CONTENTS

SPECIAL SECTION – SIGNAL PROCESSING IN GENOMICS

- 18 EXPRESSION TECHNOLOGY Phillip Stafford and Yidong Chen
- 27 STOCHASTIC MODELING AND SIMULATION OF GENE NETWORKS Xiaodong Cai and Xiaodong Wang
- 37 FINDING MODULE-BASED GENE NETWORKS WITH STATE-SPACE MODELS Rui Yamaguchi, Ryo Yoshida, Seiya Imoto, Tomoyuki Higuchi, and Satoru Miyano
- 47 DNA SEQUENCE COMPRESSION Gergely Korodi, Ioan Tabus, Jorma Rissanen, and Jaakko Astola
- 54 CONTROL APPROACHES FOR PROBABILISTIC GENE REGULATORY NETWORKS Aniruddha Datta, Ranadip Pal, Ashish Choudhary, and Edward R. Dougherty
- 64 COMPUTATIONAL IDENTIFICATION AND ANALYSIS OF NONCODING RNAS Byung-Jun Yoon and P.P. Vaidyanathan
- 75 SINGLE NUCLEOTIDE POLYMORPHISM DATA ANALYSIS Shih-Chieh Su, C.-C. Jay Kuo, and Ting Chen
- 83 GENE MAPPING OF COMPLEX DISEASES Michel Sarkis, Bernhard Goebel, Zaher Dawy, Joachim Hagenauer, Pavol Hanus, and Jakob C. Mueller

- 91 FADS AND FALLACIES IN THE NAME OF SMALL-SAMPLE MICROARRAY CLASSIFICATION Ulisses Braga-Neto
- 100 GENOMIC PROCESSING FOR CANCER CLASSIFICATION AND PREDICTION Peng Qiu, Z. Jane Wang, and K.J. Ray Liu
- 111 NANOTECHNOLOGY FOR GENOMIC SIGNAL PROCESSING IN CANCER RESEARCH Jie Chen and Stephen T.C. Wong

COLUMNS

- 2 FROM THE EDITOR
- **4 PRESIDENT'S MESSAGE**
- 10 READER'S CHOICE
- 16 FROM THE GUEST EDITORS
- 122 APPLICATIONS CORNER
- 126 LIFE SCIENCES
- 120 LIFE SCIENCES
- 130 DSP EDUCATION
- 134 LECTURE NOTES
- 137 DSP TIPS & TRICKS
- 140 STANDARDS IN A NUTSHELL
- 145 BEST OF THE WEB
- 148 BOOK REVIEW
- **152 NEW PRODUCTS**
- 160 IN THE SPOTLIGHT

DEPARTMENTS

6 SOCIETY NEWS 156 DATES AHEAD

SCOPE: IEEE Signal Processing Magazine publishes tutorial-style articles on signal processing research and applications, as well as columns and forums of interest to the signal processing community. Coverage ranges from fundamental principles to practical implementation, reflecting the multidimensional facets of interests and concerns of the readership. Its mission is to bring up-todate emerging and active technical developments, issues, and events to the research, educational, and professional communities. It is also the primary society communication platform addressing important issues concerning the IEEE Signal Processing Society. See www.ee.columbia.edu/spm for more information.

IEEE SIGNAL PROCESSING MAGAZINE (ISSN 1053-5888) (ISPREG) is published bimonthly by the Institute of Electrical and Electronics Engineers, Inc., 3 Park Avenue, 17th Floor, New York, NY 10016-5997 USA (+1 212 419 7900). Responsibility for the contents rests upon the authors and not the IEEE, the Society, or its members. Annual member subscriptions included in Society fee. Nonmember subscriptions available upon request. Individual copies: IEEE Members \$20.00 (first copy only), nonmembers \$98.00 per copy. Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limits of U.S. Copyright Law for private use of patrons: (1) those post-1977 articles that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923 USA; (2) pre-1978 articles without fee. Instructors are permitted to photocopy isolated articles for noncommercial classroom use without fee. For all other copyrign, reprint, or republication permission, write to IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854 USA. CopyrightC2007 by the Institute of Electricia and Electronics Engineers, Inc. All rights reserved. Periodicals postage paid at New York, NY, and at additional mailing offices. Postmaster: Send address changes to IEEE SP Magazine, IEEE, P.O. Box 1331, 445 Hoes Lane, Piscataway, NJ 08855-1331 USA. IEEE SIGNAL PROCESSING MAGAZINE Shih-Fu Chang, Editor-in-Chief — Columbia University

AREA EDITORS Li Deng, Feature Articles — Microsoft Adriana Dumitras, Columns and Forums — Apple Computer Doug Williams, Special Sections — Georgia Institute of Technology

EDITORIAL BOARD

Petar Djurić — SUNY Stony Brook Meng Hwa Er — Nanyang Technological University, Singapore Ling Guan — Ryerson University, Canada Yingbo Hua— University of California, Riverside Bede Liu — Princeton University B.S. Manjunath — University of California, Santa-Barbara V. J. Mathews — University of California, Santa-Barbara V. J. Mathews — University of California, Santa Barbara V. J. Mathews — University of California, Santa Barbara V. J. Mathews — University of California, Santa Barbara George Moschytz — Bar-Ilan University, Israel Antonio Ortega — University of Southern California Thrasos Papas — Northwestern University Vincent Poor — Princeton University Vincent Poor — Princeton University Todd Reed — University of Hawaii Hideaki Sakai — Kyoto University, Japan Peter Stoica — Uppsala University, Sweden Lee Swindlehurst — Brigham Young University Ahmed Tewfik — University of Minnesota Sergios Theodoridis — University of Athens, Greece Isabel Trancoso — INESC, Portugal Jennifer Q, Trelewicz — IBM Almaden Research Center Rabab Ward — University of British Columbia, Canada Peter Wilett — University of British Columbia, Canada Peter Willett — University of California, Los Angeles

ASSOCIATE EDITORS-

COLUMNS AND FORUM Ghassan AlRegib — Georgia Institute of Technology Alen Docef — Virginia Commonwealth University Dan Ellis — Columbia University Berna Erol — Ricoh California Research Center Konstantinos Konstantinides — Hewlett-Packard Rick Lyons — Besser Associates Aleksandra Mojsilovic — IBM T.J. Watson Research Center Shrikanth Narayanan — University of Southern California Fernando Pereira — Instituto Superior Tecnico, Portugal C. Britton Rorabaugh — DRS C3 Systems Co. Eli Saber — Rochester Institute of Technology Hari Sundaram — Arizona State University Wade Trappe — Rutgers University Anthony Vetro — Mitsubishi Electric Research Labs Stephen T.C. Wong — Harvard University

IEEE PERIODICALS

MAGAZINES DEPARTMENT Geraldine Krolin-Taylor — Senior Managing Editor Debby Nowicki — Associate Editor Susan Schneiderman — Business Development Manager +1 732 562 3946 Fax: +1 732 981 1855

Dawn M. Melley — Editorial Director Robert Smrek — Production Director Cathline Tanis — Sr. Advertising Production Coordinator Janet Dudar — Art Director Gail A. Schnitzer — Assistant Art Director Fran Zappulla — Staff Director, Publishing Operations

IEEE SIGNAL PROCESSING

SOCIETY (2007) Alfred O. Hero, III — President José M.F. Moura — President-Elect Mos Kaveh — Vice President, Awards and Membership Athina Petropulu — Vice President, Conferences Petar Djurić — Vice President, Finance K.J. Ray Liu — Vice President, Fublications Alex Acero — Vice President, Technical Directions Mercy Kowalczyk — Executive Director and Associate Editor