiveness. From time to time the journal publishes survey articles.

ABSTRACTED/INDEXED IN

ACM Computing Reviews, Applied Science & Technology Abstracts, Applied Science & Technology Index, CAD/CAM Abstracts, Cambridge Scientific Abstracts, Computer Abstracts, Currient Contents: Engineering, Technology & Applied Science, Current Contents: Social & Behavioral Sciences, Engineering Index/Compendex, INSPEC Information Services, Information Science Abstracts, Mathematical Reviews, Science Citation Index, Social Sciences Citation Index, Sociological Abstracts, Zentralblatt für Mathematik.

1994 SUBSCRIPTION DATA

© 1994: Volumes 65-71 (in 14 issues) Subscription price: Dfl. 2366.00 (US \$ 1279.00) including postage ISSN 0004-3702 Commenced publication 1970

Personal Cheque / Official Purch Please send me a pro forma invo	Eurocheque / International Money Order / Postal Cheque / ase Order Form / UNESCO Coupons) ice Eurocard / American Express / MasterCard / VISA)
• • • • •	
Address	
	'
•	
-	Date
price. The Dutch Guilder (Dfl.) price quoted applie The US Dollar (US \$) price quoted applies in the J	nion should add the approaphate VAT rate applicable in their country to the es worldwide, except in the Americas (North, Central and South America). Americas cniy. excent the full minor, where air delivery via SA1, mail is ensured at no extra

Journais are sant by surface meil to all counties, ercept the following, where air defivery via SAL meil is ensured at no extra cost to the subscriber: Argentina, Australia, Brazil, Canada, Hong Kong, India, Israel, Japan, Malaysia, Merico, New Zealand, Pakistan, P.R. of China, Singapore, South Africa, South Korea, Taiwan, Thailand and USA Cook's eye fell on a stack of mail at the edge of the counter. On top of it was the latest issue of *Linguistic Inquiry*. He smiled—the journal was like an old friend in hostile territory.... *—The Full Catastrophe* David Carkeet

Highly respected for its sustained excellence in quality of scholarship, **Linguistic** *Inquiry* leads the field in research on current topics in linguistic theory. Issue after issue, **LI** keeps you informed of new theoretical developments by presenting the latest in international research.

Volume 25, Number 2, Spring 1994 Select Table of Contents

Agreement, Word Order, and Conjunction in Some Varieties of Arabic Joseph Aoun, Elabbas Benmamoun, Dominique Sportiche

Head Movement and Long-Distance Reflexives Peter Cole, Li-May Sung

YEARLY RATES

Individual \$50.00, Institution \$100.00, Student (copy of current ID required)/Retired \$32.00. Outside U.S.A., add \$14.00 postage and handling. Canadians add additional 7% GST. *Prepayment is required*. Send check—drawn against a U.S. bank in U.S. funds, payable to **Linguistic** *Inquiry*—MasterCard or VISA number to:

Circulation Department **MIT PRESS JOURNALS** 55 Hayward Street Cambridge, MA 02142-1399 USA TEL: (617) 253-2889 FAX: (617) 258-6779 journals-orders@mit.edu

> Samuel Jay Keyser Editor in Chief

Published quarterly by The MIT Press ISSN 0024-3892

INGUISTIC _____ NQUIRY

EDITORS

Editor

Jacques Mehler, Laboratoire de Sciences Cognitives et Psycholinguistique, 54 Boulevard Raspail, 75006 Paris, France

Associate Editors

Thomas G. Bever, Department of Psychology, University of Rochester, Rochester, NY 14627, USA, John Morton, MRC Cognitive Development Unit, 17 Gordon Street, London WC1H 0AH, UK and Steven Pinker, Department of Brain and Cognitive Sciences, M.I.T., Cambridge, MA 02139, USA

Editorial Associate

Susana Franck, Laboratoire de Sciences Cognitives et Psycholinguistique, 54 Boulevard Raspail, 75006 Paris, France

AUDIENCE

Psychologists, Linguists, Neuroscientists, Ethologists, Philosophers, Epistemologists, Experts in Artificial Intelligence.

