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smu notes

Special Edition

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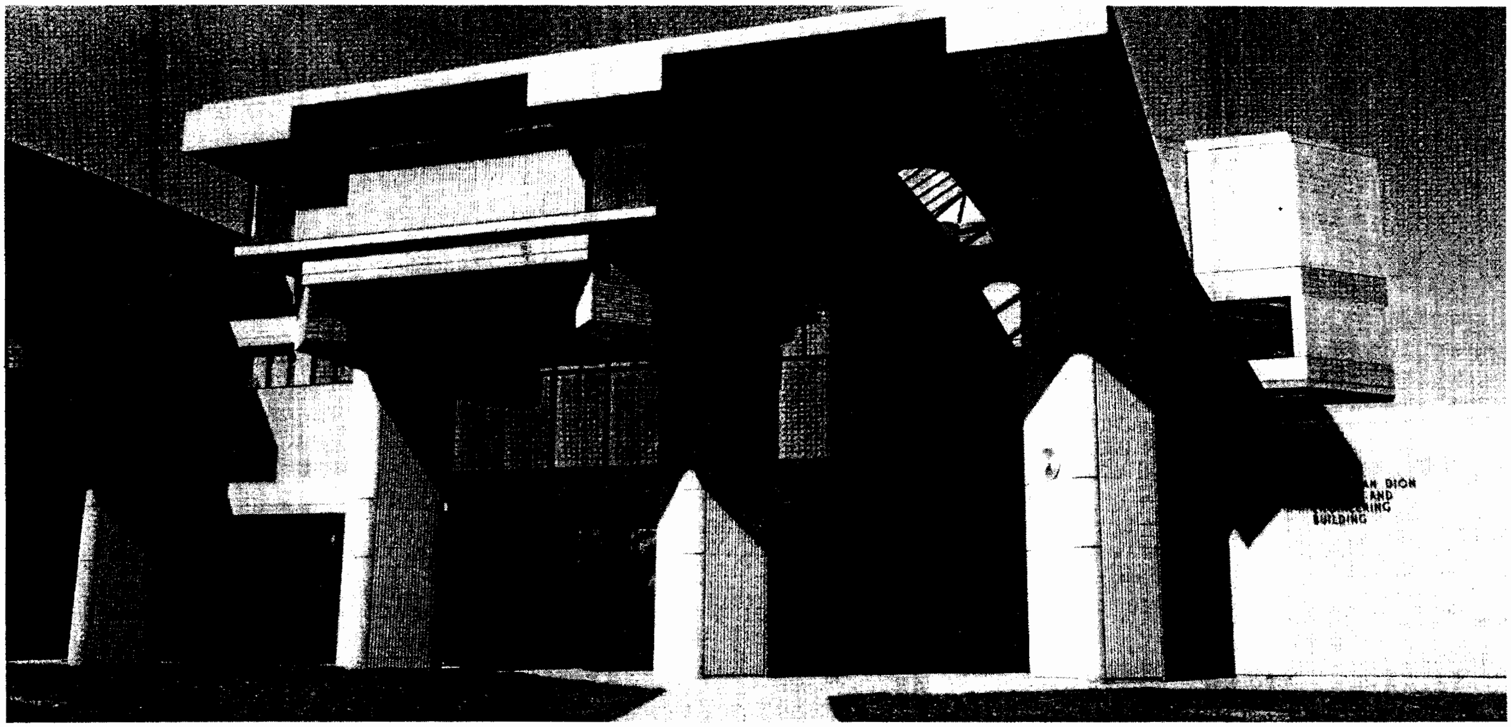


The C. Norman Dion Science and Engineering Building

It stands as the entrance building to the campus, the first thing visitors see as they turn onto Ring Road, and as such architect Whitney, Atwood, and Norcross, Inc. felt it was essential that Paul Rudolph design the new structure.

In the 1960's Rudolph created the campus master plan, and although he did not design all the buildings on campus, he had a hand — formally or informally — in most. So the noted architect was called upon once more to design the C. Norman Dion Science and Engineering building and other architects at the firm did the working drawings.

Consequently, it matches the master plan, but there are several interesting refinements. While there is one long corridor through the building, similar to the other structures, it doesn't feel the same to the visitor, because the space is widened or narrowed at irregular intervals. The two atria at either end change the quality of light in the building, and a subtle touch of color has been added to the concrete walls by putting colored strips within the seams of the ribbed concrete blocks.

