# Noteworthy Titles from Cambridge!

# **Pearls of Functional Algorithm Design**

RICHARD BIRD

\$60.00: Hardback: 978-0-521-51338-8: 295 pp.

# **Digital Nets and Sequences**

Discrepancy Theory and Quasi-Monte Carlo Integration

JOSEF DICK, FRIEDRICH PILLICHSHAMMER \$85.00: Hardback: 978-0-521-19159-3: 575 pp.

# Foundations of XML Processing

The Tree-Automata Approach

HARUO HOSOYA

#### Contents

Preface; 1. Introduction; 2. Preliminaries; 3. Schemas; 4. Tree automata; 5. Pattern matching; 6. Marking tree automata; 7. Typechecking; 8. On-the-fly algorithms; 9. Alternating tree automata; 10. Tree transducers; 11. Exact typechecking; 12. Path expressions and tree-walking automata; 13. Logic-based queries; 14. Ambiguity; 15. Unorderedness; References; Index.

\$65.00: Hardback: 978-0-521-19613-0: 230 pp.

# Steps in Scala

# An Introduction to Object-Functional Programming

CHRISTOS K. K. LOVERDOS, APOSTOLOS SYROPOULOS

#### Contents

Preface; 1. Introduction; 2. Core features; 3. Advanced features; 4. Parser builders; 5. XML processing; 6. GUI programming; 7. Concurrent programming; 8. On paths and a bit of algebraic abstractions; 9. Virtual files coming into existence; 10. Compositional file matching; 11. Searching, iterating, traversing; 12. The expression problem; 13. A computer algebra system; Appendix A. Multimedia processing; Appendix B. Distributing a Scala application along with Scala itself; Appendix C. Working with the compiler and the interpreter; Appendix D. Scala's grammar; References; Author index; Subject index.

\$99.00: Hardback: 978-0-521-76217-5: 525 pp. \$50.00: Paperback: 978-0-521-74758-5

# Combinatorics, Automata and Number Theory

EDITED BY VALÉRIE BERTHÉ, MICHEL RIGO

Encyclopedia of Mathematics and its Applications
\$130.00: Hardback: 978-0-521-51597-9: 630 pp.

# **Grammatical Inference**

**Learning Automata and Grammars** 

COLIN DE LA HIGUERA

\$85.00: Hardback: 978-0-521-76316-5: 432 pp.

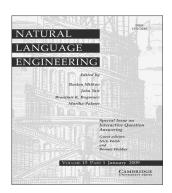


Prices subject to change.

www.cambridge.org/us/computerscience 800.872.7423



# **JOURNALS**



# NATURAL LANGUAGE ENGINEERING

# Natural Language Engineering

is available online at http://journals.cambridge.org/nle

# To subscribe contact Customer Services

# in Cambridge:

Phone +44 (0)1223 326070 Fax +44 (0)1223 325150 Email journals@cambridge.org

## in New York:

Phone +1 (845) 353 7500 Fax +1 (845) 353 4141 Email subscriptions\_newyork@cambridge.org

# **Executive Editor**

Ruslan Mitkov, University of Wolverhampton, UK

Natural Language Engineering meets the needs of professionals and researchers working in all areas of computerised language processing, whether in theoretical or descriptive linguistics, lexicology, computer science or engineering. The journal bridges the gap between traditional computational linguistics research and the implementation of practical applications with potential real-world use.

# Price information is available at <a href="http://journals.cambridge.org/nle">http://journals.cambridge.org/nle</a>

# Free email alerts

Keep up-to-date with new material – sign up at http://journals.cambridge.org/alerts

For free online content visit http://journals.cambridge.org/nle



# **JOURNALS**

# ReCALL

# **Editor**

June Thompson, University of Hull, UK



The primary focus of *ReCALL* is the use of technologies for language learning and teaching. It aims to appeal to researchers and practitioners in the area of computer-assisted and technology-enhanced language learning, normally but not exclusively operating in universities. *ReCALL* is also of interest to language teachers in secondary and tertiary education who may be considering the introduction of technologies into their teaching practice.

# ReCALL

is available online at: http://journals.cambridge.org/rec

# To subscribe contact Customer Services

# in Cambridge:

Phone +44 (0)1223 326070 Fax +44 (0)1223 325150 Email journals@cambridge.org

# in New York:

Phone +1 (845) 353 7500 Fax +1 (845) 353 4141 Email subscriptions\_newyork@cambridge.org

# **Price information**

is available at: http://journals.cambridge.org/rec

# Free email alerts

Keep up-to-date with new material – sign up at http://journals.cambridge.org/alerts

For free online content visit: http://journals.cambridge.org/rec



# **JOURNALS**



# Robotica

An official journal of the International Federation of Robotics

## Robotica

is available online at: http://journals.cambridge.org/rob

# To subscribe contact Customer Services

# in Cambridge:

Phone +44 (0)1223 326070 Fax +44 (0)1223 325150 Email journals@cambridge.org

## in New York:

Phone +1 (845) 353 7500 Fax +1 (845) 353 4141 Email subscriptions\_newyork@cambridge.org

# Editor-in-Chief

G. S. Chirikjian, Johns Hopkins University, USA

Robotica is a forum for the multidisciplinary subject of robotics and encourages developments, applications and research in this important field of automation with regard to industry, health, education and economic and social aspects. Coverage includes activities in hostile environments, applications in the service and manufacturing industries, biological robots, on-line robots and various other areas.

