

Computing History  
at  
Southwest Texas State University

Grady Early  
Department of Mathematics  
and Computer Science

## COMPUTING HISTORY AT SOUTHWEST TEXAS STATE UNIVERSITY

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Computer Science

This dedication of MCS marks the latest step in Southwest Texas State University's 15-year progression from paper-and-pencil computing to state-of-the-art digital electronic computing.

Electronic computers first came to Southwest Texas in 1964 to ease the administrative burden of rapidly increasing student enrollment and mushrooming financial information needs.

The use of computers at SWT really started in the late 1950's; but, whether due to equipment or personnel, did not really succeed. After a short hiatus, the feasibility of computer assists in administrative data processing was re-evaluated with much more positive results.

On June 1, 1964, Mr. James T. (Tom) Jannett, Computing Services Operations Manager, was hired to reinstitute automatic data processing operations. In August, 1964, an IBM 407 accounting machine, an IBM 602 calculating machine, and various peripheral equipment (sorter, punch, interpreter, collator, etc.) was delivered to Old Main and data processing operations began.

This equipment served SWT quite well until May, 1966, when a new federal payroll withholding tax algorithm was imposed on SWT. The IBM 602 simply could not handle the calculations.

From May to August, 1966, Jannett traveled to UT to do SWT's data processing on UT's IBM 1401. During this time, SWT ordered a 1401 of its own and hired Mr. Charles E. Ellis (June 20, 1966) as a programmer.

In August, 1966, the 1401 replaced the 407 and 602 in Old Main with Jannett and Ellis comprising the entire computer center staff.

As time passed, SWT's computing requirements inevitably expanded.

In the Fall of 1967, Mrs. Laura Wittenberg Hastedt offered SWT's first computer programming course, BA3320 (now BA 2320), in which she taught the SPS (Symbolic Programming System) language on the 1401. Later on, she was assisted by Mr. Terrence G. (Terry) Rice and Mr. Donald R. (Don) Self who were instructors in the School of Business. BA 3320 was requested and first taught (Fall, 1966) by Mr. Herschel Walling. However, the first offering of 3320 was as a computer appreciation course for accounting majors. It was under Hastedt that the course evolved into a computer programming course after she took a course in SPS at North Texas State University.

During that same semester, the basement of Laurel Hall was turned into a computer center at a cost of some \$20,000. This center was actually constructed among the foundation piers under the first floor of Laurel Hall; there was no pre-existing basement. During Christmas break, 1967, the 1401 was moved to the new Laurel Hall computer center where it was joined by our first version of the IBM 360/20. The 360 began arriving on January 15, 1968, and was in full operation on February 8, 1968.

As SWT's computing equipment expanded, the need for computing personnel also expanded. Mr. Arvel L. Schulle was hired on September 16, 1968, to take over the computer operation duties. And on August 1, 1969, Mr. Alistair H. (Scotty) Cowe was hired to assist Ellis as computer programmer.

The J. C. Kellam building served as the next site of the administrative computer center when it was completed in 1969. The 1401 was retired (returned to IBM), and the 360 was moved in September, 1969, to the first floor of J.C. Kellam (the 360 itself was moved by IBM; the rest of the administrative computer support equipment was moved in Cowe's 1962 Chevrolet pickup: thanks, Scotty).

Immediately after the move, in October, 1969, Mr. Richard V. Cruz was hired as second shift operator; finally there was enough computing activity to require two full shifts of computer operation. Schulle continued as first shift operator.

Of course, when the 1401 left, so too did the teaching of SPS in BA3320. Mrs. Hastedt then switched to RPG (Report Program Generator) on the 360 in that course.

It should be noted that the IBM computers used during this period contained no more storage capacity nor were faster or more versatile than the microcomputers which are now located in many locations throughout the Southwest Texas campus.

