Inside Washington

Political Accountability and R&D

By Fred W. Weingarten

Not long ago, the U.S. super­computer industry consisted of at most two or three firms competing in a market dominated almost com­pletely by the government. Times have changed. The technology has changed, both fundamentally and at the level of higher architectures, and civilian markets have grown far more im­portant. The landscape of supercomput­ ing has also changed. We now com­pare the personal computer industry with a market dominated almost com­pletely by a few firms, and the performance computers to encompass a much wider class of machines, which includes but is not limited to the most traditional supercomputers. Not surprisingly, the industry itself has changed. Numerous firms, many of them small start-ups, have entered the market; many of them are betting on new architectures. Those complaints were conveyed by some firms to Congress. They argue that ARPA will fund researchers to purchase only particular types of machines, that it restricts the flow of research results to a favored circle of grantees, and that its decision­making process is secretive and not based on broad input from the field. Finally, they argue that ARPA should be directing more attention to re­search on software, on how to use these new architectures.

I.E. Block to Retire After 18 Years as Managing Director of SIAM

SIAM managing director I. Ed­ward Block announced at the 1993 SIAM Annual Meeting in Philadel­phia that he will retire on Au­ gust 31, 1994. Block, who has been SIAM's managing director since 1976, will retire from his role central to the development of SIAM from its origin until the present day.

In his retiring president's address at the Philadelphia meeting, a few days before Block's announcement, Robert E. O'Malley, Jr. summarized Block's in数able contributions when he dedicated his talk to the SIAM, "Ed Block, 'Mr. SIAM,' for his unifying and creative work for the society and its presidents over forty years."

From the incorporation of SIAM in 1952 until his appointment as full­time managing director, Block worked on a volunteer basis to make the new society a reality. Whether recruiting speakers and generating publicity for early meetings or serving on editor of the Journal of the Society for Industrial and Applied Mathematics, he worked tirelessly, that he would continue to promote SIAM. It was Block's experience as a mathematician in industry (at Philco, Burroughs, and Remington Rand Unira) that reinforced his conviction of the need for an organization that would promote the application of mathematics in industry. More recently, Block has been working on an initiative to push the Agency communications initiative—to push the ARPA's mission in the federal High Technology Office. The most interesting part of the de­cision to support these hot new architectures.

Finally, they argue that ARPA should be giving serious consideration to the recent changes in the competitive landscape of high-performance computing firms. ARPA has long been criticized for its 'myopic' approach to technology development, and it is now being accused of being insensitive to the needs of small and medium-sized firms. This is not a new complaint. In his retiring president's address at the Philadelphia meeting,

Fred W. Weingarten, SIAM News columnist, participated in the panel discussion "Research Support—What's in Store for Us?" at the annual meeting.

Robert E. O'Malley, Jr. dedicated his Retiring President's Address, "Superior Di­rection, Value Problem Anal­ysis," to I.E. Block.

Numerical Algebra Held in Lake Arrowhead

Twelfth Householder Symposium on Numerical Algebra Held in Lake Arrowhead

By Stephen Yavainis

The 12th Householder Symposium on Numerical Algebra was held in Lake Arrowhead, California, during the week of June 14. The triennial Householder Symposium, formerly known as the Gatlinburg Confer­ence, was renamed in 1990 in honor of Alston S. Householder. House­holder, who is known for his pioneering work in numerical linear al­gebra, organized four of the series at the beginning of the series. Shortly after the 1993 meeting, which he attended, his friends and col­leagues received the sad news that Alston Householder had died on July 2.

The meeting, which was organized by Tony Chan of UCLA and Gene Golub of Stanford University, was the largest ever in the series, with approximately 160 participants. It has been traditional to hold the meet­ing in an isolated venue—Lake Ar­rowhead is located in the mountains, 60 miles east of Los Angeles—in order to promote informal inter­action.

Two Householder Awards

A highlight of the 1993 meeting was the presentation of the House­holder award, which recognizes the best PhD dissertation in numerical linear algebra completed during the preceding three years. Two winners, Barry Smith and Hong-Guo Xu, were selected for 1993.

Smith, who received his PhD in mathematics from the Courant Insti­tute of New York University in 1990, has worked in the area of domain decomposition and finite element methods. Domain decomposition refers to a class of numerical meth­ods for solving boundary value prob­lems in which independent prob­lems are solved on subdomains, fol­lowed by numerical iteration to ob­tain a global solution.

Smith's dissertation, which was written under the direction of Olof Widlund, contains new, optimal re­gions for convergence. It determined that the subdomain decomposition applied to problems where the subdomains do not have significant overlap and where the coefficients are varying. After receiving his PhD, Smith spent two years in the Argonne National Labora­tory as the Wilkinson Fellow; he is currently a member of the math­ematics department at UCLA.

Xu received his PhD in mathematic­als from Pudus University, Shang­hai, in 1991; his adviser was Jiang Xu. In his dissertation, which focuses on the numerical solution of the Ricatti equation, X.

What's Inside

News

Panel session on partnerships be­tween national laboratories, indus­try, and universities.

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structured algorithms for the solution of both of particular square roots of matrices with Toeplitz systems and Gaussian elimination in finite element problems. One of the most significant contributions of the meeting was the presentation of a new algorithm for solving the symmetric indefinite factorization problem. This algorithm, which was introduced by C.-C. Chiu (M.I.T.), has been shown to be significantly more efficient than previous methods, especially for large matrices. The algorithm uses a combination of symbolic and numeric computation, and it incorporates several innovative techniques, such as adaptive pivoting and block diagonalization.

Another highlight of the meeting was the presentation of a new implementation of the conjugate gradient method for solving large sparse systems. This implementation, which was presented by R. van Loan (Cornell), is designed to take advantage of modern high-performance computers. The algorithm is based on the use of a new preconditioner, which is derived from the Lanczos bidiagonalization process. The new preconditioner is shown to be effective for a wide range of problems, and it is particularly useful for problems with highly variable sparsity patterns.

The meeting also included a special session on the theory and practice of matrix factorization. This session featured presentations by several leading experts in the field, including G. Golub, A. Greenbaum, and R. Van der Vorst. The sessions covered a wide range of topics, including iterative methods, direct methods, and hybrid methods. The discussions were lively and informative, and they provided a valuable overview of the current state of research in this important area of numerical linear algebra.

In summary, the Householder meeting was a highly successful event, with a broad range of topics covered and a large and diverse audience. The meeting provided a valuable opportunity for researchers to share their latest results and to discuss the future directions of research in matrix theory and computational linear algebra. The organizers and the participants should be congratulated for their efforts, and the Householder Society should be commended for its role in organizing and supporting such events.