ABSTRACTED/INDEXED IN

Biological Abstracts / BIOSIS PREVIEWS, Child Development Abstracts and Bibliography, Computer Abstracts, Current Contents: Social & Behavioral Sciences, EIC Intelligence, Linguistic Inquiry, Psychological Abstracts / PsycINFO, Social Sciences Citation Index, Sociological Abstracts.

Send this form to your regular supplier or to ELSEVIER SCIENCE B.V. Attn. Mariène Hamers P.O. Box 103, 1000 AC Amsterdam The Netherlands Fax: (+31-20) 5862 616

Customers in the USA/Canada, send to ELSEVIER SCIENCE INC. Attn. Judy Weislogel, P.O. Box 945 Madison Square Station, New York, NY 10160-0757

- Please send me a FREE inspection copy of COGNITION
- Please enter my 1994 subscription to COGNITION
- Yes, I would like to be on your Mailing List: (mailing code 08250)

COGNITION

International Journal of Cognitive Science

Commenced publication 1972





ELSEVIER SCIENCE

AIMS AND SCOPE

Cognition is an international interdisciplinary journal publishing theoretical and experimental papers covering all aspects of the study of the mind. Contributions include research papers in the fields of psychology, linguistics, neuroscience, ethology, philosophy and epistemology.

Only papers that meet the highest standards of quality in the relevant disciplines are published. The journal includes research papers, short experimental reports, review monographs, discussions and replies. It also serves as a forum for discussion of every aspect of cognitive science as a lield. From time to time the journal publishes special issues on flourishing research areas such as connectionism, literacy and the biology of cognition.

Cognition publishes many of the most important papers in cognitive science and is the premier international and interdisciplinary journal in the field. It is required reading for anyone who wishes to keep up to date in this exciting research area.

©1994 SUBSCRIPTIONS

Volumes 50-53 (in 12 issues) Subscription price: Dfl. 1220.00 (US \$ 659.00) incl. postage ISSN 0010-0277

SPECIAL PERSONAL SUBSCRIPTION RATE NOW AVAILABLE. PLEASE CONTACT THE PUBLISHER FOR DETAILS

ORDER FORM

 Payment Enclosed: (Bank Draft / Eurocheque / International Money Order / Postal Cheque / Official Purchase Order Form) Please send me a pro forma invoice 				
Access Eurocard Visa Ame	rican Express DMasterCard			
Card No	Valid Until			
Name				
Signature				
Vat Registration No				
v				

The Dutch Guilder price(s) (DfL) applies worldwide, except in the Americas (North, Central & South America). US \$ price(s) quoted applies in the Americas only. Customers in the European Community should add the appropriate VAT rate applicable in their country to the price(s).

published by The MIT Press

Kenneth De Jong Editor in Chief

John Grefenstette Heinz Mühlenbein Kiroaki Kitano Associate Editors

Evolutionary Computation provides an international forum for facilitating and enhancing the exchange of information among researchers involved in both the theoretical and practical aspects of computational systems of an evolutionary nature.

Publishing both theoretical and practical developments of computational systems drawing their inspiration from nature, *Evolutionary Computation* places particular emphasis on evolutionary models of computation such as genetic algorithms (GAs), evolutionary strategies (ESs), classifier systems (CSs), evolutionary programming (EP), and other evolutionary computation techniques.

> **1994 Subscription Rates** Individual \$45 Institution \$125 Student*/Retired \$30 *Copy of current ID required. Outside U.S.A., add \$14.00 postage and handling. Canadians add additional 7% GST. Prepayment is required. Send checkdrawn against a U.S. bank in U.S. funds, payable to Evolutionary Computation-MasterCard or VISA number to: Circulation Department MIT Press Journais 55 Hayward Street Cambridge, MA 02142-1399 Tel: 617 253-2889 Fax: 617-258-6779 journals-orders@mit.edu Quarterly from The MIT Press ISSN 1063-6560 Volume 2 forthcoming

Artificial Life

Edited by Christopher G. Langton Los Alamos National Laboratory, Santa Fe Institute

Premiering in January with a double Fall/Winter issue, *Artificial Life* is intended to serve as the first unifying forum for the dissemination of scientific and engineering research in the field of artificial life. Relevant topics span the hierarchy of biological organization, including studies of the origin of life, self-assembly, growth and development, evolutionary and ecological dynamics, animal and robot behavior, social organization, and cultural evolution.