Less subtle is the change in flooring surface—from the pebbled concrete that give maintenance people headaches in the other buildings, to tile and carpet surfaces which should be easier to keep clean. Ceiling surfaces were given a more finished appearance, and all major mechanical equipment was put inside a penthouse on the roof, rather than outside. In the other structures this equipment is exposed and maintenance people have difficulty working on the equipment. "When you make it easier to maintain it's more likely to be maintained properly," explained one architect.

There were also several special problems to solve because of the sophisticated and varied uses planned for the building. Computer and other electronic labs were located on the third floor so that if there's a plumbing problem with the science labs below them the sensitive electronic equipment won't be damaged. There are several protective hoods in various labs and each is independently vented through its own duct system. Two air conditioning systems keep sensitive equipment at the right operating temperatures in summer and winter. Because reflected light would introduce problems in optical experiments, the optics lab is a uniform flat black — walls, ceiling, floor, and fixtures.

C. Norman Dion '59

Finally, the land the building stands on has a high water table, so the whole structure was put on top of two-foot thick concrete base with a waterproof rubber coating.

A bright new world for Medical Technology

"Ohhh," said a recent graduate looking over the new high-tech analysis equipment in the spacious medical technology laboratory, "can I come back!"

The reaction was typical of faculty, students, and alumni who struggled for years in cramped quarters with equipment that was quickly outdated by the rapid advance of technology. Where there was one lab dedicated just to medical technology studies, now there are four. Where there were two small prep rooms with no place to store more than a day's supply of special preparations, there are two prep rooms, each twice as large as the old rooms, with plenty of appropriate storage space.

In addition, most faculty now have private offices, there's a conference room, a large work area for the department's technician, nearly twice the storage space for supplies, and two special project rooms stocked with computers, microscopes, and other equipment where students can work on research and independent study projects.

"Most hospitals don't have one of these yet, let alone other schools," said an enthusiastic faculty member pointing to a machine labelled "Whole-Blood Aggregometer." She explained that the machine analyzed platelets, small objects in your blood believed to be an important element in clotting. "When physicians advise people to take aspirin to help avoid heart attacks, it's because of aspirin's effect on platelets," she said.

And that was only one of a host of new pieces of laboratory equipment — machines that "wash" red blood cells, do a dozen chemical tests at once, check the sodium and potassium level in a person's blood, or measures the oxygen level in blood.

Miniature video camera and high resolution television monitor make it possible for several medical technology students to study the same view through a single microscope.

The list goes on and while most of the new equipment appears strange and mysterious to all but a medical technologist, the use of one new device would be clear to any visitor who has spent even a little time in a biology class trying to learn how to identify things under a microscope. Medical technology students spend a lot of time looking through microscopes, and some day a person's life may depend on how well they understand exactly what it is they're seeing. The old way to do this was to have a microscope with five heads on it so the instructor and four students could all see the same thing at the same time. The new labs take that several steps farther. The microscope now has a miniature video camera aimed into it and a high quality image is transferred to several monitors which students watch as the professor explains what they're seeing.

The impact of the new space and equipment on the education of students is immense, but difficult to quantify. By having labs that are dedicated to their subjects rather than shared with biology and chemistry, the medical technology faculty can set up experiments, equipment, and supplies and leave them. (When sharing a lab everything had to be set up and then taken down for each session.) This not only saves time, but it means students can come into a lab after the formal session is ended and use equipment to review experiments and procedures just learned. Because the labs are staffed and open longer, the students are around longer.

A private office for a faculty member means that students can be counselled without disturbing (or being disturbed by) an officemate trying to conduct other business. With proper storage space for supplies it's much easier to keep the necessary items in stock. ("People don't realize," a faculty member explained, "that a senior can use as many as 100 petrie dishes in a single day. Our students not only have to be able to do analysis accurately, but quickly. It doesn't do much good to get one patient's blood sample analyzed correctly, if you've ignored the needs of 99 others.")

So for the future medical technologist the Dion building provides a larger, better, safer, and more exciting space in which to receive an education.

Nursing students learn to use complex, modern medical care equipment in the therapeutics laboratory.

Nursing: Getting ahead of the health care revolution

When SMU's College of Nursing was established 20 years ago, health care in general, and nursing care in particular were much different.

