COMPCON 80 Spring: VLSI designers face new challenges

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"It is no longer sufficient to assure that integration levels will increase by factors of two or three every year or that circuit costs will decrease by a factor of two. A new focus is required.


VLSI in the 1980's will reach more than 100,000 gates per chip, Bloch predicted. VLSI will take system concerns down to the chip and package level—"what we were faced with at the box level before, we are faced with at the chip level today." So the problems of designing and using chips of this size may outweigh the substantial amount of logic capability they make available.

Four key problems face the industry, Bloch said. One is part number proliferation—semiconductor part numbers at IBM have increased 100-fold in the last five years. Another problem is the need, with denser chips, for more I/O connections to, from, and on the chip. Third is the requirement for more efficient packaging. Perhaps the most significant problem is the entire domain of designing, manufacturing, testing, and keeping track of logistics throughout the life of the system in the field.

Moreover, when small numbers of many different parts are being produced, turnaround time becomes critical because there is no finished parts inventory to buffer needs. Testing and diagnostics must be efficient and rapid.

This series of problems can be solved, Bloch said, only through the agency of an integrated software system extending from computer-aided design all the way through to the field. This will take the form, speaking in broad terms, of a design data base surrounded by a variety of automated tools.

Designing the Z-8000 16-bit microprocessor, by traditional, largely manual methods, took more than 13,000 man-hours over a period of three years, Rex Rice pointed out in his tutorial, "VLSI from the User's Perspective." Addressing an over-flow tutorial audience of 200 on Monday of COMPCON week, Rice noted that Gordon Moore of Intel has generalized the design complexity problem in a new law: effort required for VLSI product definition, design, and layout is doubling every two and two-thirds years.*

Rice believes that the way out lies in cheap computing power coupled with sophisticated CAD systems. He described the CAD systems currently in use at IBM, Fujitsu, STC-Microtechnology Corp., and Caltech's Silicon Structures Project.

Not all observers, however, are convinced that CAD systems are ready yet to maximize silicon utilization, gate density, performance, and timing. The semiconductor vendors still employ considerable hand effort on major projects where every last ounce of every parameter is important, and where large volumes can support such effort.

From the point of view of a systems manufacturer, such as a computer company, however, less than optimum VLSI chips can be very effective if they are specifically adapted to the needs of the application, provided that the one-time design cost can be held on a level with the relatively small production volume. In such an environment, squeezing manufacturing costs to a minimum is less important than keeping one-time design costs low. Present CAD tools can reduce design costs, as long as the user can accept less density and higher manufacturing costs.

CAD tools will soon be good enough for the more exacting design jobs, according to Fred Buelow, general conference chairman and president of STC-Microtechnology Corp., a leader in the field. In fact, he mentioned a figure of "a year or two."

Above left, General Chairman Fred Buelow of Microtechnology Corporation welcomes attendees to the plenary session. Above right, Program Chairman Don Senzig of Hewlett-Packard outlines the technical program.

At right, Erich Bloch, general manager of IBM’s East Fishkill facility, delivered the keynote address, “VLSI and Computers: Challenge and Promise.”

Below, left to right, are preconference tutorial speakers Rex Rice, consultant (“VLSI from a User’s Perspective”), Kenneth J. Thurber of Sperry Univac (“Distributed Processor Communication Architecture”), and Herbert Freeman of Rensselaer Polytechnic Institute (“Interactive Computer Graphics”).
Professor Donald E. Knuth of Stanford University received the 1980 W. Wallace McDowell Award. Author of *The Art of Computer Programming* and widely acclaimed as a scholar and researcher, Knuth was cited "For his many contributions to software engineering and education and for the excellence of his scholarship and creativity in organizing vast subject areas of computer science so that they are accessible to all segments of the computing community." The McDowell Award was established through a grant by IBM in honor of its retired vice-president, W. Wallace McDowell. The award, which consists of a certificate and $1000 in cash, is presented annually by the IEEE Computer Society to an individual whose professional work has been outstanding in concepts, technology, programming, education, or management in the computer field. This year marks the 15th presentation of the award.

