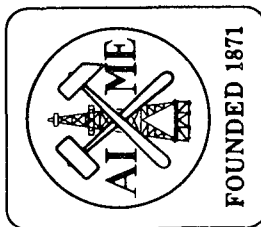
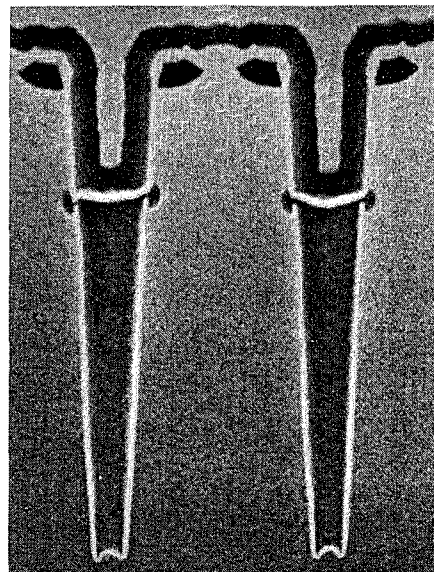


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ELECTRONIC MATERIALS SYMPOSIUM



THE



The
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presents

THE FIFTEENTH ANNUAL
**ELECTRONIC MATERIALS
SYMPOSIUM**

A One-Day Symposium on Electronic Materials
Featuring Outstanding Authorities
in Their Respective Fields

MARRIOTT HOTEL
GREAT AMERICA PARKWAY
SANTA CLARA, CALIFORNIA

Monday
March 16, 1987
7:30 A.M.

PROGRAM

Monday, March 16, 1987
Marriott Hotel

7:30 Registration

MORNING SESSION (California Ballroom - Center)

Session Chair: Dr. James McVittie
Stanford University
Stanford, CA

8:30 **Welcoming Remarks and Introduction**

Dr. Aare Onton
IBM Almaden Research Center, San Jose, CA

8:40 **"4 Mbit dDRAM Technology and Circuits."**

Dr. Pallab Chatterjee
Texas Instruments, Dallas, TX

9:30 **"Microelectronic Packaging Applications of Polymers."**

Dr. Donald C. Hofer
IBM Almaden Research Center, San Jose, CA

10:20 **REFRESHMENTS (California Ballroom - Right)**

10:50 **"Data Integrity in E²PROM's."**

Dr. John Caywood
Xicor Corp., Milpitas, CA

11:45 **LUNCHEON (California Ballroom - Left)**

12:20 **The thirteenth annual Ross Tucker Award**

12:30 **"Reasoning about Knowledge."**

Dr. Joseph Halpern
IBM Almaden Research Center, San Jose, CA

AFTERNOON SESSION (California Ballroom - Ctr)

Session Chair: Dr. Lynn M. Roylance
Hewlett-Packard Laboratories
Palo Alto, CA

1:30 **"World Class Technologies Mean
World Class Manufacturing Challenges."**

Dr. Billy L. Crowder
IBM Watson Research Center, Yorktown Hts., NY

2:15 **"Interconnection Materials and Electromigration."**

Dr. Paul A. Flinn
Intel Corporation, Santa Clara, CA

3:00 **REFRESHMENTS (California Ballroom - Right)**

3:30 **"Gallium Arsenide on Silicon : Progress and Opportunities."**

Dr. Hadis Morkoç
University of Illinois (CSL), Urbana, IL

4:15 **"Process Considerations in Advanced Bi-CMOS Technology."**

Mr. Antonio R. Alvarez
Motorola Semiconductor, Mesa, AZ

5:00 **HOSTED COCKTAIL PARTY**
(California Ballroom - Right)

VENDOR'S SHOW (California Ballroom - Right)

8:00 - 5:00 Vendor's Exhibits

GENERAL INFORMATION

The registration to the Symposium covers admission to the Symposium sessions, abstracts of the Symposium presentations, luncheon, a vendor's exhibit, and a partially hosted cocktail hour following the Symposium. Beverage tokens for the cocktail hour will be available in the vendor area during the afternoon sessions. Physical limitations require that attendance be limited to the first 400 registrants.

Costs for the Symposium have been kept to a minimum to encourage attendance. A surcharge will be required from those who do not register by March 2, 1987, because of added costs for arrangements after that date. To reserve your place at the Symposium and the luncheon, we urge you to register early by mail, using the attached form. No refunds of registration fees will be made after Monday, March 2, 1987.