Today's revolution in health care systems demands a revolution in health care education, and that's why the new Dion Science and Engineering Building is so important to the College of Nursing.

In the 1960's, nurses worked primarily in hospitals where technology was unsophisticated and patients stayed until they were well. Community nursing focused on helping high-risk families and the chronically ill to stay well. All "laboratory" learning in the original nursing program took place in practice settings.

But the health care revolution of the 80's aimed at reducing the costs of all forms of health care. Today people are admitted to hospitals for only the most serious problems, their length of stay has been shortened, and while there they are subjected to increasingly sophisticated diagnostic and treatment procedures. The use of sophisticated technology and the constant care of critically ill people make today's hospital a high-pressure environment for the neophyte nursing student.

It has become imperative, both for student and patient well-being, that initial practice in many skill areas occurs in a laboratory where clinical situations can be simulated. For maximum reality and effective learning, various forms of computer applications are essential.

Nursing faculty have been planning for learning experiences to take place in simulation laboratories since the mid-1970's, when the new science building was initially approved but not funded. In September, 1988, the dreams became reality.

There are now:

• 18 handicapped-accessible examining rooms for complete assessment of persons of any age.

Step into one of these rooms and you feel like you're in a doctor's office. There's a small desk, an examining table, and instruments for checking ears, nose, eyes, breathing, and blood pressure.

• 20 carrels and one large viewing area in a media lab.

Each carrel, large enough to hold several students, is equipped with video cassette players, monitors, and a personal computer. Students singly, or in small groups can review instructional videotapes, use computers to prepare papers, analyze data, or interact with instructional software. One machine, hooked to an optical disc, anticipates the day when video and computing media are combined to provide an even better inter-active instructional environment.

• 10 stations in a more traditional therapeutics laboratory.

This includes an adult intensive care station, an infant care unit, and manikins which in some instances can be hooked to sophisticated equipment such as a respirator, intravenous machines that rely on pumps rather than gravity and can regulate the flow of fluids into a patient, an incubator for new-born children, and a variety of other equipment you are likely to find in a modern hospital room.

In September, 1988, nursing faculty initiated three new laboratory-supported programs:

• a graduate program in Leadership in Nursing Practice, with clinical options in acute care, community, and gerontological nursing;

• a strengthened and dramatically modified basic undergraduate program; and

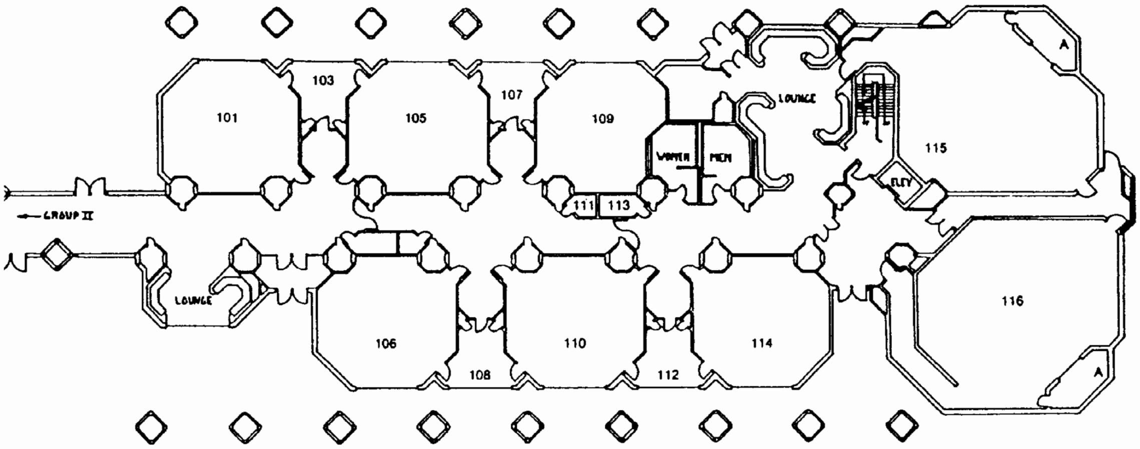
• a separate track in the baccalaureate degree program for students who already have the R.N. license.

Without the new facilities in the Dion Science and Engineering Building these new programs simply wouldn't be possible.

C. Norman Dion Science and Engineering Building

First Floor

Five classrooms,
one computer laboratory,
and
two large lecture halls.