Below, President Tse-yun Feng is presented a special bronze medal by Governing Board member Paul Hazan of Johns Hopkins Applied Physics Lab in recognition of the Computer Society's cosponsorship of the educational TV series *Personal Computing: Adventure of the Mind*. Produced last year under the auspices of Johns Hopkins University in conjunction with the International Institute for Television Cooperative, the six-part series was awarded the bronze medal at the International Film Festival of New York held November 9, 1979. The series, which presents concepts of hardware, software, programming, and applications, is intended to motivate students to apply personal computing to meet their own needs and to explore the impact of computers on society. It is expected that some 5 million students across the US and Canada will view the films this year. Information on distribution can be obtained by contacting William Sagan of Children's Television International at (703) 379-2707.

Clockwise from above, President Tse-yun Feng presents Honor Roll Awards to Dean Brown of Picodyne Corporation ("For leadership as COMPCON 78 Spring program chairman and COMPCON 79 Spring general chairman") and to Ralph Preiss of IBM ("For long and distinguished service in support of the Computer Society's awards program"). Continuing from center right, Feng presents Outstanding Paper Awards to co-authors Richard B. Kieburz of the University of Utah and Abraham Silberschatz of the University of Texas at Dallas ("Capability Managers," *IEEE Transactions on Software Engineering*, November 1978), and to S.S. Reddi (below right) of Ford Aerospace and Communications Corporation ("A Reconfigurable Computer System," *IEEE Transactions on Computers*, January 1978). Co-author with Reddi was Edward A. Feustel of IDA/GRD, who was not present. Winner of the 1978 Outstanding Paper Award for *Computer was Stanton A. Glantz of the University of San Francisco ("Computers in Clinical Medicine: A Critique"), also not present.

Gaye Seaborn receives the Certificate of Appreciation ("For long and dedicated service to the Computer Society").
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NCC program preview

“New Directions for a New Decade” is the theme of this year’s National Computer Conference to be held May 19-22 at the Anaheim Convention Center in Anaheim, California. Over 95 program sessions are scheduled, presenting new developments and trends in eight broad areas to include topics such as artificial intelligence, digital voice communications, computer graphics, data-base management, distributed systems, medical imaging, and simulation hardware architecture.

This year’s program has been broadened to include half-day as well as full-day seminars. These half-day seminars relate to subjects covered in the regular program sessions.

In-depth professional development seminars have been included on topics such as performance measurement, contract negotiations, software design techniques, text editing in office automation systems, and distributed data processing.

Highlighting the 1980 conference will be a series of six program sessions on the use of computers in entertainment—including movies, television, theater, sports presentations, fairs, and casinos. In addition, the science theater will present films on computer topics.

Another special event will be a Pioneer Day program honoring the 25th anniversary of SHARE, which started the worldwide user group movement. The program will trace the history of SHARE and its role in shaping the present computer environment.

More than 1400 exhibits by over 300 companies are also planned, providing the only overall view of the entire computer industry, including mainframes, minis, micros, software, peripherals, networking, simulation, applications, and management.

A separate three-day Personal Computing Festival will be held May 20-22 at the Disneyland Hotel in Anaheim. Besides exhibitions, the PCF will present over 50 learning sessions on all aspects of personal computers and their use, including applications in personal finance, household management, home entertainment, and home security. Special PCF seminars will cover the use of personal computers in “mom-and-pop businesses.”

NCC '80 will feature 95 learning sessions in eight general areas and a series of professional development seminars, according to the program chairman, Don B. Medley of Moorpark College.

New magazine focuses on VLSI

*Lambda*, a new quarterly aimed at the VLSI design community, explores the relationships between VLSI circuits and computer architecture and examines VLSI design strategies, costs, and aids.

*Lambda* takes its name from a basic scaling parameter of the chip fabrication process, first defined by Lynn Conway (who also serves as a contributing editor for the magazine) in collaboration with Carver Mead. Edited by Douglas G. Fairbairn and James A. Rowson, *Lambda* is published by Redwood Systems Group, PO Box 50503, Palo Alto, CA 94303. Subscriptions are $12/year until May 15 and $16/year thereafter.