# Pricing information is available at: <a href="http://journals.cambridge.org/rob">http://journals.cambridge.org/rob</a>

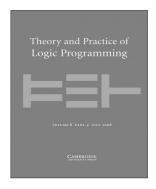
# Free email alerts

Keep up-to-date with new material – sign up at http://journals.cambridge.org/alerts

For free online content visit: http://journals.cambridge.org/rob



# **JOURNALS**



# Theory and Practice of Logic Programming

Published for the Association for Logic Programming

# Theory and Practice of Logic

**Programming** is available online at http://journals.cambridge.org/tlp

# To subscribe contact Customer Services

# in Cambridge:

Phone +44 (0)1223 326070 Fax +44 (0)1223 325150 Email journals@cambridge.org

## in New York:

Phone +1 (845) 353 7500 Fax +1 (845) 353 4141 Email subscriptions\_newyork@cambridge.org

# Editor-in-Chief

A Bossi, Università Ca' Foscari di Venezia, Italy

Theory and Practice of Logic Programming emphasises both the theory and practice of logic programming. Among the topics covered in this journal are Al applications that use logic programming, natural language processing, knowledge representation, nonmonotic reasoning, databases implementations and architectures and constraint logic programming.

# Price information is available at <a href="http://journals.cambridge.org/tlp">http://journals.cambridge.org/tlp</a>

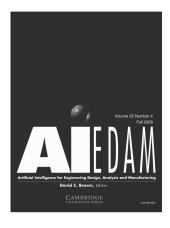
# Free email alerts

Keep up-to-date with new material – sign up at http://journals.cambridge.org/alerts

For free online content visit http://journals.cambridge.org/tlp



# **JOURNALS**



# AIEDAM Artificial Intelligence for Engineering Design,

Analysis and Manufacturing

#### AI EDAM

is available online at: http://journals.cambridge.org/aie

# To subscribe contact Customer Services

# in Cambridge:

Phone +44 (0)1223 326070 Fax +44 (0)1223 325150 Email journals@cambridge.org

## in New York:

Phone +1 (845) 353 7500 Fax +1 (845) 353 4141 Email subscriptions\_newyork@cambridge.org

# **Editor**

David C. Brown, Worcester Polytechnic Institute, USA

This journal publishes original articles about significant AI theory and applications based on the most up-to-date research in all branches of phases of engineering. Suitable topics include: analysis and evaluation; selection; configuration and design; manufacturing and assembly; and concurrent engineering.

# Price information is available at: http://journals.cambridge.org/aie

# Free email alerts

Keep up-to-date with new material – sign up at http://journals.cambridge.org/alerts

For free online content visit: http://journals.cambridge.org/aie



# **Instructions for contributors**

#### **Editorial policy**

Mathematical Structures in Computer Science (MSCS) is a journal of theoretical computer science which focuses on the application of ideas from the structural side of mathematics and mathematical logic to computer science. The journal aims to bridge the gap between theoretical contributions and software design, publishing original papers or broad surveys with original perspectives in all areas of computing, provided that ideas or results from logic, algebra, geometry, category theory or other areas of logic and mathematics form a basis for the work. The journal also welcomes applications to computing based on the use of specific mathematical structures (e.g. topological and order-theoretic structures) as well as on proof-theoretic notions or results. In addition, it is interested in contributions in new interdisciplinary fields bridging computer science, quantum physics, mathematics and information theory. In particular, papers on mathematical formalisms for quantum computation, quantum information processing and communication will be considered. The journal will also consider papers on computational modelling of epigenetic phenomena, protein-protein interactions, stochasticity in molecular cascades.

Mathematical approaches to System Biology will be welcomed, within the broad framework of post-genomic views of embryogenesis and evolution.

The purpose of the journal is to increase the circulation of new very high standard results in fast growing areas which are currently influencing various aspects of actual computing. Indeed, this journal is not meant to be only a 'theory journal' but, by choosing as a theme the use of mathematical methods of Computer Science independently of their area of application, it aims to highlight connections among different topics and to encourage applications of theoretical contributions.

In order to promote the use of mathematical methods in computer science, expository and introductory papers are welcome, provided that there is a clear connection to computational issues or they investigate mathematical structures whose relevance to computer science is well established. However, these contributions should be directed to the broad audience of computer scientists to which this journal is addressed. Equally, discussions of a methodological or philosophical nature concerning the foundation of Computer Science are of interest for the journal.