Second Floor

Nursing Assessment Lab 207

Nursing Media Center 205

Nursing Therapeutics Lab 203

Prep Room 1 214

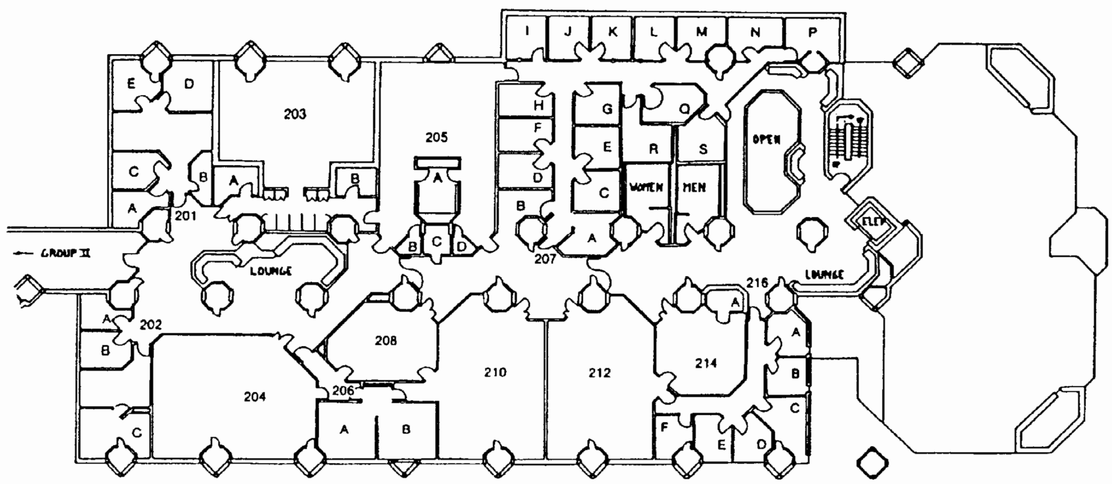
Prep Room 2 208

Microbiology Lab 212

Hematology/ Immuno-
Hematology Lab 210

Medical technology Special
Projects Lab 206

Clinical Chemistry Lab 204



Third Floor

Acoustic/ Optics Lab 322

VLSI Lab 316

Signal Processing Lab 320

Small Computer Lab 309

Robotics Lab 315

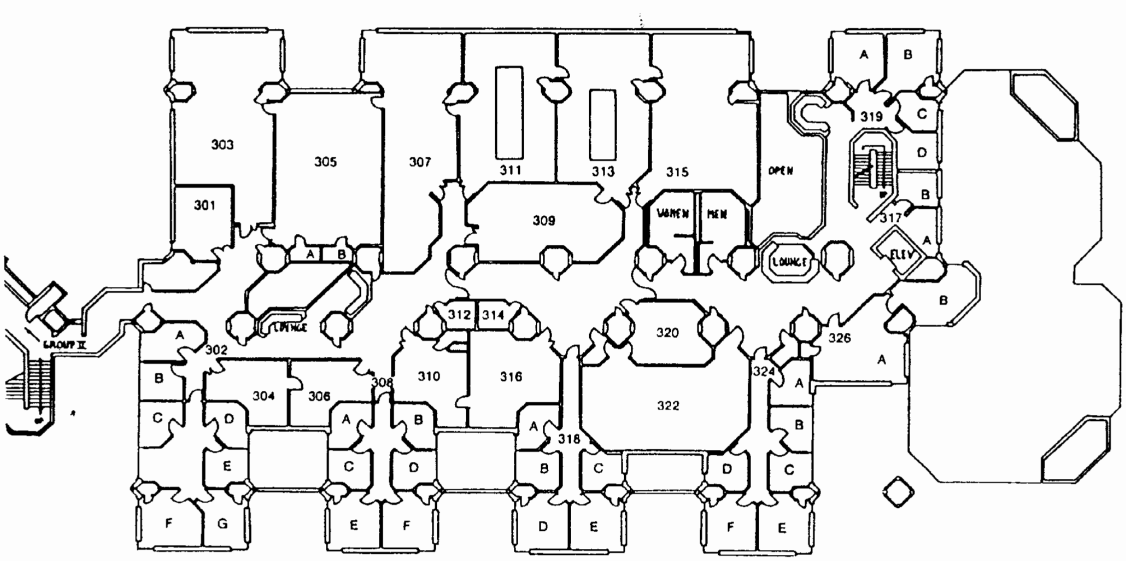
Digital Systems Lab 313

Software Engineering Lab 311

Intelligent Workstation Lab 307

Data Base Lab 305

Computer Architecture Lab 303



What you can see, where

Want to have your blood type checked? Watch a laser demonstration? See the latest in computer workstations? Have a nursing student check your blood pressure?