Articles for Volume 1, Numbers 1 & 2 will include: Artificial Life as Philosophy - Daniel Dennett. Toward Synthesizing Artificial Neural Networks - Michael Dyer Beyond Digital Naturalism - Fontana et al. Levels of Functional Equivalence - Stephen Harnad Chaos as a Source of Complexity - Kunihiko Kaneko Cooperation and Community Structure - Kristian Lindgren and Mats G. Nordahl Visual Models of Morphogenesis - Przemyslaw Prusinkiewicz An Evolutionary Approach to Synthetic Biology - Thomas Ray Learning about Life - Mitchel Resnick Extended Molecular Evolutionary Biology - Peter Schuster Computer Viruses as Artificial Life - Eugene Spafford Books on Artificial Life - David G. Stork

Quarterly, Volume 1 forthcoming, fall/winter/spring/summer 96 pp. per issue, 7 x 10 illustrated, ISSN 1064-5462 Yearly Rates: \$45 Individual; \$125 Institution Outside U.S.A. add \$14 postage and handling. Canadians add additional 7% GST. Prepayment is required. Please send check drawn on a U.S. bank in U.S. funds, MasterCard or VISA number to: MIT Press Journals 55 Hayward Street Cambridge, MA 02142-1399 TEL: 617-253-2889 / FAX: 617-258-6779 / journals-orders@mit.edu

New from The MIT Press!

Languages of design

Formalisms for Word, Image and Sound

EDITORS

Editor-in-Chief: R.G. Lauzzana, Penrose Press, P.O. Box 470925, San Francisco, CA 94147. USA

Managing Editor: D.E.M. Penrose, Benjamin-Cummings, Menlo Park, San Francisco, CA 94147, USA

Board of Advisors: W. Andersen, Boston, MA, USA, M. Balaban, Ben Gurion University of the Negev, Beer-Sheva, Israel, B. Bel, CNRS, Marseille, France, P. Berg, Koninklijk Conservatorium, The Hague, The Netherlands, M. Borillo, Institut de Recherche en Informatique, Toulouse, France, L.C. Camilleri, Conservatorio di Musica G.B. Martini, Florence, Italy, D. Carrier, Carnegie-Mellon University, Pittsburgh, PA, USA, K.S. Champa, Brown University, Providence, RI, USA, A. degli Antoni, Universita degli Studi, Milano, Italy, B. Galeyev, Kazan Aerospace Institute, Kazan, Russia, J. Kirsch, Sturvil Corp., Clarksburg, MD, USA, R.L. Kirsch, Sturvil Corp., Clarksburg, MD, USA, T. Knight, University of California, Los Angeles, CA, USA, R. Krishnamurti, Carnegie-Mellon University, Pittsburgh, PA, USA, K. Krithivasan, Indian Institute of Technology, Madras, India, O. Laske, Arlington, MA, USA, J.P. Leavey, Jr., University of Florida, Gainesville, FL, USA, C. Machover, Machover Associates Corporation, White Plains, NY, USA, T. Machover, Massachusetts Institute of Technology, Cambridge, MA, USA, R.F. Malina, University of California, Berkeley, CA, USA, F. Nake, Universität Berkeley, CH, USA, F. Nake, Universitat Bremen, Germany, D. Nardoni, Universita Cassino, Rome, Italy, Y. Okawa, Osaka University, Japan, G. Prince, University of Pennsylvania, Philadelphia, PA, USA, J.G. Rosebush, Judson Rosebush Co, New York, NY, USA, A. Rosenfeld, University of Maryland, College Park, MD, USA, M. Sperke, Academy of Fine Arts, Bratislava, Slovac Republic, D. Spinelli, University of Massachusetts, Amherst, MA, USA, R. Stickrod, IEEE Computer Society, San Francisco, CA, USA, G. Stiny,