Computer Society delegation to China planned

Negotiations are underway for an IEEE Computer Society delegation to the People’s Republic of China, to be conducted for a two-week period during September of this year. Computer Society members who are interested in being considered for joining the delegation should send their resumes as soon as possible to Computer Society President Tse-yun Feng, Department of Computer Science, Wright State University, Dayton, OH 45435.
IEEE dues increase likely for 1981

An increase of from $4 to $8 in the basic $35 annual dues is being considered for 1981 by the IEEE Board of Directors, acting on the recommendations of a task force which prepared a financial management plan for the organization. A specific recommendation on 1981 dues will be made at the August meeting of the board.

Donald S. Brereton, IEEE treasurer and task force chairman, explained that the recommendations are designed to assure a sound financial operation based on a balanced budget, investment income from reserves to offset inflation and product pricing policies which reflect true costs and added values. While the 1980 operating budget was approved with a projected $1.2 million deficit, Brereton said, further assessment has set that deficit at $750,000. Without a dues adjustment, the deficit could be substantially higher in 1981.

In addition to the dues increase, the task force recommended that prices for goods and services offered for sale by the institute include both direct and indirect costs and that nonmember prices reflect the value of member contributions. “Our cost per member in 1981 will be about $45, and when one considers students, retired and unemployed members, the average basic dues being paid is about $326. This gap must be filled by income from other sources such as sales of publications, conferences, courses, investment income, and reserves,” Brereton said. He emphasized that the task force’s considerations affect only the institute’s operating budget and that individual technical society membership fees were not evaluated.

IEEE board names candidates for 1981 president, executive vice president

Richard W. Damon and Robert W. Lucky have been declared candidates for the offices of 1981 IEEE president and executive vice president, respectively, by the Board of Directors.

Damon is director of the Applied Physics Laboratory, Sperry Research Center, Sudbury, Massachusetts. He has served on advisory committees with NASA, the National Bureau of Standards, and the Department of Defense. Active in IEEE affairs since 1944 and named a Fellow in 1968, he has served in both technical and professional activities, including membership on the Board of Directors as a technical division director, 1978-79, and chairmanship of the Ad Hoc Committee on Registration and of the Audit Committee, 1978-79.

Robert W. Lucky is director of the Electronics and Computer Systems Research Laboratory of Bell Laboratories, Holmdel, New Jersey. An IEEE member since 1955, he was named a Fellow in 1972. In 1978-79, he served on the Board of Directors as vice president for publications and was also president of the Communications Society.

In accordance with IEEE bylaws, a qualified member may declare his or her candidacy by submitting a petition signed by one percent of the eligible voting membership (approximately 1600) by noon, May 30, 1980. IEEE elections, including the offices of regional and technical division directors, will take place by mail ballot in September. Complete information on candidacy eligibility and campaign practices is available from IEEE headquarters.

IEEE suspends Soviet exchange; protests Sakharov exile

The IEEE has suspended its more than 20-year-old technical exchange program with the leading electrical engineering society of the Soviet Union. In another action, the IEEE, jointly with the Association for Computing Machinery and the American Mathematical Society, has issued a statement protesting recent actions of the Soviet government against physicist Andrei Sakharov.

Exchange suspension. Citing the “current world condition” as the reason for its action, the IEEE Board of Directors has suspended the institute’s official program with the Popov Society delegation at Electro’80 in Boston, May 13-15, and has withdrawn the 10-member IEEE delegation to the Popov Society Congress in Moscow, May 27-29. The board’s action empowers the Executive Committee to “reinstate the exchange as appropriate.” It does not affect the IEEE’s open attendance policy for individual members at IEEE conferences.

Sakharov banishment. ACM President Daniel D. McCracken, AMS President Peter D. Lax, and IEEE President Leo Young have issued the following statement:

“Well regard with the utmost seriousness the arrest and banishment of Andrei Sakharov, the distinguished Russian physicist, by Soviet authorities apparently in an attempt to remove him and other like-minded persons from Moscow in time for the Olympics. The action will further worsen the climate of scientific cooperation across national boundaries, which our societies have tried so diligently to foster for so many years.

“An Andrei Sakharov’s arrest and banishment will be felt as a personal loss by scientists and engineers everywhere. This latest curtailment of scientific and individual freedom will make Moscow a less desirable place to visit and the world a poorer place to live in.

“We hope that Andrei Sakharov and other freedom-loving engineers and scientists will soon be released in order to help us and the Soviet scientific and engineering communities to reestablish that spirit of cooperation which could contribute so much to making a better and safer world.”

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