In 1967, the Department of Mathematics acquired a Univac Athena, an obsolete guidance computer for the old Titan I missile system, from the Air Force through the auspices of President Lyndon B. Johnson. Although this Athena had originally been scheduled to go to a University in California, SWT President James H. (Jim) McCrocklin called the White House and asked President Johnson to send it to SWT instead. He did. The Athena was acquired for shipping costs and was assembled by Dr. Henry N. McEwen, Professor of Mathematics and Computer Science, and Mr. David E. (Dave) Hufferd, an electrical engineer hired by the department to maintain the Athena. In addition, Mr. Marcus M. Muirhead was hired to serve as half-time computer center director and half-time Computer Science faculty member. He served until September, 1971, when Mr. John I. Prewitt was hired to replace him.

The Athena was a huge (11 1/2 ton) computer which was very noisy because it had to have its own generator to produce 400 hz power and its own air conditioning unit to keep it cool enough to operate. The Athena was assembled in the Laurel Hall computer center where it shared space with the 1401.

The Athena was a very interesting machine in its own right. It was the first large-scale, all solid state computer ever built. It had limited use as a Titan I guidance computer (1961-1962). But it was used by NASA at Vandenburg Air Force Base and at Cape Kennedy for ground guidance of the early CommSat Corporation communication satellites (Transit, Tyros, Echo). This service extended from 1962 until about 1970. The Athena did not actually communicate with the satellite. It guided the Thor booster to get the delivery vehicle free of the ground. When the booster stage broke away, on-board computers guided the satellite into orbit.

An interesting problem associated with the Athena concerned writing to the magnetic storage drum. The Athena had 256 24-bit words of core memory and 8K 17-bit words of drum memory. Programs were entered on the drum manually, then executed in Run mode. The drum could be read, but not written, at Run time. Unfortunately, this prohibited the writing of self-modifying code; i.e., creating a loop. Thus, one of Hufferd and Muirhead's first chores, to turn the Athena into a relatively practical academic computer, was to add four hardwired instructions to the instruction set to allow writes to the drum.

Another problem concerned output. The only human-readable output device was a 10-key Remington adding machine with mechanical fingers which were activated to strike the appropriate keys to produce output. Communication with the Athena really improved when Hufferd and Muirhead rigged the Athena to produce output on an ASR 35 Teletype.

In 1968, academic computing was enhanced by a single terminal tied to the University of Texas Computation Center. Again, problems were encountered. Muirhead collaborated with the University of Texas Computation Center staff to write the software that would allow our terminal to communicate over a telephone line to the CDC 6400 at the University of Texas. But occasionally, for no apparent reason, the communication software would crash. One day when a crash occurred, Muirhead, on impulse, picked up the phone and said, "Hello." After a pause, the operator said, meekly, "You sure do have some funny signals on the phone line." The operator, curious about the signals on the phone line, would patch in and say 'hello'. The 6400 thought the signal came from our terminal, but it could not interpret that signal, so it terminated the connection.

In the Fall semester, 1969, the Department of Mathematics rented an IBM 1130 minicomputer which could run Assembly Language and Fortran programs. In addition, the IBM 1130 was connected to the CDC 6400/6600 at the University of Texas so that more exotic, number-crunching programs could be run. Other problems arose. One night, William (Bill) Patton, a student operator, called Muirhead at home to report that the 1130 was down. Muirhead told Patton to call IBM for service, but Patton insisted that Muirhead come to the computer center. When he arrived, Muirhead discovered that someone had dropped a wad of bubble gum into a box of printer paper. The gum was transported, with the paper, into the printer. Muirhead and Patton worked long and hard to remove the gum from the printer. Alas, they were finally forced to call IBM to restore the printer to service.

Computing budgets were very tight in those days also. It was common practice at the end of each day for a student operator to collect all of the punched cards lying on tables or in the trash, load them in the card reader, and, under control of an assembly language program, direct unpunched cards to an alternate card reader output stack. Thus, unused cards could be recycled. One day Muirhead remarked to a particularly gullible student that it would be nice to have a program to separate those unused cards into separate stacks based on the location of the clipped corner. After long hours poring over the assembly language manual, the student was somewhat indignant to learn that computers pay no attention to clipped corners.

