Just Released!



Molecular and Biomolecular Electronics

ere is a comprehensive review of molecular and biomolecular electronics, the final stage in the miniaturization of computer circuitry that provides promising new methodologies for high speed signal processing and communication, novel associative and neutral architectures, and linear and nonlinear devices and memories.

Because the field is relatively new, leaders in the principal areas of investigation have contributed overviews of the fundamental methods and procedures of their specialties; each introduction is followed by a review of recent research.

Topics such as quantum electronics, nanoscale semiconductor fabrication, genetic engineering, molecular biophysics, and nonlinear optics are described here for readers unfamiliar with these specific fields.

Robert R. Birge, Syracuse University, Editor

Advances in Chemistry Series 240 608 pages (1994) Clothbound ISBN 0-8412-2698-9 \$139.95

Order from

American Chemical Society Distribution Office Dept. 74 1155 Sixteenth Street, NW Washington, DC 20036

Or Call TOLL FREE 1-800-227-5558 (in Washington, D.C. 872-4363) and use your credit card! FAX: 202-872-6067.

ACS Publications Catalog now available on internet: **gopher acsinfo.acs.org**

ACS III PUBLICATIONS

Biochemistry

Biochemistry (ISSN 0006-2960) is published weekly except for the first week in January by the American Chemical Society at 1155 16th St., N.W., Washington, DC 20036. Second-class postage paid at Washington, DC, and additional mailing offices. POSTMASTER: Send address changes to Biochemistry, Member & Subscriber Services, P.O. Box 3337, Columbus, OH 43210. Canadian GST Reg. No. R127571347. Printed in the USA.

American Chemical Society

1155 16th St., N.W. Washington, DC 20036 (202) 872-4600 TDD (202) 872-8733; FAX (202) 872-4615

Member & Subscriber Services

American Chemical Society P.O. Box 3337, Columbus, OH 43210 (614) 447-3776; (800) 333-9511

Journals Department

American Chemical Society 2540 Olentangy River Road P.O. Box 3330, Columbus, OH 43210 (614) 447-3600, Ext 3171 TELEX 6842086; FAX (614) 447-3745

Publications Division

Robert H. Marks, Director

Journals Department: Charles R. Bertsch, Head

Editorial Office: Mary E. Scanlan, Manager; Kathleen E. Duffy, Journals Editing Manager; Deborah K. Miller, Senior Associate Editor; Daniel R. Kelsey, Associate Editor; Amy S. McKee, David L. Norris, Barbara I. Taylor, and Beth A. Welch, Assistant Editors

Advertising Office: Centcom, Ltd., 1599 Post Road East, P.O. Box 231, Westport, CT 06881

1995 Subscription and Ordering Information

ety. Copyright permission: Reprographic copying beyond that permitted by Section 107 or 108 of the U.S. Copyright Act is allowed, provided that the appropriate per-copy fee is paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Dr., Danvers, MA 01923, USA. Anyone may excerpt up to 200 words per article for noncommercial, scholarly purposes with appropriate credit to the source. Direct other reprint permission requests to ACS Copyright Office, Publications Division, 1155 Sixteenth St., N.W., Washington, DC 20036. For quotes and information on ordering bulk reprints, call (202) 872-4539 or write to Distri-

© Copyright 1995 American Chemical Soci-

The paper used in this publication meets the minimum requirements of American National Standard for Information Sciences—Permanence of Paper for Printed Library Materials, ANSI Z39.48-1984.

bution Office at the ACS Washington address.

Editorial Information

Instructions to authors and copyright status form are printed in the first issue of each volume. Please conform to these instructions when submitting manuscripts.

Manuscripts for publication should be submitted to the Editor, Gordon G. Hammes, Duke University Medical Center, Box 3673, 081 Yellow Zone, Duke South, Durham, NC 27710. Correspondence regarding accepted papers and proofs should be directed to the Journals Department at the address above. Page charges of \$30.00 per page may be paid for papers published in this journal. Payment does not affect acceptance or scheduling of papers.

The American Chemical Society and its Editors assume no responsibility for the statements and opinions advanced by contributors.

Registered names and trademarks, etc., used in this publication, even without specific indication thereof, are not to be considered unprotected by law.

A nine character code that is unique to each article is assigned during the editorial production of the manuscript and appears at the end of the published paper. It serves as a link between the documents in the printed product and the electronic products (CJACS Plus Images and journals on CD-Rom) and makes it easy to retrieve the full text of the exact article on-line.

Members may share/donate their personal subscriptions with/to libraries and the like but only after 5 years from publication.

	U.S.	Canada, Mexico	Europe*	All Other Countries*
Printed				
Members-1 yr	\$ 115	\$ 224	\$ 384	\$ 468
Nonmembers	\$1517	\$1626	\$1786	\$1870
Microfiche				
Members-1 yr	\$ 115	\$ 115	\$ 163	\$ 163
Nonmembers	\$1517	\$1517	\$1565	\$1565
Supplementary	\$ 50	\$ 80	\$ 80	\$ 80
material on mic	crofiche	,		
* Air service inclu-	ded.			

New and renewal subscriptions should be sent with payment to American Chemical Society, Department L-0011, Columbus, OH 43268-0011.

Microforms and Back Issue orders should be sent to Microforms & Back Issues Office at the ACS Washington address.

Nonmember subscribers in Japan must enter subscription orders with Maruzen Company Ltd., 3-10 Nihonbashi 2-chome, Chuo-ku, Tokyo 103, Japan. Tel: (03) 272-7211.

Claims for missing numbers will not be allowed if loss was due to failure of notice of change of address to be received in the time specified; if claim is dated (a) North America, more than 90 days beyond issue date; (b) all other foreign, more than 180 days beyond issue date. Claims are handled by Member & Subscriber Services.

