The special committee of the General Faculty to prepare a memorial resolution for David Monaghan Young, Jr., professor emeritus, mathematics, has filed with the secretary of the General Faculty the following report.

Sue Alexander Greninger, Secretary
The General Faculty

IN MEMORIAM
DAVID MONAGHAN YOUNG, JR.

David M. Young, Jr. (October 20, 1923-December 21, 2008), Ashbel Smith Professor Emeritus of Mathematics and Computer Sciences at The University of Texas at Austin, was an international pioneer in numerical analysis, whose career coincided with the first fifty years of the modern scientific computer era. Dr. Young was the founding director of both the University’s Computation Center and the Center for Numerical Analysis.

In the fall of 1941, David enrolled as an undergraduate, on a full scholarship, at the Webb Institute of Naval Architecture in New York City. On discovering that the President of Webb, an admiral in the navy, shared his love of tennis, David frequently volunteered to play tennis with him on Sunday mornings. David was a skillful and avid tennis player. Soon after the attack on Pearl Harbor, David and his classmates at Webb enlisted in the navy. Because the navy needed officers, these students were allowed to finish their degrees but on an accelerated basis. David graduated from Webb in 1944 and went to Cornell University for midshipman’s school. Then, he was assigned to the David Taylor Model Basin in Washington, D.C. as an assistant naval architect. (Later, he became a lieutenant commander in the U.S. Naval Reserves.)

After World War II and the completion of his active military duty, David went to Harvard University. He received a master’s degree in mathematics in 1947 and then went on for a Ph.D. under the direction of Professor Garrett Birkhoff. Early in David’s graduate career, Sir Richard Southwell was visiting Birkhoff and had discouraging words about David’s research: “Any attempt to mechanize relaxation methods would be a waste of time!” Nevertheless, David continued with his work on mathematical relaxation methods. Due to his propensity for making numerical errors, David wanted to find a way to use the new computing machines in solving a significant mathematical problem.

David received his Ph.D. in June 1950. Given the technology of the time, all of the mathematical symbols and equations in the final three copies of his dissertation were beautifully handwritten, in ink, by David’s wife, Mildred. Birkhoff considered David’s work to be a classical piece of mathematical research. It established the mathematical framework for the successive overrelaxation (SOR) method as well as introduced some new mathematical concepts. In the summer of 1951, Richard S. Varga, a graduate student at Harvard, shared an office with David, who was by then an instructor in mathematics. Subsequently, they became close friends as well as prominent researchers who helped establish the field of numerical analysis.

Getting a journal to publish a paper based on David’s dissertation posed considerable difficulty. In the 1950s, few journals even considered numerical analysis papers as publishable! Moreover, David had a hard time condensing his dissertation; it was painful for him to omit results that he found interesting. One referee, Hilda Geiringer, wrote, “This paper is far from ready for publication!” It took several years and many revisions before the paper was published. Acknowledging the help of his adviser, David said: “Without Garrett Birkhoff’s continued interest and encouragement, this paper would never have seen the light of day!”

In 1951, while working at Aberdeen Proving Ground in the computing laboratory, David took the train to Philadelphia to attend the first organizational meeting of the Society for Industrial and Applied Mathematics (SIAM). He was an active member of SIAM throughout his career. At this time, David often worked with
Mario Juncosa, of the RAND Corporation. An early contribution to SIAM arose from an encounter on the New York subway, when David and Mario saw Ed Block, SIAM founder and later the organization’s first managing director. Ed told them about his difficulties in finding suitable papers for the new SIAM journal. Immediately, Mario handed Ed a copy of a manuscript that he and David were writing. In 1953, their paper appeared in volume one, issue two, of the *Journal of the Society for Industrial and Applied Mathematics*.

