Computers in the School of Engineering

The use of computers at Tulane has changed dramatically in recent history, keeping up with the changes in technology. Depending on how long ago you graduated, you remember computer environments based on everything from card fed hulking mainframes, to vastly underpowered, overworked “dumb” terminal based systems, as well as a sprinkling of departmental mini computers. Some of you may even remember a time before computers were invented or the computer you used was based on a circuit board that you wired. How things have changed! Today, the use of computers in engineering is no longer a novelty. Computer literacy and a working knowledge of a wide variety of software is a necessity for the professional practice. To bring you up to date with what the Tulane School of Engineering is doing with computers, we asked each department to give us a summary of their computer uses. This is what we learned:

Computer Science

The 1980's have seen computing move from the powerful computational tool of scientists and engineers to becoming commonplace, virtually household devices. So too, computing education has changed. Students now routinely enter with programming experience and some already own their own personal computers. Computer science must now address issues as intelligent systems, human/machine interfaces, voice activated systems, and massively parallel systems in addition to its traditional areas. Similarly, the nature of computing has moved to workstations, instead of “dumb” terminals, Unix-based environments, and networks.

Tulane's Department of Computer Science not only studies computers, computer systems, theoretical computing, and specific domains such as expert systems, but also makes extensive administrative use of computers in document preparation, financial planning and management, Computer Aided Software Engineering, and simulation. The equipment includes an IBM mainframe, MicroVax, Pyramid 9015, several SUN workstations and a variety of other workstations. Students gain access on multiple systems and multiple operating systems. In the near future, the department will begin a very exciting research project, that of sharing memory across multiple Unix workstations connected by a local area network.

Civil Engineering

In 1987, based on a $218,000 State of Louisiana Board of Regents grant supplemented with additional funds provided by Tulane University, a Computer Aided Design Teaching and Research Laboratory was established. The lab is based on 17 IBM Unix workstations and MS-DOS personal computers as well as a number of terminals, printers and plotters and a large variety of software packages. In addition to being used for research and class assignments, the systems are used in an interactive class environment where an instructor may display instructions and run applications via a PC with a large screen monitor while the students practice these applications simultaneously. Currently, the lab is being enhanced with a network and with the conversion of some of the DOS systems to Unix enabling more students to participate in a class as well as improving instructor/student interaction and information sharing. The department is also augmenting the lab with hardware and software to support an ambitious program in interactive multimedia coursework as a means of solving some of the basic problems in engineering education.

Mechanical Engineering

The Mechanical Engineering Department is nearing completion of installation of a networked computing system funded by a grant from the Louisiana Board of Regents. The system is intended for research and instruction and is

New Engineering Faculty

EFSTATHIOS E. (STATHIS) MICHAELIDES is the new Department Head of Mechanical Engineering as of January 1990.

From Brown University he received his Ph.D. in 1980 and his M.S. in 1979. Dr. Michaelides received an M.B.A. from the University of Delaware in December 1988, his B.A. from Oxford University in 1977 and in 1983 he received an M.A. degree (honoris causa) from Oxford.

He was an Associate Professor and Acting Chairman of Mechanical Engineering at the University of Delaware. From January 1987 to July 1987 he was on sabbatical leave at Chercher Associe' du Centre National de la Recherche Scientifique (CNRS) Paris, France. He was a Research Associate and Assistant at Brown University and for the summers of 1975 and 1976 he worked with Esso Petroleum Co. (Exxon), Thessaloniki, Greece.

His research interests are two-phase flow, particular flow, materials handling, conversion of geothermal energy and heat transfer. He was a Schillizzi Scholar and Casberg Scholar while at Oxford University. He was elected to Outstanding Young Men in America; listed in Who's Who in the American Men and Women in Science; and Who's Who in Engineering. He holds membership in Sigma Xi, ASME, ASHRAE, ASEE Greek Technical Chamber and Oxford Union Society.

He has 38 publications; 30 presentations in referenced conferences, published in proceedings; numerous technical reports and book reviews; and 23 invited seminar/presentations. He has done consulting work and has had numerous research grants.

In December 1989, DR. SANJOY K. BHATTACHARYA joined the Civil Engineering Department as Assistant Professor. He received his Ph.D. degree in December 1985 from Drexel University. His dissertation was “Toxic
1989 HAROLD R. LEVEY AWARD

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R. ROBIN M. VAUGHAN was the recipient of the 1989 Harold R. Levey Award. This award recognizes outstanding professional achievement as well as the desire to encourage others to achieve their career potential in the early stages of their career. Dr. Vaughan received her Bachelor of Science in Mechanical Engineering, Summa Cum Laude, from Tulane University in May, 1981. From here she went on to Massachusetts Institute of Technology where she received her Master of Science in Aeronautics and Astronautics in May, 1983 and her Doctor of Philosophy in Aeronautics and Astronautics in June, 1987.

