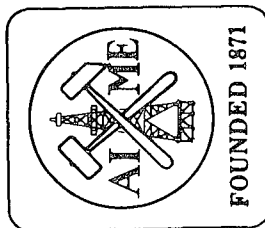
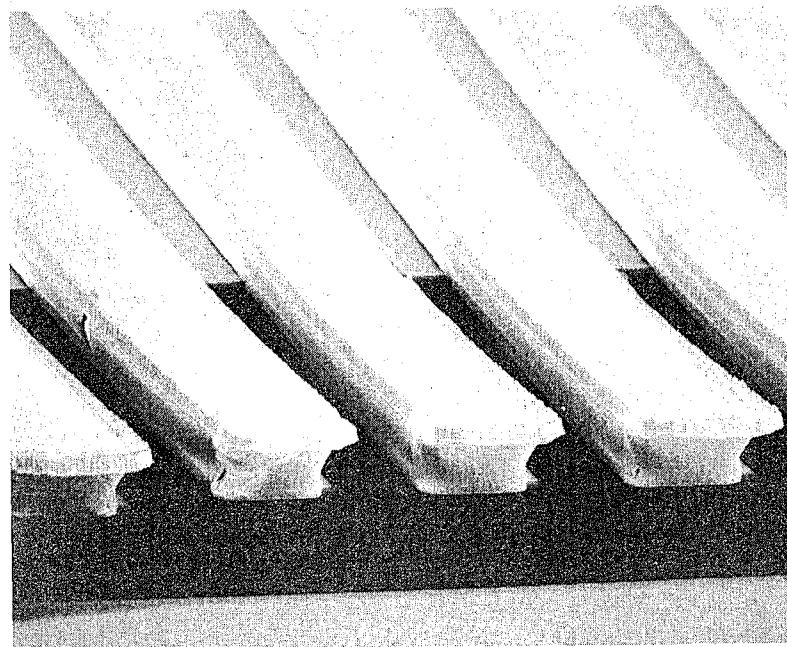


Non Profit  
 Organization  
 US Postage Paid  
 Los Altos, CA 94022  
 Permit No. 383

**METALLURGICAL  
 SOCIETY OF AIME**  
 THE NORTHERN CALIFORNIA METALLURGICAL SECTION  
**ELECTRONIC MATERIALS SYMPOSIUM**



THE



Cantilever Microcontacts.

The  
 NORTHERN CALIFORNIA  
 METALLURGICAL SECTION

of  
 AIME

presents

THE SIXTEENTH 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 28, 1988  
 7:30 A.M.

**PROGRAM**

Monday, March 28, 1988  
 Marriott Hotel

\*\*\*\*\*

7:30 Registration

**MORNING SESSION** (California Ballroom - Center)

Session Chair: Dr. Kent Carey  
 Hewlett-Packard Laboratories  
 Palo Alto, CA

8:30 **Welcoming Remarks and Introduction**  
 Dr. James P. McVittie  
 Stanford University, Stanford, CA

8:40 **"Epitaxial Growth of Silicon-Germanium Heterojunctions  
 Using the Limited Reaction Process."**  
 Prof. James Gibbons  
 Stanford University, Stanford, CA

9:30 **"AlGaAs/GaAs Heterojunction Bipolar Transistor Technology."**  
 Dr. Peter Asbeck  
 Rockwell, Thousand Oaks, CA

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

10:50 **"Erasable Optical Storage Media."**  
 Dr. Martin Chen  
 IBM Research, San Jose, CA

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

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

12:30 **"Learning in Neural Networks."**  
 Prof. David Rumelhart  
 Stanford University, Stanford, CA

**AFTERNOON SESSION** (California Ballroom - Ctr)

Session Chair: Dr. Hugh Grinolds  
 Hewlett-Packard Laboratories  
 Palo Alto, CA

1:30 **"High-Temperature Superconducting Materials."**  
 Dr. Edward Engler  
 IBM Research, San Jose, CA

2:15 **"Selective Metal Deposition for Planarized Contacts."**  
 Dr. Chiu Ting  
 Intel Corporation, Santa Clara, CA

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

3:30 **"Wafer Scale Integration/Packaging."**  
 Prof. Fabian Pease  
 Stanford University, Stanford, CA

4:15 **"Nanofabrication."**  
 Prof. Edward Wolf  
 Cornell University, Ithaca, NY

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 21, 1988, 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 21, 1988.

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 Prof. David Rumelhart of Stanford University as our luncheon speaker. His talk describes progress that is being made in the development of learning algorithms for neural networks.

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. James P. McVittie, Center for Integrated Systems Rm 133, Stanford University, Stanford, CA 94305-4070. (415) 725-3640.