During the Symposium, the thirteenth annual Ross N. Tucker Memorial Awards will be presented to two Bay Area students in recognition of excellence in research.

We are honored to have Dr. Joseph Halpern of IBM Research as our luncheon speaker. His talk describes progress that is being made on the philosophical basis of distributed processing. In an environment where device technology is becoming more concerned with simulating some functions of human intelligence, we are sure the Symposium will find this topic relevant, informative, and entertaining.

The Symposium features a Vendor's exhibit. Information and displays of new materials, processing equipment, and analytical instruments will be presented by representatives of the manufacturers.

A partially hosted cocktail hour will follow the Symposium presentations. This provides an opportunity for informal discussions with symposium speakers, vendors, and attendees.

Registration material and abstracts of the Symposium presentations will be provided at the registration booth.

The opening session will begin promptly at 8:30 A.M. Registration begins at 7:30 A.M. The vendor area will be available for setup at 7:00 A.M.

Further questions regarding the Symposium should be directed to Dr. Aare Onton, IBM Research K65/803, Almaden Research Center, 650 Harry Road, San Jose, CA 95120-6099; (408) 927-2005.

ABOUT THE COVER

A cross-section of the 3-D trench transistor cross-point cell in the Texas Instruments 4 Mbit dRAM. (Photo courtesy of Texas Instruments.)

ABOUT THE SPEAKERS

Mr. Antonio R. Alvarez received a BEE and MSEE from the Georgia Institute of Technology in 1978 and 1979, respectively. He joined Motorola in 1979, working initially in linear technology development. This included high voltage Bipolar-DMOS I.C.'s, Power BIMOS, design rule generation, and process consolidation. Since 1982, he has been working on advanced digital bipolar and Bi-CMOS development and production implementation. Mr. Alvarez has authored or co-authored papers on low and high voltage Bi-CMOS, application of statistical techniques, MOSFET physics, and I.C. material and processing techniques.

Dr. John Caywood received his PhD in electrical engineering from Caltech in 1969. Subsequent to this, he conducted research on charge conduction through organic crystals at the Institute for Applied Physics of the University of Basel, Switzerland, and on metal-semiconductor interactions and molecular channeling at Caltech. During employment with Texas Instruments, Fairchild Semiconductor, and Intel he worked on CMOS and CCD development, pseudostatic RAM design, and non-volatile memory reliability. Since 1981 he has been with Xicor, Inc. where he has been engaged with the development of reliable, high-density EPROM's. At Xicor he is currently Vice President, Technology, Reliability, and Quality Assurance. He is a member of Sigma Xi, the Böhmische Physikalische Gesellschaft, and senior member of the IEEE.

Dr. Pallab Chatterjee received the B.Tech. degree in electronics and communication engineering from the Indian Institute of Technology, Kharagpur, India, in 1972, and the M.S.E.E. and Ph.D. degrees from the University of Illinois, Urbana Champaign, in 1974 and 1976, respectively. His academic awards include the President of India Gold Medal for curricular excellence and B.C. Roy Memorial Gold medal for extracurricular excellence. He joined Texas Instruments in 1976, working on CCD memories and storage cells for dRAM's, modelling and fabrication of submicron MOS devices, and device scaling. He is responsible for the device structure now used in VLSI CMOS. Dr. Chatterjee was elected a Texas Instruments Senior Fellow in 1985 and is Vice President Corporate Staff and Director of the Semiconductor Process and Design Center. His responsibilities include developing VLSI Process and Design Technology. His credits include more than a hundred articles and more than ten U.S. patents. He is a member of the American Physical Society and a Fellow of IEEE. He won the IEEE "Keys to the Future" award in 1984.

Dr. Billy L. Crowder joined IBM as a Research Staff Member at the IBM Thomas J. Watson Research Center in 1964. His initial research was in material science problems associated with II-VI semiconductors. From 1967 to 1974 he conducted research on ion implantation and its applications to MOSFET devices and high-conductivity silicides. He transferred to GTD - East Fishkill in March 1982 to manage the advanced technology group for high performance bipolar integrated circuits and subsequently became program manager for advanced silicon products in manufacturing. He was appointed as IBM's representative to the Semiconductor Research Corporation's Technical Advisory Board in 1982 and served as Chairman of the Manufacturing Sciences Subcommittee for the past three years. He was appointed Director of Manufacturing Research of the Research Division in February 1986. Dr. Crowder received a B.S. degree in chemistry from Duke University in 1957 and a Ph.D. in physical chemistry from Cornell University in 1962.