Languages of design

Send this form (or a photocopy) to your regular supplier or to: **ELSEVIER SCIENCE B.V.** Attn: Petra van der Meer P.O. Box 103, 1000 AC Amsterdam The Netherlands

Customers in the USA/Canada, send to: ELSEVIER JOURNAL INFORMATION CENTER

P.O. Box 945, Madison Square Station New York, NY 10159-0945

Please send me a FREE inspection copy Please enter my 1994 subscription



University of California, Los Angeles, CA, USA, J. Sundberg, Royal Institute of Technology, Stockholm, Sweden and E. Tarasti, University of Helsinki, Finland

AUDIENCE

Researchers in Artificial Intelligence, Formal Languages, Design Synthesis, Computer Graphics, Computational Linguistics, Computer Music, Text Synthesis, Sound Synthesis, Image Synthesis and Productive Systems.



AIMS AND SCOPE

Languages of design is an international, interdisciplinary journal devoted to research in formal languages and their use for the synthesis of words, images and sounds. Languages of design welcomes articles employing linguistic techniques to generate literary and "nonliterary" texts, music and visual works, including fine art, dance, theatre, architecture and all types of design. This multidisciplinary focus is reflected in the composition of the journal's editorial board, which includes literary theorists, music theorists and composers, researchers in artificial intelligence, artists and art critics. Formal design theory, generative grammars, shape grammars, and computational musicology are the central domain of the journal, More general subject areas such as formal languages, finite state automata, grammatical inference, pattern recognition, cellular automata, semantic networks, connectionism and syntactical analysis will be discussed in the context of their application to productive systems. Specific analytic perspectives such as syntactics, semiotics, deconstruction, hermeneutics, stylistics, narratology, philology, morphology, prosody, harmony theory, formal musicology and performance analysis will be presented in terms of their impact and influence on a theoretical foundation for productive systems.

Research results from visual, audio, and textual analyses that may have impact on the arts are also invited. Of particular interest is research utilising computational methods to verify theoretical formal analyses. Articles criticising the assumptions and results of this work are also encouraged.

ABSTRACTED/INDEXED IN

Sociological Abstracts.

1994 SUBSCRIPTION DATA

© 1994: Volume 2 (in 4 issues) Subscription price: Dfl. 368.00 (US \$ 199.00) including postage ISSN 0927-3034 **Commenced Publication 1993**

Π Payment enclosed: (Bank Draft / Eurocheque / International Money Order / Postal Cheque / Personal Cheque / Official Purchase Order Form / UNESCO Coupons) Please send me a pro forma invoice Charge my credit card: (Access / Eurocard / American Express / MasterCard / VISA) Card Number Address City.....Postal/Zip Code

Country VAT Registration Number

Signature.....Date......Date Nor WAT registered customers in the European Union should add the approapriate VAT rate applicable in their country to the price. The Outch Guider (DR) price quoted applies worldwide, except in the Americas (North, Central and South America). The US Dolia (US 3) price quoted applies in the Americas only. Journals are sent by surface mail to all countries, accept the following, where air delivery via SAL mail is ansured at no extra cost to the subscriber. Argentina, Australia Prazil, Canada Hong Kong, Inda, Israel, Japan, Malaysia. Mexico, New Zealand, Pakistan, P.R. of Chine, Singapore, South Africe, South Korea, Taiwan, Thailand and USA

Association for Computational Linguistics 1994 MEMBERSHIP, CHANGE OF ADDRESS, AND ORDER FORM

New Address for ACL Office

MEMBERSHIP

Membership in the Association for Computational Linguistics is for the calendar year, regardless of when dues are paid. Membership includes a full year of the ACL journal Computational Linguistics, reduced registration at most ACLsponsored conferences, and discounts on ACL-sponsored publications. A late payment fee will be charged for renewals made after 15 April; this fee does not apply to new members. Institutions now subscribe to the journal through MIT Press Journals, 55 Hayward Street, Cambridge, MA 02142 USA; +1-617-253-2889 phone; 258-6779 fax; journalsorders@mit.edu email. Back issues and proceedings are available only from the ACL, except that institutions should backorder journals for 1988 and following years through MIT Press. Payments for dues, back issues, and proceedings can be made in Europe and Japan as well as the U.S. Read the directions under the heading PAYMENT below carefully. *Identify institutional affiliation, if it is not part of your address*. Also provide telephone country & region codes and computer network & email address, even if you have done so before. Write legibly, please!