**ABOUT THE COVER**

Micromachined cantilevers for chip-to-substrate contacts in an experimental high-density packaging structure. These cantilevers fabricated by S. Hong and J. L. Bravman, using orientation dependent etching and controlled stress metalization, may be able to provide a reversible, compliant contact array that would allow one thousand pin-outs around a 10mm x 10mm chip. (Photo courtesy of Prof. Fabian Pease, Stanford University)

**ABOUT THE SPEAKERS**

**Dr. Peter Asbeck** attended MIT, where he received the B.S. and Ph.D. degrees in 1969 and 1975, respectively, both from the Electrical Engineering Department. His thesis research dealt with the preparation and physics of PbSe homojunction lasers. Prior to joining Rockwell International, he worked at Philips Laboratories, Briarcliff Manor, NY, where he was concerned with the characterization, physics and applications of (Ga,Al)/As/GaAs double heterostructure lasers. In 1978, Dr. Asbeck joined Rockwell International Science Center. As part of the GaAs IC activity, he undertook extensive studies in ion implantation and related processing in GaAs. He investigated the diffusion of Cr in GaAs, and has studied the relationship between implant behavior and substrate characteristics. He is presently project leader for the heterojunction bipolar transistor projects at Rockwell, active in the design of experiments for new high-speed device structures and circuits. Dr. Asbeck is a member of IEEE and the American Physical Society. He is the author of numerous publications in the field of compound semiconductors.

**Dr. Martin Chen** received his Ph.D. in applied physics from Caltech in 1977. Since joining the Almaden Research Center of IBM Research in 1978, he has engaged in research in reactive plasma etching and, since 1980, in optical recording media. He is currently manager of the Optical Storage Studies project which is concerned with recording physics and measurement techniques of optical recording.

**Dr. Edward M. Engler** is senior manager of Materials Science at IBM's Almaden Research Center. He joined IBM in 1973 after receiving his PhD degree in chemistry at Princeton University. In 1979-80 he was appointed Technical Assistant to IBM's Chief Scientist and Vice President, Dr. Lewis Branscomb. Dr. Engler has received three IBM Outstanding Technical Achievement Awards for his research, and is author of over 100 technical publications and over twenty patents in the area of advanced electronic materials. He currently heads the high temperature superconductor research effort at Almaden. His specific research involves the exploration of new superconducting materials, and the relationship of processing and structure to superconductivity.

**Prof. James F. Gibbons** received his Bachelor of Science Degree in EE from Northwestern University in 1953 and his Ph.D. from Stanford University in 1956. He spent a year as Fulbright Fellow at Cambridge University and returned in 1957 to Stanford to join the EE faculty. He became professor in 1964, Reid Weaver Dennis Professor of EE in 1983, and Dean of the School of Engineering in 1984. His professional career has included outstanding work in undergraduate teaching, in research, and as an education innovator. His awards include: the Western Electric Fund Award for Excellence in Teaching, 1975; Northern California Solar Energy Association Award for Outstanding Achievement, 1975; Tau Beta Pi Award for Outstanding Undergraduate Engineering Teaching, 1976; Texas Instruments Founder's Prize, 1982; Outstanding Alumni Award from Northwestern University, 1985; and the IEEE Education Medal for outstanding contributions to education, 1985. Professor Gibbons' research interests are in semiconductor device analysis, process physics, and solar energy. He has directed the thesis research for 50 Ph.D. students and 6 Engineer's degree candidates. He has been author or co-author of 3 textbooks in semiconductor electronics, 3 research monographs on ion implantation and beam processing of semiconductors and has published over 200 papers. He is a Fellow of the IEEE, a member of the National Academy of Engineering, National Academy of Science and the Swedish Academy of Engineering Science.

**Prof. Fabian Pease** received his BA and PhD degrees in 1960 and 1964 from Cambridge University. His PhD research was on high resolution scanning electron microscopy. From 1964 to 1967 he was on the faculty at U. C. Berkeley and continued to research scanning electron microscopy. From 1967 to 1971 he was at Bell Labs, Holmdel, N.J. researching the digital encoding of television and then transferred to Murray Hill where he was responsible for developing materials and processes for electron beam lithography. Since 1978 he has been Professor of Electrical Engineering at Stanford University researching the techniques and applications of microfabrication; this has included both high resolution lithography and high-density packaging of VLSI systems.

**Prof. David E. Rumelhart** received his Ph.D. degree from Stanford University in Mathematical Psychology in 1967. He was Assistant, Associate, and Full Professor at University of California, San Diego in Psychology from 1967-1987 at which time he moved to Stanford University as a Full Professor in Psychology. While at San Diego he was a co-founder of the Institute of Cognitive Science. He has worked as a Cognitive Scientist building computational models of human intelligence through most of this time. During the last 10 years Professor Rumelhart has concentrated on the development of "brain-style" or "neurally inspired" computational architectures. He was co-author of a two-volume work on this topic entitled, "Parallel Distributed Processing: Explorations in the Microstructure of Cognition," which has played an important role in the popularization of work on neural networks. He was a recent recipient of a MacArthur Foundation Fellowship for his work on this and related topics.