Dr. Paul A. Flinn received his AB in 1948 and his MS in Physics in 1949 from Columbia University, and his ScD in Metallurgy from MIT in 1952. His career includes faculty and research appointments at Wayne State, Westinghouse Research Laboratory, and Carnegie Tech (now Carnegie-Mellon University), as well as visiting professorships at the University of Nancy, France and at the Universidade Federal do Rio Grande do Sol, Brasil. In 1971 he received the Argonne University Association Distinguished Appointment at the Argonne National Laboratory. He joined Intel in 1978 as a Senior Staff Scientist. In 1984, he was selected for the Intel Researcher in Residence program, and spent the year at Stanford University as a Visiting Professor, investigating the mechanical properties of thin films. In 1985 he was appointed a Consulting Professor in the Materials Science and Engineering department at Stanford. His interests include the properties of metal and dielectric films used in multilevel interconnections, and the fundamentals of electromigration. He is a member of Phi Beta Kappa, Tau Beta Pi, Sigma Xi, AIME, AAAS, and is a Fellow of the APS.

Dr. Joseph Halpern received a B.Sc. in mathematics from the University of Toronto in 1975, and a Ph.D. in mathematics from Harvard University in 1981. In between, he spent two years as head of the mathematics department at Bawku Secondary School in Ghana. After a year as a visiting scientist at MIT, he joined IBM in 1982. His major research interests are reasoning about knowledge, distributed computing, and logics of programs. He organized a conference on Theoretical Aspects of Reasoning About Knowledge, was program chairman for the 5th ACM SIGACT-SIGOPS Conference on Principles of Distributed Computing, and is an editor of the journal *Information and Control*. He coauthored the paper which received the MIT Publisher's Prize for the best paper of the 1985 International Joint Conference on Artificial Intelligence.

Dr. Donald C. Hofer received his Ph.D. in Physical Chemistry from the University of California, Davis in 1967. After postdoctoral work at the University of Illinois, Urbana on high resolution NMR of solids he joined faculty of the University of Arizona, Tucson as an Assistant Professor of Chemistry. In 1974 he joined IBM at Poughkeepsie, NY and transferred to the Thomas J. Watson Research Center in 1976. From 1976 to 1980 he was a research staff member pursuing interests in x-ray resists, mask technology, and alignment techniques. In 1980 he joined the the IBM San Jose Research Laboratory in the areas of UV resist and lithography modeling, multilayer resists, and polysilane chemistry and lithography. He is currently manager of the Memory and Logic group in the Department of Polymer Science and Technology at the IBM Almaden Research Center. His present research includes synthesis and physics of polymers for chip and electronic packaging applications.

Dr. Hadis Morkoç received the BSEE and MSEE degrees in 1968 and 1969, respectively, from the Istanbul Technical University, and the Ph.D. degree in 1975 from Cornell University. After one year of postdoctoral research, he joined the Central Research Laboratory of Varian Associates in Palo Alto, California. In 1978 he spent a year at AT&T Bell Laboratories, Murray Hill, New Jersey before joining the University of Illinois in 1979. At Illinois he established the molecular beam epitaxy and high speed device research laboratory. His work has focussed on the science and technology of thin films and heterostructures, quantum wells and heterojunction devices. He has collaborated extensively with university and industrial laboratories across the country. The research results of his group and collaborators have appeared in some 400 journal articles. Dr. Morkoç is a member of APS and a fellow of IEEE.

1987 Ross Tucker Award Recipients

To be announced

SYMPOSIUM COMMITTEE

<i>Douglas M. Collins</i>	<i>Frank Perlaki</i>
Hewlett-Packard	Hewlett-Packard
<i>Robert M. Fisher</i>	<i>Dilip Rajdev</i>
Lawrence Berkeley	Consultant
<i>Vincent Marrello</i>	<i>Lynn M. Roylance</i>
IBM	Hewlett-Packard
<i>James McVittie</i>	<i>Krishna Saraswat</i>
Stanford University	Stanford University
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Intel	Xerox

SYMPOSIUM CHAIR

Aare Onton
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SYMPOSIUM SUPPORT

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() Registration Fee	\$50	\$60
() Full-Time Registered Student	\$15	\$20

Make check payable to: "No. Cal. Met. Section, AIME", and send with the above information to: Dr. Aare Onton, IBM Research K65/803, Almaden Research Center, 650 Harry Road, San Jose, CA 95120-6099. (408) 927-2005. Do not send purchase orders. Please make sure your name and affiliation are clearly identified.