Supplementary material is noted in the table of contents with a . It is available as photocopy (\$12.00 for up to 3 pages and \$1.50 per page for additional pages, plus \$2.00 for foreign postage) or as 24× microfiche (\$12.00, plus \$1.00 for foreign postage). Canadian residents should add 7% GST. See supplementary material notice at end of journal article for number of pages. Orders must state whether for photocopy or for microfiche and give complete title of article, names of authors, journal, issue date, and page numbers. Prepayment is required and prices are subject to change. Order from Microforms & Back Issues Office at the ACS Washington address. Supplementary material except structure factors also appears in the microfilm

Cover based on the structure of myosin sub-fragment-1, courtesy of Adam Steinberg and Ivan Rayment.

Biochemistry

EDITOR: GORDON G. HAMMES

Duke University Medical Center, Box 3673, 081 Yellow Zone, Duke South, Durham, North Carolina 27710 [Phone (919) 681-3250; FAX (919) 681-8344 or (800) 334-0892]

ASSOCIATE EDITORS:

Mary D. Barkley, Louisiana State University Marc G. Caron, Duke University Medical Center Earl W. Davie, University of Washington Perry A. Frey, University of Wisconsin

Arno L. Greenleaf, Duke University Medical Center

William W. Parson, University of Washington James F. Riordan, Harvard Medical School Joseph J. Villafranca, Bristol-Myers Squibb Leslie Wilson, University of California, Santa Barbara

EDITORIAL ADVISORY BOARD

ROBERT H. ABELES **Brandeis University** DAVID S. AULD

Harvard Medical School

JOSEPH AVRUCH

Massachusetts General Hospital

GERALD T. BABCOCK Michigan State University

Barbara A. Baird Cornell University ROBERT L. BALDWIN Stanford University ROBERT M. BELL

Duke University Medical Center

STEPHEN J. BENKOVIC

The Pennsylvania State University

E. MORTON BRADBURY University of California, Davis

MICHAEL J. CHAMBERLIN University of California, Berkeley

JOSEPH E. COLEMAN Yale University MINOR J. COON

The University of Michigan

DAVID R. DAVIES

National Institutes of Health WILLIAM F. DEGRADO

Du Pont Merck Pharmaceutical Company

JACK E. DIXON

The University of Michigan RUSSELL F. DOOLITTLE

University of California, San Diego

RAYMOND A. DWEK University of Oxford MAURICE R. EFTINK University of Mississippi

JULI FEIGON

University of California, Los Angeles

ALAN R. FERSHT

Cambridge University Chemical Laboratory

IRWIN FRIDOVICH

Duke University Medical Center

ERROL C. FRIEDBERG

University of Texas Southwestern

Medical Center

CARL FRIEDEN

Washington University School of Medicine

MARTIN GELLERT

National Institutes of Health

LILA M. GIERASCH

University of Massachusetts

IRVING H. GOLDBERG Harvard Medical School

JACK GORSKI

University of Wisconsin-Madison

ANGELA M. GRONENBORN National Institutes of Health

HEIDI E. HAMM University of Illinois ROBERT HASELKORN University of Chicago CLAUDE HÉLÈNE

Museum National d'Histoire Naturelle,

Paris

JOHN W. B. HERSHEY

University of California, Davis

GEORGE P. HESS Cornell University STEFAN HIGHSMITH University of the Pacific

PETER C. HINKLE Cornell University DICK HOEKSTRA University of Groningen

BARRY HONIG Columbia University TONY E. HUGLI

Scripps Clinic & Research Foundation

LINDA JEN-JACOBSEN University of Pittsburgh ROBERT L. JERNIGAN National Institutes of Health

HANS JÖRNVALL Karolinska Institutet NEVILLE R. KALLENBACH New York University CLAUDE B. KLEE

National Institutes of Health

JUDITH P. KLINMAN

University of California, Berkeley

ROBERT J. LEFKOWITZ

Duke University Medical Center

TOMAS LINDAHL

ICRF Clare Hall Laboratories

PHILIP W. MAJERUS

Washington University School of Medicine

ROWENA G. MATTHEWS The University of Michigan THOMAS J. McIntosh

Duke University Medical Center

CHRISTOPHER MILLER **Brandeis University**

PAUL L. MODRICH Duke University Medical Center

LUCIANO MUELLER Bristol-Myers Squibb GARY L. NELSESTUEN University of Minnesota BERT W. O'MALLEY Baylor College of Medicine

ARTHUR PARDI

University of Colorado, Boulder

IVAN RAYMENT

University of Wisconsin M. THOMAS RECORD, JR. University of Wisconsin

GARY RUDNICK

Yale University School of Medicine

DAVID W. RUSSELL

University of Texas Southwestern

Medical Center

J. EVAN SADLER Washington University School of Medicine

HAROLD A. SCHERAGA Cornell University PAUL R. SCHIMMEL

Massachusetts Institute of Technology

JOACHIM SEELIG University of Basel G. GRAHAM SHIPLEY

Boston University School of Medicine

ANTERO G. SO University of Miami LINDA L. SPREMULLI

University of North Carolina, Chapel Hill

JOANNE STUBBE

Massachusetts Institute of Technology

IGNACIO TINOCO, JR.

University of California, Berkeley

OLKE C. UHLENBECK

University of Colorado, Boulder

BERT L. VALLEE Harvard Medical School JANE M. VANDERKOOI University of Pennsylvania TERESA S.-F. WANG

Stanford University PETER E. WRIGHT

Scripps Clinic & Research Foundation

CHENG-WEN WU Academia Sinica