You can do that and more today as you tour SMU's new C. Norman Dion Science and Engineering Building. Students and faculty will be available in most labs to demonstrate equipment and answer your questions.

The floor plans at left may be helpful in finding your way, but the Dion Building is small enough so that you shouldn't get lost. One caution! The south end of the building does link with the Group II Science and Engineering Building, so if you find yourself in this area, turn around and come back. If you have any questions, just ask one of the students or faculty to help you.

There's an elevator at the north end of the building (towards the campus entrance) and the whole building is designed for handicapped access, so enjoy your tour. The first floor includes two large lecture halls and five classrooms, as well as the lounge where the dedication ceremonies will be held. The labs are all on the second and third floors.

Here are some highlights of what you'll find.

Second floor:–In the medical technology area you'll be able to have your blood type checked (Room 210), take a health risk assessment test (Room 206B), or even perform a laboratory test in urinalysis (Room 206A). You'll also see demonstrations of automated instruments used in blood analysis (Room 204), a videomicroscopy demonstration of blood cells (Room 210), and a state-of-the-art diagnostic instrument for the identification and testing of bacteria and fungi.

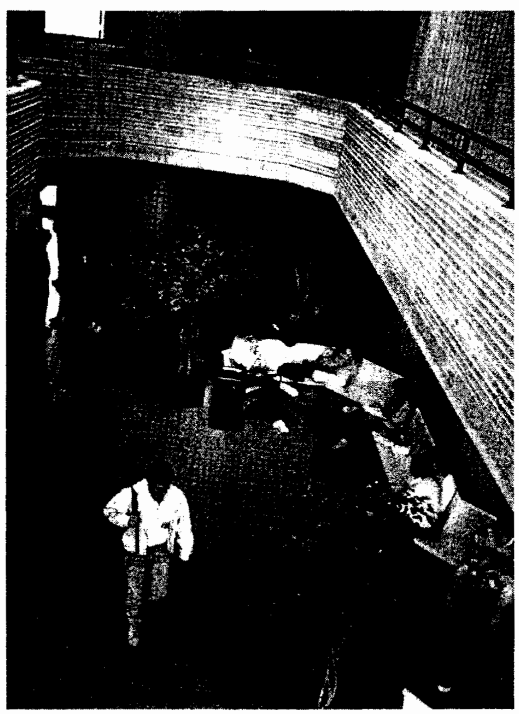
In the nursing area there are three labs. The therapeutics lab (Room 203) looks like a hospital ward, complete with "patients." The "patients," however, are really sophisticated manikins on which nursing students can practice a number of medical care procedures. In the second lab you'll be able to see students using computer assisted learning software, as well as videotapes about nursing. The third lab area is really several individual physical assessment rooms. Rooms 207H and 207F will be open for you to see and, if you like, have your blood pressure checked.

Third floor–All the engineering labs will be open. In the optics/acoustics lab (Room 322) there will be demonstrations of graduate and undergraduate student projects using lasers. Other projects will be found in the robotics lab (Room 315) and be sure to visit the small computer lab (Room 309), digital systems lab (Room 313) and the VLSI lab (Room 316) to learn what is happening in those areas.

Three-quarters of a million dollars worth of computer equipment is still arriving and being installed in the computer science labs. This means that what you will see here is more a promise of what's to come shortly, than what's already being used by students. There will be demonstrations of dramatic graphics and other software on the new advanced computer workstations in Rooms 303 and 305.

The program

2:00 pm	Open House Demonstrations	
4:30 pm	Dedication Ceremonies	
	Welcome and introductions	President John R. Brazil Southeastern Massachusetts University
	Remarks	Rep. Robert Correia Majority Whip Massachusetts House Sen. William Q. MacLean Massachusetts Senate Joseph Finnerty Chairperson, SMU Board of Trustees Dr. Joyce Y. Passos Dean, SMU College of Nursing Ms. Donna Young '89 President, Massachusetts Student Association for Medical Technology
	Unveiling of Dedicatory Plaque	Dr. C. Norman Dion '59 '83 Hon.
5:00 pm	Reception and Refreshments	



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Editor
Greg Stone

Art Director
Michael P. Mahoney

Photographer
Alma Cummings '86

On being the best

"This is the best optics lab in New England!" said Dr. Lee E. Estes, as he surveyed his small kingdom on the third floor of the Dion Science and Engineering Building.