After the 1401 and the 360 were removed, the IBM 1130 and the Univac Athena shared space in the basement of Laurel Hall just across the street from a popular girls' sunbathing area. In those days, being a Computer Science student had certain tangible fringe benefits.

Encouraged by McCrocklin, the Department of Mathematics offered its first Computer Science course (Fortran programming) in the Spring semester of 1968. This course in Fortran programming was designed by McEwen and taught by Muirhead and Hufferd. Each student purchased a set of pre-punched cards designed especially for exercises in the textbook (a CDC card kit). For each exercise, the student would select the appropriate cards, assemble them into a program, and turn them in to the instructor who would then send all of these card decks to Dallas on the bus for processing by a computer there. Computer printouts would be returned in the same way. McEwen is certainly not the appropriate person to approach with complaints about turnaround time. (As an aside, it was noticed that printouts, sent first class, took two days to get to San Marcos. The card decks, sent bulk rate, only took one day. After requesting that printouts be returned with the cards, one day turnaround was achieved. IH 35 was an unusual but effective communication link.)

The Athena served the department well as a teaching tool for machine language programming and for computer organization until 1971. In 1972, it was placed on the surplus property list and sold to McEwen and Dr. Grady G. Early, Director of Computer Science. Parts of the Athena still serve as concrete models of core memory and drum memory devices. Incidentally, McEwen and Early were long in the good graces of an administration which was not completely sure that they had not acquired a Titan I missile to complement the Athena.

Computer Science as a minor for the Bachelor of Science degree was proposed in 1967, approved in 1968, and first appeared in the University catalog of 1969-1970. The curriculum consisted of seven courses: Math 2308, 2318, 2328, 3308, 3318, 3328, 3338, and required the calculus as a pre-requisite. This curriculum certainly reflected the then prevalent bias toward scientific computing.

These courses were gradually introduced into the curriculum as follows:

<u>Course</u>	<u>Instructor</u>	<u>Semester</u>	<u>Enrollment</u>
2308	Hufferd	Spring 1968	42
	Muirhead		23
2318	Muirhead	Fall 1968	15
2328	McEwen	Spring 1969	27
3328	Sawey	Spring 1969	21
3318	McEwen	Spring 1970	13
3308	Muirhead	Fall 1970	33
3338	Hibbs	Fall 1970	15

The first computer science students thus were mostly Mathematics majors who chose to minor in Computer Science. But there were some chemistry, physics, and biology majors in the group.

These first course offerings were treated in a relatively cavalier fashion. Math 2308 was used, as has been noted, to teach Fortran using a card kit in Spring, 1968. The next Fall, the only subject taught was machine language programming and organization on the Athena. Some students took the course as Math 2308; others, who already had credit for 2308, signed up for 2318. In Spring, 1969, the teletype to U.T. was operational, and in Fall, 1969, the 1130 was available. At that point, the material for each course began to stabilize; at least, insofar as stability in Computer Science is possible.

In late 1972, the IBM 1130 was replaced with a PDP-11/20 manufactured by Digital Equipment Corporation (DEC). Prewitt supervised the installation of the PDP-11/20 in 112 BAM (now Leland Derrick Hall).

During the Spring semester of 1973, Ms. Judy Malkin was hired as a temporary replacement for Prewitt. Then, in the Fall of 1973, Mr. Robert J. (Bob) Goss, our present Director of Computing services took over as Academic Computer Center Director and part-time faculty member.

On December 23, 1973, an historic milestone was reached. The first two Computer Science graduates, Mr. David Wayne Kornfuehrer and Mr. Jesse P. Garcia, received the Bachelor of Science degree at the School of Science graduation exercises.

The first Bachelor of Business Administration graduate was Mr. Ron Carlisle who graduated in August, 1974.