FULL NAME

(first/given names) ADDRESS	(last/family names)	
INSTITUTION	ТЕLЕРНОЛЕ	
COMPUTER NETWORK & EMAIL ADDRESS		

CREDITCARD INFORMATION: VISA and MASTERCARD only

CARDNUMBER

TOTAL PAYMENT (for Dues Payment, International Fund, Back Issues, Supplements, and Proceedings)

MEMBERSHIP DUES FOR 1994: Dues for *Regular Members* are \$40. Couples with the same mailing address may become *Joint Members* for \$50; they will receive only one set of publications, but each will be eligible for all other member benefits. Students taking a *full-time program of courses* and *not earning a regular income* may become *Student Members* for \$25 with copy of current student ID. Students who are not *Student Members* and pay at the Regular rate can still participate in student activities as *Student-Employed*. *Retired Members* and *Unemployed Members* pay \$25. Surface mailing costs are included in the membership dues.

□Regular(\$40) □Joint(\$50) □Student(\$25) □Student-Employed(\$40) □Retired(\$25) □Unemployed(\$25) DUES \$

Ist class or air (\$10 U.S., Canada, Mexico; \$20 elsewhere): \$10 late payment for renewals after 15 April 1994 OPTIONAL DUES MAILING \$_____ LATE PAYMENT FEE \$_____ TOTAL DUES PAYMENT \$____

\$

EXPIRATION DATE

INTERNATIONAL FUND: The ACL set up a fund in 1982 to make ACL memberships and publications available to colleagues who have difficulty in using their national currencies for international transactions or for whom membership would otherwise be impossible. Contributions may be tax-deductible in various countries; check local regulations.

INTERNATIONAL FUND \$

THE DON AND BETTY WALKER INTERNATIONAL STUDENT FUND: The ACL set up a fund in 1993 to honor Don and Betty Walker. It will help support student travel to ACL meetings. Contributions may be tax-deductible in various countries, and companies may provide matching funds; check local regulations. Send contributions to The Walker Fund, Judith Klavans (ACL), PO Box 105, Hastings-on-Hudson, NY 10706, USA; +1-914-478-1802 (phone and fax); acl@cs.columbia.edu. Make checks payable to the "The Walker Fund"; Visa and MasterCard payments are accepted; payments can be made by email or through the ACL offices in Switzerland and Japan with copies sent to Klavans.

JOURNAL BACK ISSUES AND PROCEEDINGS

JOURNAL BACK ISSUES: Back issues of Computational Linguistics are available from the ACL, as are two new special supplements: a Directory of Graduate Programs in Computational Linguistics, revised in 1992, and a Survey of Computational Linguistics Courses, revised in 1993. Surface mailing costs are included in the prices; additional charges for 1st class or air delivery are noted. Institutions must order back issues for 1988 and following years through MIT Press Journals; see addresses above. ORDERS BY MEMBERS FOR USE IN LABORATORIES OR LIBRARIES MUST BE PAID FOR AT THE "OTHERS" RATE.

1980-1992 VOLUMES – CIRCLE YEARS (Each Year: Members \$30; others \$60)): BACK ISSUES \$
Print: 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991	1992
(Institutions must order 1988-1992 through MIT Press Journals)	
Ist class or air (Each year: \$10 U.S., Canada, Mexico; \$25 elsewhere):	BACK ISSUE MAILING \$
SUPPLEMENTS - CHECK ITEMS (Members \$15; others \$30):	SUPPLEMENTS \$
□1992 Directory of Graduate Programs □1993 Survey of Courses (Sum	mer delivery)
Ist class or air (each: \$5 U.S., Canada, Mexico; \$10 elsewhere):	SUPPLEMENT MAILING \$

PROCEEDINGS: Proceedings are available for the ACL conferences listed below. COLING proceedings for 84, 86 (shipped from Bonn), 88, 90 and 92 should be ordered through the ACL. Order information for COLING-94 will be available in September. Surface mailing costs are included in the prices; additional charges for 1st class or air delivery are noted. ORDERS BY MEMBERS FOR USE IN LABORATORIES OR LIBRARIES MUST BE PAID FOR AT THE "OTHERS" RATE.