"The best?"

"Yes. In terms of onboard resources, the way it's designed, and the physical size which allows for big experiments, it's the best."

It's also typical of what the new building means to the Electrical and Computer Engineering Department, for while the building provides additional facilities for the education of undergraduate engineering students, the real gain is in space for graduate studies and research.

Look at the optics/acoustic lab and the first thing you'll notice is that everything — the ceiling, the walls, the floors and the furnishings — are black. That's to keep reflected light to a minimum so it doesn't interfere with the frequent experiments that depend upon shooting a beam of light across a precise path and making precise measurements of the results.

Look more closely and you'll see the room is dominated by three large optical benches. One of them has a fiberboard top and was imported from the old lab. But the other two are special. They are covered with a special, magnetic stainless steel. One-quarter inch diameter, tapped holes are drilled on one-inch centers over the entire surface. These are used to hold brackets on a standard quarter-inch thread and the brackets hold the optics being tested. The fact that the surface is magnetic means that, where appropriate, a magnetic fixture can be used to hold a piece of test equipment. The goal in all this is a to provide a firm surface where lenses and prisms that are part of an experiment can be precisely positioned and held in place.

In addition there are high voltage outlets at the ends of each table to power the lasers used in many of the experiments. The room shares an air conditioning system with the VLSI Lab next door and has a chemical hood. "You can actually make this into a clean room with positive air pressure if you need it," says Prof. Estes.

Capping all this is a wealth of small, off-the-shelf optical devices — beam splitters, lenses, beam deflectors, modulators, etc—that have been garnered through various government research contracts over the past decade by Prof. Estes and his frequent research partner, Prof. Gilbert Fain.

At any given time the room includes Prof. Estes' own research projects, plus several projects being carried out by graduate students, or an occasional upper-level undergraduate student.

Other major engineering facilities on the third floor include:

- **A Robotics Lab** where 12 work stations provide students with an opportunity to work with "Rhino Robots." These don't look like R2D2, but they're sophisticated learning tools. Undergraduate engineering students use them in courses where they learn the kinematics of robots, the math for predicting trajectories (when and where they will move) , and the actual programming of the robots to carry out specific tasks.

"They actually have five degrees of freedom of movement," explains Prof. Fain who teaches the robotics courses. "Think of this as an arm attached to a torso. You can move the whole structure at the waist, or move it from the shoulder, elbow, or wrist." When you consider all the possible combinations of movements and think ming involved.

The lab, with high ceilings to accommodate a large industrial robot in the future, is a major step up from the four robots that were available in a jammed research space outside Prof. Fain's office in the former building.

- **A Digital Systems Lab** includes several computer work stations which will be used to study a variety of digital devices. While computers are one example of digital devices, there are many others that run the gamut from toys to signal processing systems.

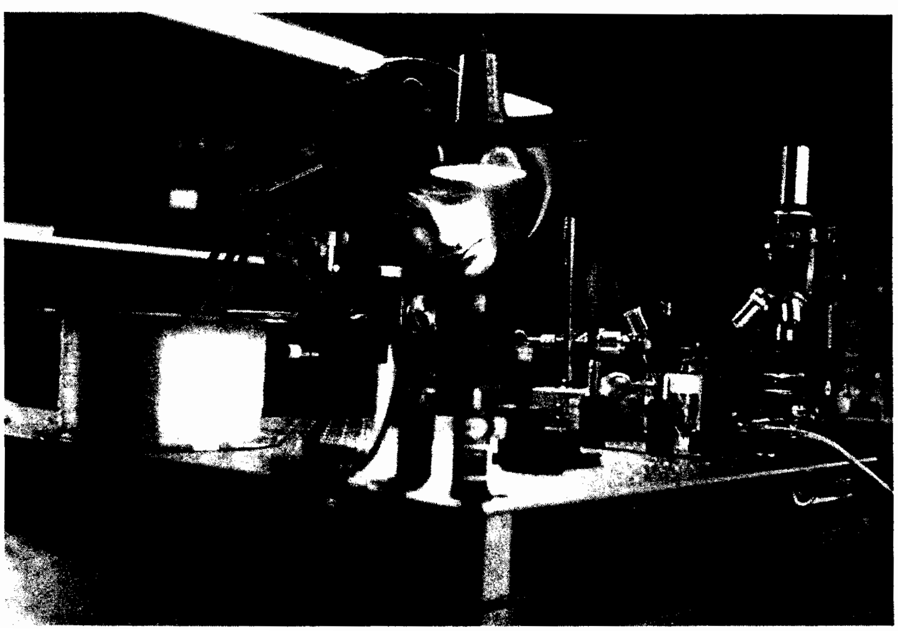
- **A Small Computer Lab** where engineering students not only use microcomputers, but learn what makes them compute.