# Submission of manuscripts

Papers may be submitted to any member of the Editorial Board. A file .pdf should be sent accompanied by the author's address, telephone and fax number, and e-mail address.

A copy of the paper together with the name of the editor chosen should also be sent to the Editor-in-Chief who will record the submission.

Submission of a paper is taken to imply that it has not been previously published and that it is not being considered for publication elsewhere. Authors of articles published in the journal assign copyright to Cambridge University Press (with certain rights reserved) and you will receive a copyright assignment form for signature on acceptance of your paper.

The publisher encourages submission of papers written in LaTeX using the MSCS LaTeX style file. The LaTeX 2.09 style file mscs.sty together with a guide to its use mscsguide.tex, or the corresponding LaTeX 2e file mscs.cls are available via anonymous ftp from the Cambridge University Press site at ftp.cup.cam.ac.uk in the directories /pub/texarchive/journals/latex/mscs-sty or /pub/texarchive/journals/latex/mscs-sty out will find a concatenated file called mscs.all. This file contains readme.txt, mscs.sty and mscguid.tex. If you Tex mscguid.tex you will get a full set of instructions for using the style file. In case of difficulties obtaining these files, there is a help-line available via e-mail; please contact texsupport@techbooks.com. While use of the MSCS LaTeX style file is preferred, ordinary LaTeX or plain TeX files can also be accepted.

On final acceptance of their paper, authors should make accessible to the Editor-in-Chief (downloadable) the LaTeX source code including all figures (line figures only), a file .pdf and author-defined macro and style files, together with a hard copy produced using the same file. Discs should be in Apple Mac or PC format and will not be returned. The publisher reserves the right to typeset any article by conventional means if the author's TeX code presents problems in production.

#### Layout of manuscripts

Papers should be typewritten in **double spacing throughout**, on one side of the paper. Please avoid footnotes if possible. Papers should begin with an abstract of not more than 300 words and should end with a brief concluding section.

#### Illustrations

Figures should be drawn in indian ink on good quality white paper or produced by computer to comparable quality. Wherever possible they will be reproduced with the author's original lettering. Originals of figures should not be sent until the paper has been accepted. A list of captions should be attached separately.

#### References

The Harvard system of references should be used. In the text, a reference should be quoted by the author's name and date in parentheses, in date order, e.g. (Smith 1983; Jones and Jones 1985; Hunter 1986a,b). Where there are three or more authors, the first name followed by et al. should be used. A full list of references should be given at the end of the main text, listing, in alphabetical order, surname of author and initials; year of publication (in parentheses); article title; journal name abbreviated in accordance with the *World List of Scientific Periodicals* (4th edn); volume number; inclusive page numbers. For books and conference proceedings, place of publication and publisher (and Editor(s) if appropriate) should be included.

# **Proof Reading**

Typographical or factual errors only may be changed at proof stage. The publisher reserves the right to charge authors for correction of non-typographical errors. No page charge is made.

#### Offprints

Extra offprints may be purchased from the publisher if ordered at proof stage.

© Cambridge University Press 2010

PUBLISHED BY THE PRESS SYNDICATE OF THE UNIVERSITY OF CAMBRIDGE

The Pitt Building, Trumpington Street, Cambridge CB2 1RP, United Kingdom

CAMBRIDGE UNIVERSITY PRESS

The Edinburgh Building, Cambridge CB2 8RU, United Kingdom

32 Avenue of the Americas, New York, NY 10013-2473, USA

477 Williamstown Road, Port Melbourne, VIC 3207, Australia

C/Orense, 4, planta 13, 28020 Madrid, Spain

Lower Ground Floor, Nautica Building, The Water Club, Beach Road, Granger Bay, 8005 Cape Town, South Africa

# NSCS OCTOBER 2010 VOLUME 20 NUMBER 5

# CONTENTS

SPECIAL ISSUE: THEORY AND APPLICATIONS OF MODELS OF COMPUTATION (TAMC 2008–2009)

of Computation (TAMC 2008–2009) MANINDRA AGRAWAL, BARRY COOPER AND ANGSHENG LI Quantitative aspects of speed-up and gap phenomena KLAUS AMBOS-SPIES AND THORSTEN KRÄLING THOMAS ANBERRÉE MATHIAS BARRA ERNST-ERICH DOBERKAT ANDREA SORBI, GUOHUA WU AND YUE YANG 813 GREGORY LAFITTE AND MICHAEL WEISS A practical parameterised algorithm for the individual haplotyping problem MLF MINZHU XIE, JIANXIN WANG AND JIANER CHEN Axiomatic semantics of projection temporal logic programs XIAOXIAO YANG, ZHENHUA DUAN AND QIAN MA Connection between logical and algebraic approaches to concurrent systems The computational SLR: a logic for reasoning about computational

© Cambridge University Press 2010

RAHUL JAIN, ASHWIN NAYAK AND YI SU

# **Cambridge Journals Online**

For further information about this journal please go to the journal website at: journals.cambridge.org/msc



A separation between divergence and Holevo information for ensembles