ACL PROCEEDINGS (ea	ch proceedings: Members \$30;	others \$60):	PROCEEDINGS \$
Ist class or air (each pro	ceedings: \$10 U.S., Canada, M	exico; \$25 elsewhere):	MAILING \$
ACL ANNUAL MEETING	GS		
□17th, San Diego, 1979	□18th, Philadelphia, 1980	🗆 19th, Stanford, 1981	🗆 20th, Toronto, 1982
□21st, Cambridge, 1983	-22nd, see COLING-84 below		24th, New York, 1986
□25th, Stanford, 1987	□26th, Buffalo, 1988	27th, Vancouver, 1989	28th, Pittsburgh, 1990
□29th, Berkeley, 1991	□30th, Newark, 1992	□31st, Columbus, 1993	□32nd Las Cruces, 1994 (August delivery)
CONFERENCES ON AP	PLIED NATURAL LANGUAGE	E PROCESSING	
□First, Santa Monica, 19	83 ⊡Second, Austin, 1988	Third, Trento, 1992	□Fourth, Stuttgart, 1994 (November delivery)
EUROPEAN CHAPTER	CONFERENCES		
□First, Pisa, 1983	⊡Second, Geneva, 1985	DThird, Copenhagen, 198	37 □Fourth, Manchester, 1989
□Fifth, Berlin, 1991	□Sixth, Utrecht, 1993		
COLING PROCEEDINGS (note differences in prices and in charges for 1st class or air delivery):			
□COLING-84, Stanford,	1984 (Members \$45; others \$90)) COI	LING-84 PROCEEDINGS \$
lst class or air (\$15 U	.S., Canada, Mexico; \$25 elsewl	here):	COLING-84 MAILING \$
□COLING-86, Bonn, 198	36 (through ACL: \$65 surface de	elivery; \$80 air): CO	LING-86 PROCEEDINGS \$
□COLING-88 (2 vol.), B	udapest, 1988 (Members \$75; o	thers \$150): CO	LING-88 PROCEEDINGS \$
Ist class or air (\$20 U	S., Canada, Mexico; \$40 elsewl	here):	COLING-88 MAILING \$
□COLING-90 (3 vol.), H	elsinki, 1990 (Members \$95; otl	hers \$190): COI	LING-90 PROCEEDINGS \$
lst class or air (\$20 U	.S., Canada, Mexico; \$40 elsewl	here):	COLING-90 MAILING \$
□COLING-92 (4 vol.), N	antes, 1992 (Members \$75; othe	ers \$150): COI	LING-92 PROCEEDINGS \$
1st class or air (\$20 U	.S., Canada, Mexico; \$40 elsewl	here):	COLING-92 MAILING \$
□COLING-94, Kyoto, 19	94 (Order information available	in September)	

PAYMENT

METHOD (circle): CHECK MONEYORDER CREDITCARD BANKTRANSFER Enter Total Amount at end of address field.

Prepayment is necessary; invoices are available on request. The U.S. dollar price is definitive when paying in other currencies, although rounding off is appropriate. Checks and money orders should be made out to the Association for Computational Linguistics (or to ACL). ALL CREDITCARD PAYMENTS MUST BE MADE TO THE ACL OFFICE IN THE USA; ELECTRONIC SUBMISSIONS ARE PREFERRED; send the information above from Name through Total Payment, with an identification of the items for which payment is being made, to acl@bellcore.com; or request a form by email. Other payments can be made to one of the addresses below, as follows:

- To the ACL office (address below) in the USA; mail this dues statement with creditcard information or with a check or money order *payable to ACL*. PAYMENTS OTHER THAN BY CREDITCARD MUST BE MADE IN U.S. DOLLARS, DRAWN ON A U.S. BANK OR IN U.S. OR CANADIAN DOLLARS (CALCULATED AT THE CURRENT EXCHANGE RATE), DRAWN ON A CANADIAN BANK.
- 2. To Rosner in Europe; mail this dues statement with a check or money order in Swiss francs or the equivalent in your local currency on the day the check is written, *payable to ACL*. DO NOT MAKE CREDITCARD PAYMENTS THROUGH EUROPE. Make sure that the check or money order is payable in Switzerland or France. DO NOT ISSUE A CHECK OR MONEY ORDER IN U.S. DOLLARS UNLESS IT IS DRAWN ON A U.S. BANK. Payment can also be made by bank transfer to ACL account number 141.880.LAV at the Union Bank of Switzerland, 8 rue de Rhone, CH-1211 Geneva 11, SWITZERLAND. Send Rosner a copy of the bank transfer as well as the dues statement. NOTE THAT EUROPEAN MEMBERS SHOULD PAY THROUGH ROSNER UNLESS THEY PAY BY CREDITCARD OR HAVE A U.S. BANK ACCOUNT.
- 3. To Nagao in Japan; transfer an equivalent amount in yen on the day of payment to "Dai-ichi Kangyo Bank, Hyakumanben Branch; Ordinary Deposit, 476-1319944; Name: Keisangengogakkai Kaihi Nagao Makoto." Send Nagao a copy of the bank transfer. DO NOT MAKE CREDITCARD PAYMENTS THROUGH JAPAN. Also mail this dues statement to the ACL office together with a copy of the bank transfer. NOTE THAT THE DUES STATEMENT MUST BE SENT TO THE ACL OFFICE TO BE PROPERLY RECORDED.

Assoc. for Computational Linguistics	Dr. Michael Rosner (ACL)	Prof. Makoto Nagao (ACL)
Walker	IDSIA	Electrical Engineering
C.N. 925 Bernardsville, NJ 07924-0925	Corso Elvezia 36 CH-6900 Lugano, SWITZERLAND	Kyoto University

+1-908-204-1337 phone/fax acl@bellcore.com +41-91-22-88-81 phone; 89-94 fax mike@idsia.ch +81-75-753-5344 phone; 751-1576 fax nagao@pine.kuee.kyoto-u.ac.jp

Guidelines for Submissions

Manuscripts for **Computational Linguistics** should be submitted on letter-size paper (8.5 by 11 inches, or A4), double-spaced throughout, including footnotes and references. The paper should begin with an informative abstract of approximately 150–250 words. Manuscripts must be written in English. Contact the editor regarding the possibility of electronic submission.

Submissions may be made in any of the following categories:

Papers: This category includes contributions that report significant new research results in computational linguistics or that provide critical reviews of the literature on a particular topic. The length of a paper depends on its content, but it is suggested that manuscripts be limited to forty double-spaced pages. That is the equivalent of thirty journal pages. Each paper is fully refereed, being read by at least two members of the editorial board and usually by an additional expert in the particular subject area. The submission of an article to CL for refereeing means that the author certifies the manuscript is not copyrighted; nor has it been published or submitted for publication to another refereed journal. If any version of the paper has appeared, or will appear, in a non-refereed publication, the details of such publication must be made known to the Editor at the time of submission. The final version of a paper tentatively accepted for publication must be accompanied by a Copyright Transfer Agreement signed by all of the authors or, in the case of a "work for hire," by the employer. This written transfer is necessary under the 1978 U.S. Copyright law.

Letters to the Editor: This category includes statements of opinion on issues relevant to the readership. The Editor and the editorial board will evaluate the appropriateness of these contributions for inclusion.