- **A VLSI (Very Large Scale Integration) Lab** where undergraduate and graduate students, as well as faculty, get to design and simulate microelectronic chips.

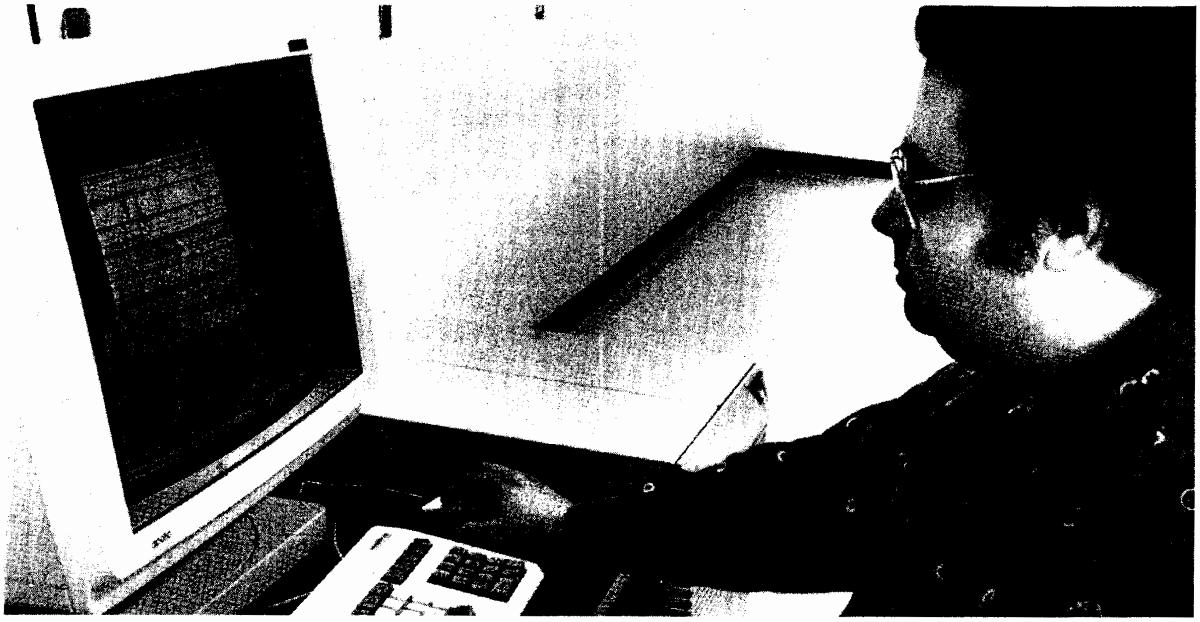
This lab used to share space with mechanical engineering design facilities. Now there is more room for the VAX 785 super-mini-computer and the three micro-VAX workstations that are the heart of the lab. Once a chip is designed, simulated, and tested on these workstations, it can be sent directly by computer to a facility that actually fabricates the chip. The fabricated chip then is returned to SMU where it can be tested to see if it meets the designer's goals.

The lab is connected through an electronic network to many other networks throughout the country and world. It also is linked directly to the new Massachusetts Microelectronics Center for fabrication of chips. SMU is part of the group of educational institutions and industries that joined to create the Center.

"Enrollment in our graduate programs has expanded three-fold over the past five years," says Dr. L. Bryce Andersen, dean of the College of Engineering. "We now have a doctoral program in the planning stages and the additional, high quality spaces in the Dion Building mean we can continue to expand our efforts in graduate studies and research."



Engineering student makes fine adjustments on laser experiment in the optics/acoustics lab.