In the early 1970's, Computer Science, and computing in general, experienced the beginnings of an explosive growth which has not yet abated.

In 1974, because of the large growth in enrollment, the University decided to purchase a larger computer, and to combine Administrative Data Processing and Academic Computing Activities. After carefully considering proposals from Digital Equipment Corporation (DEC), Xerox, Honeywell, National Cash Register (NCR) and Burroughs, the University agreed to purchase a DEC System 10 (delivered in 1975), a machine which, after several upgrades, still serves the ADP needs of the University, initially from the first floor of the library, now from the third floor.

Also in 1974, McEwen was selected by Interim President Jerome C. (Jack) Cates to serve as our first Director of Computing Services. He filled this position until September 1, 1977 when Goss became full-time Director (but still teaching one Computer Science course per year. When Goss became director of all of the University's computing activities, Mr. Raul R. (RR) Rodriguez became half-time Academic Computer Center Director, half-time system analyst. He held this dual position until April 1978 when Mr. Danny E. (Dan) Harris, an SWT graduate with a Master of Science in Computer Science, became full-time Academic Computer Center Director, a position which he currently holds.

Also, in 1971, Dr. Marvin A. Johnston was hired by President Billy Mac Jones to organize a Management Information Systems (MIS) program within the School of Business. In May 1973, the MIS degree option was approved by the Coordinating Board. The program was administered and taught by Johnston and Dr. James R. (Randy) Cook, Chairman, Department of Accounting and Computer Information Systems (CIS). In 1979, the MIS name was dropped in favor of CIS to more closely identify the program with the tool whose use was being taught.

From 1971 to 1976, Computer Science was guided by Dr. James L. Poirot, then from 1976 to 1980, by Early after Poirot became faculty member, then Chairman of the Department of Computer Science at North Texas State University. During Early's leave of absence and during 1981-1982, Mr. Wilbon P. Davis served first as Chairman of the Computer Science Committee, then as the first Director of Computer Science. On September 1, 1982, Early replaced Davis in that position.

In the late 1970's, the University recognized the need for more computing power. Thus, plans were begun to buy another computer system to be housed in a new building.

MCS thus serves the dual function of providing office and laboratory space for the Department of Mathematics and Computer Science as well as equipment and office space for the Academic Computer Center. Our new DEC 1091, assorted support functions, and Computer center administrative offices occupy the first floor of MCS. The second floor houses the PDP-11/20, a Datapoint 5500, various micro-computers, a Computer Science electronics lab, and a student terminal room containing 64 terminals. The third and fourth floors house the Department of Mathematics and Computer Science.

Student interest in computing formed the actual basis for the explosive growth in computing activity. We have progressed from an initial enrollment of about 20 Computer Science minors in 1968, to 360 Computer Science majors, 170 Computer Science minors, 977 CIS majors, and 326 would-be CIS minors during the Fall semester, 1982. It is somewhat difficult to determine the number of Computer Science minors in those first years because they were actually classified as mathematics minors until Fall, 1973, when Computer Science was given a separate, identifying code. Also, there is not really a CIS minor; some School of Business students just fill in a minor code so that the blank will not be - well - blank.

The real indication of student interest in computing is given by the following tables which show the growth in the number of majors, minors, lower division semester credit hour (LDSCH) generation, upper division semester credit hour (UPSCH) generation, and graduate semester credit hour (GSCH) generation. The figures speak for themselves for the most part. One cannot help but note, however, that the only decrease in Computer Science majors from one year to the next occurred in 1980-1981 when the author was on leave of absence from SWT.