As a member of the faculty at the University of Maryland (1952–55), David taught the first course in numerical analysis offered by the mathematics department. In response to his request for a raise, David was promoted to associate professor and given tenure instead! Because David and Mildred had a growing family and the aerospace industry paid more than academia, David took a job in Los Angeles as manager of the mathematical analysis department at Ramo-Wooldridge Corp, (later, TRW Inc.). During that time (1955–58), Professor George E. Forsythe of Stanford University visited David’s group, accompanied by a young Gene H. Golub, who had recently moved to California after finishing his Ph.D. at the University of Illinois. David wondered why Forsythe brought, what he mistakenly believed to be a mere graduate student, to a consulting job. David and Gene became good friends and colleagues for the rest of their lives!

Beginning in 1958, David spent the rest of his career at The University of Texas at Austin. He was a professor of mathematics and the first director of the University’s Computation Center. In the mid-1960s, with the help of a million-dollar grant from the National Science Foundation, UT Austin purchased a CDC 6600 *supercomputer*, the fastest computer at any university at the time. During these years, David worked closely with Robert T. Gregory and Charles H. Warlick, among others. In 1966, David Young, Bob Gregory, and a small group of professors from various departments, who were active users of the computer system, established the computer sciences department. Originally, it was strictly a graduate program! To concentrate on mathematical research, David became the founding director of the newly established Center for Numerical Analysis in 1970 and relinquished his management duties at the Computation Center.

In 1983, David was awarded a distinguished professorship: Ashbel Smith Professor of Mathematics and Computer Sciences. Throughout his career, David was actively involved in joint research projects with members of the Cockrell School of Engineering, such as Professor Graham F. Carey. Beginning in early 1993, David served as a member of an inter-departmental committee that established the Computational and Applied Mathematics (CAM) graduate program. Also, David was a founding member of, what is now, the Institute for Computational Engineering and Sciences (ICES). For health reasons, David retired in 1999 and was an emeritus professor of mathematics and computer science until his death on December 21, 2008, at the age of eighty-five.

Beginning in the mid-1970s, David Young’s group of researchers focused on iterative algorithms and the development of research-oriented mathematical software for solving large sparse linear systems. Many of the adaptive iterative algorithms used in the ITPACK Project were developed by David Young, working together with his students and collaborators. Some of their major contributions were the development of novel iterative solvers together with the associated mathematical software. As supercomputer architectures evolved from vector to parallel to distributed computer systems, these iterative algorithms and the software evolved as well.

Dr. Young wrote approximately 200 research papers and three books. The first book was devoted to the basic theory of iterative methods, such as variants of the SOR method. The second book, with Robert Todd Gregory, was in two volumes and suitable for use in a year-long undergraduate numerical analysis course. Then David wrote a third book with Louis A. Hageman, which was a graduate-level monograph on the mathematical theory behind the iterative algorithms used in the ITPACK software. All of these books have been reprinted by Dover.

Over the years, David’s research was supported by various federal grants, primarily from the National Science Foundation, Department of Energy, and U.S. Army. Many millions of dollars in grants were obtained by David. This money helped purchase computers and partially supported David’s research as well as that of other faculty members, staff, and graduate students. During his career, David was involved in hiring many outstanding faculty members, and arranged joint appointments for those involved in computing in the Computation Center and later the Center for Numerical Analysis. In this way, Young increased the number of faculty positions in both the Departments of Mathematics and Computer Science at The University of Texas at Austin. David involved his graduate students in his research and incorporated the research into his graduate courses.
Frequently, the research lead to master’s theses or Ph.D. dissertations for his students. Dr. Young supervised fourteen Ph.D. students and twenty-five master’s degree students (all at The University of Texas at Austin, except for two at The University of Maryland).

David was a well-liked teacher and mentor. Frequently, visiting professors to UT Austin sat-in on David's graduate classes as did students from other academic departments, especially those from engineering. David taught graduate courses that were jointly-listed in the Department of Mathematics, Department of Computer Science, and Computational and Applied Mathematics Program. With students, David was friendly and generous with his time. At conferences, he always spent time talking to students and giving them advice and counsel. Many of his friends in scientific computing can trace their first meetings with him to such occasions.