**Dr. Chiu H. Ting** received his B.S.E.E. from U. C. Berkeley and his Ph.D. from Stanford University. Since 1961 he worked for the IBM Corporation at San Jose, California, East Fishkill, New York, and Yorktown Heights, New York, on electron beam lithography, bipolar and MOS integrated circuit processing technologies, E-beam Mask and magnetic bubble device fabrication. Since 1981 he has been employed by Intel Corporation at Santa Clara, California as a Program Manager/Sr. Scientist in the Technology Development Group. He is leading a group working on a variety of advanced integrated circuit processing technologies, with emphasis on advanced lithography and multilayer interconnection.

**Prof. Edward D. Wolf** received his Ph.D. degree in physical chemistry from Iowa State University and did postdoctoral studies at Princeton University. He joined the Rockwell International Science Center, Thousand Oaks, CA, in 1963, studying absorption, diffusion, surface reactions, and work function lowering of cesium fluoride on tungsten by field emission microscopy. In 1965 he joined Hughes Research Laboratories, Malibu, CA, where he designed and built an UHV low energy (0-1keV) scanning electron microscope for the study of electron beam interactions with solid surfaces. During part of 1968, Dr. Wolf studied scanning electron microscopy with Prof. Thomas E. Everhart. Later he led a team in new high-resolution scanning electron beam techniques for diagnostics and for computer controlled scanning electron beam lithography and finally held simultaneously the positions of Senior Scientist and Head, Electron Beam Surface Device Physics. In 1976, he co-organized the first Gordon Conference on the Chemistry and Physics of Microstructure Fabrication. Currently Dr. Wolf is Professor of Electrical Engineering and Director of the National Nanofabrication Facility (NNF) at Cornell. Dr. Wolf is the author of several book chapters and more than one-hundred-fifty papers, holds three patents, and has three patents pending. He is a fellow of IEEE and a member of the Böhmsche Physical Society, American Physical Society, American Vacuum Society, and the Electron Microscopy Society of America.

**1988 Ross Tucker Award Recipients**

*Yu-Chong Tai*  
Department of EE/CS, UC Berkeley

*Peter B. Griffin*  
Department of Electrical Engineering, Stanford

**SYMPOSIUM COMMITTEE**

<i>Kent Carey</i>	<i>Frank Perlaki</i>
Hewlett-Packard	Hewlett-Packard
<i>Hugh Grinolds</i>	<i>John M. Pierce</i>
Hewlett-Packard	National
<i>David F. Kyser</i>	<i>Lynn M. Roylance</i>
Philips Research	Hewlett-Packard
<i>Eugene Meieran</i>	<i>Krishna Saraswat</i>
Intel	Stanford University
<i>Aare Onton</i>	<i>Robert L. Thornton</i>
IBM	Xerox

**SYMPOSIUM CHAIR**

*James P. McVittie*  
Center for Integrated Systems, Rm 133  
Stanford University  
Stanford, California 94305-4070  
(415) 725-3640

**SYMPOSIUM SUPPORT**

We are grateful to the following companies which pledged their support of this symposium by the printing date of this program:

<b>ASM Inc.</b>	<b>Olympus</b>
<b>Buehler Ltd.</b>	<b>P-E/Physical Electronics</b>
<b>Charles Evans Assoc.</b>	<b>Process Physics Inc.</b>
<b>Griot/Gaertner</b>	<b>Solecon Laboratories</b>
<b>JEOL Inc.</b>	<b>Sumitronics</b>
<b>Kevex Corp.</b>	<b>Surface Science Labs Inc.</b>
<b>Microscope Systems</b>	<b>Technical Instrument Co.</b>
<b>Microscope West</b>	<b>Tylan</b>
<b>Nissei Sangyo America Ltd.</b>	<b>US Inc.</b>

**REGISTRATION FORM - 1988 16th AIME ELECTRONIC MATERIALS SYMPOSIUM**

Name: \_\_\_\_\_ Title: \_\_\_\_\_

Organization: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City, State: \_\_\_\_\_ ZIP: \_\_\_\_\_

Symposium date: March 28, 1988 Preregistration before March 21, 1988 Day of Symposium

Registration Fee (please circle)	\$55	\$75
Full-Time Registered Student	\$15	\$20

Make check payable to: "No. Cal. Met. Section, AIME", and send with the above information to: Ms. Irene Sweeney, Center for Integrated Systems Rm 10, Stanford University, Stanford, CA 94305-4070. (415) 725-3611. Do not send purchase orders. Please make sure your name and affiliation are clearly identified.