Computer Science  
Enrollment Data 1974-1982

Year	Majors	Minors	LDSCH	UDSCH	GSCH	Total SCH
1973	46	79	702	141	21	864
1974	67	71	783	357	21	1161
1975	93	74	909	276	24	1209
1976	110	69	960	306	24	1290
1977	129	77	1101	309	36	1446
1978	184	85	1353	320	36	1709
1979	225	70	1473	478	33	1984
1980	205	63	1260	646	60	1966
1981	254	79	1401	736	39	2176
1982	360	170	1929	835	69	2833

Computer Information Systems  
Enrollment Data 1974-1982

Year	Majors	Minors	LDSCH	UDSCH	GSCH	Total SCH
1974	133	N/A	516	270	57	843
1975	130	N/A	405	315	114	834
1976	124	N/A	564	423	109	1095
1977	169	N/A	891	525	39	1455
1978	227	N/A	951	630	54	1635
1979	423	N/A	1137	838	21	1986
1980	518	N/A	1137	1080	72	2289
1981	589	N/A	1272	951	--	2223
1982	977	N/A	4059	1305	27	5391

Student interest is also reflected in the various student organizations.

The Computer Science Association (CSA) was formed by Computer Science minors in the Spring of 1970 with nine members. As an outgrowth of the CSA, several members applied for a local chapter of Epsilon Delta Pi, a Computer Science honor society. On March 4, 1974, they received a charter for the Zeta chapter of Epsilon Delta Pi. In 1978, a student chapter of the Data Processing Management Association (DPMA), chartered through the Austin DPMA chapter, was formed to serve the needs of CIS majors. In the Spring of 1982, Southwest Texas became an institutional member of the Association for Computing Machinery (ACM).

As equipment procurement proceeded, the development of academic programs kept pace. The roll call of new computer programs is impressive.

9/?/1967	BS with a minor in CS
6/8/1973	BS with a major in CS
6/8/1973	BBA with a major in MIS (changed to CIS on 7/20/81)
2/?/1974	MA/MS with a minor in CS
5/13/1974	Second Teaching Field in CS
3/9/1979	MA/MS with a major in CS
2/28/1983	First Teaching Field in CS

New courses accompanied new programs until, from an initial offering of three Computer Science courses in 1968, we now have:

22 undergraduate and 6 graduate Computer Science courses  
14 undergraduate and 4 graduate CIS courses

as well as numerous courses in other departments who have begun to apply the power of electronic computers to their own special computing needs. Indeed, more courses and more programs are in various stages of consideration from individual departments to the Coordinating Board.

The current programs are:

#### Computer Science

- scientific applications programming
- computer system analysis
- teacher certification
- BS, MA, MS

#### Computer Information Systems

- business application programming
- management information system analysis
- BBA, MBA

MCS began to take shape in the Summer of 1981, when groundbreaking took place. From their vantage point in Derrick Hall, the Computer Science and Computer Information Systems faculty supervised day to day construction. Finally, during the weeks of September 27 to October 8, 1982, the Department of Mathematics and Computer Science occupied the top two floors of the building.

On November 10, 1982, the new DEC 1091 was delivered. Installation was begun on November 22, 1982, by Harris, Rodriguez, and Mr. Bill Welch, a DEC engineer. Installation and testing was completed in January, 1982. And the Academic Computer Center moved from Derrick Hall to MCS during December, 1982--January, 1983.

On Sunday, February 20, 1983, Dr. James Wade became the first CS faculty member to use a terminal (MIME - 2A) in his office (561 MCS) by connection to the DEC-10 through the Micom port selector rather than using the stairs or an acoustic coupler to communicate with the DEC-10. Wade, Sellars, McCabe, Borm, and Davis were the first five CS faculty members to have terminals wired to the DEC-10.

The new facility, the Mathematics/Computer Science building, serves the needs of both the Department of Mathematics and Computer Science and of the Academic Computer Center. The building itself contains about 38,500 square feet of usable space. Room numbers in MCS are in the 200's for the ground floor, followed by the 300's, 400's, and 500's on successive floors. This numbering scheme was chosen for compatability with Derrick Hall to which MCS is physically connected.