Five copies of papers or three copies of letters should be sent to:

Julia Hirschberg, CL Editor AT&T Bell Laboratories 600 Mountain Avenue, 2D-450 Murray Hill, NJ 07974, USA (+1 908) 582-7496; acl@research.att.com

Squibs and Discussions: This category includes short articles reporting technical results, discussions of results, algorithms, or new computational linguistic data or tools of interest to the journal readership. Submissions should generally not exceed eight double-spaced pages and should be submitted to:

James Pustejovsky, CL Squibs and Discussions Co-Editor Brandeis University Computer Science Department Waltham, MA 02254, USA (+1 617) 736-2709; jamesp@cs.brandeis.edu

Book Section: Anyone interested in reviewing a book, or in suggesting a book for review, should contact the Book Review Editor; publishers may also submit copies of books for review directly to:

Graeme Hirst, CL Book Review Editor University of Toronto Department of Computer Science Toronto, CANADA M5S 1A4 (+1 416) 978-8747; gh@cs.toronto.edu

The FINITE STRING: Send (a) summaries of research in progress — of particular interest would be perspectives on the activities at a particular institution; (b) announcements of meetings of potential interest to the membership; and (c) personal notes (e.g., honors, moving, changes in status) to The FINITE STRING Editor. Time-sensitive material should be received by the first day of the second month of each quarter to appear in the next issue. Submissions (where possible in electronic form) should be sent to:

Ralph Weischedel, FINITE STRING Editor BBN Systems & Technologies 10 Moulton Street Cambridge, MA 02138, USA (+1 617) 873–3496; weischedel@bbn.com Founded in 1962, the Association for Computational Linguistics (ACL) is the primary scientific and professional society for natural language processing research and applications. A European chapter was established in 1982. Besides publishing *Computational Linguistics*, the ACL holds international meetings (annually in North America, biennially in Europe) where the state-of-the-art in natural language processing research and development is presented. It also sponsors a series of books on natural language processing through The MIT Press. Recently, special interest groups on the Mathematics of Language, the Lexicon, Parsing, Generation, Computational Phonology, and Multimedia Language Processing have been formed; others are likely to be added.

President (1994)

Vice-President (1994)

Secretary-Treasurer (1977–93)

Associate Secretary-Treasurer (1993)

Executive Committee

(1992–94) (1993–95) (1994–96) Journal Editor

Nominating Committee (1992–94) (1993–95) (1994–96)

ACL EUROPEAN CHAPTER OFFICIALS Chair (1993–94)

Secretary (1993-94)

Treasurer (1982–94)

Advisory Committee (1993–94)

Nominating Committee (1991-94)

(1993 - 96)

Karen Sparck Jones University of Cambridge Computer Laboratory New Museums Site, Pembroke Street Cambridge CB2 3QG, ENGLAND (+1 44 223) 334631; sparckjones@cl.cam.ac.uk

Douglas E. Appelt Artificial Intelligence Center SRI International 333 Ravenswood Ave. Menlo Park, CA 94025 (+1 415) 859-6150; appelt@ai.sri.com

†Donald E. Walker Belicore 445 South Street, MRE 2A379 Morristown, NJ 07960, USA (+1 201) 829-4312; walker@belicore.com

Judith Klavans Columbia University Computer Science Department New York, NY 10027, USA (+1 212) 939-7120; acl@cs.columbia.edu

President, Vice-President, Associate Secretary-Treasurer and Chair of the ACL European Chapter Bente Maegaard, Centre for Language Technology Stuart Shieber, Harvard University Eduard Hovy, USC/Information Sciences Institute Julia Hirschberg, AT&T Bell Laboratories

Ralph Grishman, New York University Kathleen McKeown, Columbia University Fernando Pereira, AT&T Bell Laboratories

Ewan Klein University of Edinburgh Centre for Cognitive Science 2 Buccleuch Place Edinburgh EH8 9LW, SCOTLAND (+44 31) 650-4428; klein@ed.ac.uk

Susan Armstrong ISSCO University of Geneva 54 route des Acacias CH-1227 Geneve SWITZERLAND (+41 22) 705-7113; susan@divsun.unige.ch

Michael Rosner IDSIA Corso Elvezia 36 CH-6900 Lugano, SWITZERLAND (+41 91) 22 88 81; mike@idsia.ch

Chair, Secretary, Treasurer and Igor M. Boguslavsky, Russian Academy of Sciences Anna Sågvall Hein, University of Uppsala Harold L. Somers, University of Manchester Institute of Science and Technology

Henrik Holmboe, Aarhus School of Business Petr Sgall, Charles University (Chair) Nicoletta Calzolari, Institute of Computational Linguistics Christian Rohrer, University of Stuttgart