During his career, David received numerous awards and honors. In 1983, he was named a Fellow of the American Association for the Advancement of Science. David was given an award for Outstanding Contributions to Computer Science in 1990 by the Special Interest Group on Computer Science Education of the Association of Computing Machinery (ACM). For many years, David served on national and international boards and committees, such as a member of the Board of Trustees for the Argonne Universities Association at the Argonne National Laboratory. David was honored with special issues of research journals dedicated to him as well as book dedications. Moreover, conferences were held in his honor, with the conference proceedings being published. In particular, a conference on Iterative Methods was held in Austin in October of 1988, on the occasion of David’s sixty-fifth birthday. The invited talks were published in a book edited by David Kincaid and Linda Hayes. This was one of the first in a series of conferences exclusively devoted to iterative methods! Then again in October of 1998, on the occasion of David’s seventy-fifth birthday, another conference on iterative methods was held at The University of Texas at Austin. The proceedings were published in a book edited by David Kincaid and Anne Elster. These conferences continue to be held every two or three years, sponsored by the International Association for Mathematics and Computer Simulation (IMACS), and they are called the International Symposium on Iterative Methods in Scientific Computations. During the 1988 conference, Dr. Charles Warlick mentioned to Professor Garrett Birkhoff that he was David’s first student. Professor Birkhoff smiled and replied: “No, I was!”

As to his other major talent, tennis, David teamed up with one of his sons, Arthur or William, to play in doubles tennis tournaments. In 1969, David and William were ranked the number one father-son doubles team in the state of Texas. David spoke frequently at conferences in England around the time of the Wimbledon Tennis Tournament, which he then attended. Before Wimbledon became a tournament for professional tennis players, David once applied to play in the amateur ranks. David said, in jest, that he’d like his tombstone to read: “Considered to play at Wimbledon.” He frequently stopped over in Boston to work with Garrett Birkhoff at Harvard, to give seminar talks at Yale, and to visit his relatives and friends in Quincy.

David grew up in Quincy, Massachusetts, the son of David Monaghan Young (who immigrated from Scotland) and Madge Colby Tooker Young. David, Jr. and Mildred Acker first met in the eighth grade and then were often classmates during their high school years until they graduated from North Quincy High School in the class of 1941. They married on October 9, 1949, which was the beginning of their fifty-nine years together. In addition to Mildred, David is survived by their two sons, William David Young and Arthur Earle Young, and their daughter, Carolyn Ellen Young. Also surviving to cherish his memory are William David’s wife, Linda, and their two children, John Robert Young (wife Katherine) and Sara Noelle Young, all of Peoria, Arizona. David is also survived by his sister, Christine Young Sorenson and her family members: son, David Wendell Sorenson of Quincy, Massachusetts, and daughter, Sylvia Sorenson Newell, and family of Schenectady, New York.

A big man, both physically and in his profession, Professor David Young had a huge impact on the lives of his students, colleagues, and friends. We have lost an inspiring teacher and a fine gentleman, who was an international leader during the first half century of the modern scientific computing era. We miss him, but his spirit remains alive in our memories.

To honor his memory, The University of Texas at Austin established the David M. Young, Jr., Instructorship in Computational and Applied Mathematics to support young postdoctoral researchers. Additional information on
Dr. David M. Young’s career, including the online version of his dissertation, a list of his publications, some personal photos and more, can be found at the web page <www.ma.utexas.edu/CNA/DMY>.

This memorial resolution was prepared by a special committee consisting of Dr. David R. Kincaid (chair) and Professors Bjorn Engquist, Tinsley J. Oden, Kamy Sepehrnoori, and Mary F. Wheeler.

Distributed to the dean of the College of Natural Sciences, the executive vice president and provost, and the president on July 8, 2010. This resolution is posted under “Memorials” at: http://www.utexas.edu/faculty/council/.