The space utilization in MCS is as Follows (square foot figures are approximate):

Second Floor (Main equipment)

2,825 square feet	-	Stairs, elevator, corridors
1,640 square feet	-	Restrooms, janitor, mechanical
810 square feet	-	Miscellaneous
1,025 square feet	-	DEC-10
540 square feet	-	Dispatch area
1,455 square feet	-	Ready Room (Student area)
700 square feet	-	Administrative offices and reception
520 square feet	-	Graduate student offices
550 square feet	-	Storage
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10,065		

Third Floor (Primary student area)

2,465 square feet	-	Stairs, elevator, corridors
785 square feet	-	Restrooms, janitor, mechanical
1,145 square feet	-	Miscellaneous
1,630 square feet	-	Terminal room
570 square feet	-	Electronics Lab
635 square feet	-	Offices
1,560 square feet	-	Mini and micro computer rooms
350 square feet	-	Graphics lab
350 square feet	-	Keypunch room
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9,490		

Fourth Floor (Mathematics/Computer Science Department)

2,525 square feet	-	Stairs, elevator, corridors
775 square feet	-	Restrooms, janitor, mechanical
720 square feet	-	Miscellaneous
3,200 square feet	-	23 offices
250 square feet	-	Conference room
1,500 square feet	-	Departmental administrative offices and reception
280 square feet	-	Lounge
240 square feet	-	Secure storage
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9,490		

Fifth Floor (Mathematics/Computer Science Department)

2,280 square feet	-	Stairs, elevator, corridors
790 square feet	-	Restrooms, janitor, mechanical
800 square feet	-	Miscellaneous
4,915 square feet	-	36 offices
440 square feet	-	2 faculty electronics labs
200 square feet	-	Conference room
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9,425		

In summary, our present enviable state is partly due to an enlightened administration, but more to the sacrifice and enthusiastic efforts of such faculty and staff members as:

- Mrs. Hastedt and Dr. McEwen, who started it all;
  - Mr. Hufferd, who kept the Athena running;
  - Mr. Muirhead, who was the first Academic Computer Center director;
  - Mr. Prewitt, Ms. Malkin, Mr. Goss, Mr. Rodriguez, and Mr. Harris, who kept (and keep) the Academic Computer Center functioning during times of tight budgets and unforeseen computing demands;
  - Mr. Jannett, who organized ADP and now serves as operations manager;
  - Mr. Ellis and Mr. Cowe, who were our first ADP programmers and who, along with
  - Mr. Lee M. Phelps, Mr. Robert L. (Bob) Kerley, Mr. Donald D. (Don) Volz, Mr. John Loyd, Mr. Michael (Mike) Dubois, Ms. Jeanne-Michelle Davis, and Ms. Ruby Welch, successfully effected our mammoth transition from a card-oriented ADP system to our current on-line system;
  - Ms. Margery E. Castellaw and Ms. Josie G. Islas, who kept both academic and administrative data entry operations moving smoothly and efficiently;
  - Dr. Poirot, Dr. Early, and Mr. Davis, who guided Computer Science;
  - Dr. Johnston and Dr. Cook, who guided CIS;
  - Mr. Cruz and Mr. Schulle, who operated the machines;
  - countless student operators, laboratory assistants and student programmers who bore the brunt of student discontent;
  - and to many other faculty and ADP staff who have worked so hard to advance strong academic programs and reliable computing.
- It is to all of these individuals that this building should be dedicated.

However, we should not forget the equipment which has served us so well:

Univac Athena

IBM 407, 602

IBM 1401

IBM 360/20

IBM 1130

PDP-11/20

DEC 10 (the first one)

Datapoint 5500 (used by CIS)

DEC 10 (the second one)

and various teletypes, card readers, ADM-1's, ADM-2's, DECwriters, MIME-2A's, GIGI's, ACT-5's, etc. via which our students attempt to control that wonderful, exasperating computing engine.

Note: The MCS dedication ceremonies are scheduled for April 15, 1983.