Computer technician checks software on the Computer Science Department's new "Personal Supercomputer," an Apollo 10000.

They've come a long way

"Is the Dion Building a large improvement over what you had?" a Computer and Information Science faculty member was asked.

"Improvement? " he replied. "It's like we died and went to heaven."

Heaven, in this case, is defined as five labs dedicated just to computer science, where before there was only one lab and that was shared with other disciplines. Not to mention 30 Apollo 3500 workstations, 4,000 megabytes of memory storage, and a "Personal Supercomputer," the Apollo 10,000. These machines are all dedicated to computer science and all run the UNIX operating system, the system used by more computers in America than any other. (Prior to this most department labs were taught on equipment shared with other university users.)

These gains come to a department that wasn't formed until the spring of 1982. At that time it had four faculty who held joint appointments in the new department and in either engineering or math. The next fall the department was given offices in the Violette Building and faced the task of recruiting new faculty, meeting the demands of the campus for computer literacy, finding space and equipment to teach their courses, and developing a curriculum.

Now, just six years later, the Department of Computer and Information Science has:

• six full-time faculty and four others who hold joint appointments;

• 169 undergraduate majors, and 12 full-time graduate students;

• an undergraduate program that has been accredited by the Computer Sciences Accreditation Board;

• a reputation for implementing computer literacy at SMU by helping nearly every department in every college incorporate computers into their curriculum

Having independent facilities dedicated to the use of computer science students means that students have computers on which they can carry out complex programming assignments and also do the kind of experimenting that is associated with other sciences.

The computer scientist —and the computer science students — need to experiment with the machines they use. They need to explore ideas and in the process of exploring those ideas they may have to alter the software of the machine. If they make those changes on a shared machine, the machine may be of no use to others who want to use it for some other purpose.

Computer science students are frequently interested in how fast a computer handles a given procedure. Speed is one measure of how well a program performs. But when using a computer shared with other users, the length of time it takes to run a procedure may have nothing to do with the program. It may, instead, be a function of how many other people are trying to use the same machine at the same time.

For these reasons, and many others, the five labs, dedicated to the use of computer science, open up a whole new world of computer science education for both graduate and undergraduate students. Here they are able to explore computer architecture, tinkering with the components in a way that would be irresponsible on a shared machine. Here they can do human-computer interaction studies where different types of interfaces are tried and peoples reactions to these interfaces are videotaped and studied.

But computer science remains a young department and a young discipline, both at SMU and elsewhere. You'll find labels next to the doors to the various labs in computer science. Don't take them too seriously. This is an area that's changing faster than the people who make the signs. What you can be sure of, is that the Dion Building marks a major advance for this youngest of SMU's academic departments.

The person

C. Norman Dion '59, a Fall River native, was the founder of Dysan Corporation and is currently investing in new business ventures from his home base in California.

In 1959 he was awarded a bachelor of science degree with distinction in electrical engineering from Bradford Durfee College of Technology in Fall River, one of SMU's predecessor institutions.

After spending eight years at IBM Corp. as an engineer, Mr. Dion moved to Memorex which had just entered the computer disc pack field. In 1970 he was promoted to oversee new product development. In 1973, he left Memorex with two other engineers and started Dysan Corp, a computer disc manufacturing firm. His basic strategy was to grow and diversify as a manufacturer of information storage devices for the data processing industry, concentrating in the early years on magnetic products.

Obviously the strategy worked. A 1983 story in *Forbes Magazine* reported Dysan's sales were $161 million, with $41 million annual profit. In 1985, Mr. Dion sold his interest in Dysan and the company merged with Xidex Corp.

In 1986 he and his wife, Genevieve, gave SMU $1 million in unrestricted funds, believed to be the largest unrestricted cash gift from an individual ever bestowed upon a public college or university in Massachusetts. At their meeting on October 30, 1986, trustees voted to name SMU's new science and engineering building, then under construction, after Mr. Dion.

C. Norman Dion '59

In making the gift, Mr. Dion said. "I have competed with alumni of MIT, Harvard, Columbia, and Stanford with the education I got in this school—and I was one of the best at IBM and Memorex. I'd like to thank the professors and instructors who taught me and, after all these years, give back some of what they gave me."

Mr. Dion has started more than 23 new companies since leaving Memorex. He sees his future as fostering new ideas and pushing ahead the frontiers of knowledge. "I'll spend the rest of my life," he said, "helping other people get started."