Dr. Vaughan spent the summers of 1983 and 1984 at Charles Stark Draper Laboratory where she worked as a member of the technical staff in the Control and Dynamics division. From September 1981 - August 1982, Dr. Vaughan was a Draper fellow in the Guidance and Navigation Analysis division, and from September 1982 - June 1987, Draper fellow in the Control and Dynamics division. Here, among other projects, she performed support work for an advanced spacecraft autopilot with applications to shuttle orbiter and various candidate space station designs.

Though a native of New Orleans, Dr. Vaughan is currently employed by Jet Propulsion Laboratory located in Pasadena, CA where she is a member of the technical staff, Optical Systems Analysis Group, Navigation Section. Since September, 1987, Dr. Vaughan has been a member of the Jet Propulsion Laboratory Voyager team, and is responsible for orbit determination of some of the newly discovered moons of Neptune. Other memberships which are held by Dr. Vaughan include, JPL chapter and San Gabriel Valley Section of AIAA, and Vice-Chairman for Chapters, San Gabriel Valley Section of AIAA June 1989 - present. Publications by Dr. Vaughan include: "An Elegant Lambert Algorithm," AIAA Journal of Guidance, Control, and Dynamics; and "Manually Augmented Proximity Operations and Docking Control, "Proceedings of the AIAA Guidance, Navigation and Control Conference, Snowmass, CO, August 19-21, 1985.

We wish to extend our heartiest congratulations to Dr. Robin M. Vaughan for receiving this prestigious award.

From Slide Rules to Scales

When pianist Nicole Seward played Ernst Toch's "The Juggler" at the dedication of the Chevron Chemical Engineering Suite, it was an appropriate choice. Like a number of students at Tulane, she juggles an aptitude for engineering and ability in music.

Seward grew up in St. Louis and took lessons from the same music teacher as Michael Spaid, an engineering junior who played at several dedication events in the Boggs Center last year. She attended Tulane for two reasons: she and her parents thought its engineering program would be more challenging, and Faina Lushtat, a renowned pianist on the Music Department faculty, came highly recommended.

"I also received a Dean's Honor Scholarship," said Seward. "That's when my parents said, 'You're going to Tulane.'"

Seward didn't expect Engineering to be so difficult.

"It's very competitive, and you get enraptured with it. I didn't think I would become so fascinated with the mechanics of the universe, but it can absorb all of your attention.'

Yet this disciplined young woman does make time for music. In addition to her studies and her summer internships at Union Carbide, Seward devotes at least two hours a day to piano practice and takes an hour of private lessons every week. She also participates in the New Orleans Junior Philharmonic and statewide competitions every year.

After she graduates, Seward plans to go on for a master's degree in chemical engineering, to support her goal of one day attaining a management position. Whatever her achievement, there will always be room for musical instruments as well as instrumentation in her life.

Fall 1989 Prospectus -GL
Tulane student comes on strong in concrete test

Robert Frosch, a civil engineering student at Tulane University, has taken one of the oldest, toughest construction materials—and made it stronger.

Frosch, 20, recently won first place in the international concrete strength competition sponsored by the American Concrete Institute. Competing against 38 other entries, Frosch's concrete had an endurance of 28,419 pounds per square inch. That is, it took that much pressure from a stress machine to shatter the concrete.

Let's put that into perspective.

Up to the late 1970s, most of the concrete used in large buildings had a PSI average of 5,000 to 8,000. Then, concrete engineers discovered that they could make concrete even stronger by adding microsilica fibers. That boosted concrete strengths to more than 10,000 pounds. These concretes have mostly been used on buildings in the North.

"When some people got it up to about 10,000 PSI that was really something," said Frosch, a junior from New Orleans. "Concrete is one of the most essential materials used in construction and a stronger, more durable concrete is going to be the wave of the future," Frosch said. "The stronger it is, the more cost effective it will be."

Frosch's concrete mixture will be cost effective simply because it can do more with less. If a builder uses concrete with a strength of 16,000 pounds, he can theoretically cut the thickness of the concrete floors in high rise buildings by 2 inches.

In a 100-story building, Frosch said, "those 2 inches really add up. You could easily reduce the overall size of the building by about 2 feet."

Frosch, with the advice of Tulane Professor Robert Bruce Jr., began experimenting in the labs at Delta Testing and Inspection Inc., at 725 S. Genoa St., in January.

He poured his concrete mixture into square cubes and put them under the stress machine. Pretty soon, "I was hitting some really high strengths," Frosch wouldn't give the precise formula, but it does include, besides regular concrete:

- Micro-silica fibers.
- Fly-ash—the by-product of burning corn husks.
- A chemical retardant to slow the hardening process.
- A super plasticizer—a chemical that pushes water out of the mixture and increases the density of the concrete.

Although concrete as a construction material dates to the Roman Empire, Donald Meyn, president of Delta Testing, said that construction companies are always looking for new ways to strengthen it.

"I've always thought that there wasn't much else you could do with it, that it was a pretty static material," he said. "But as people keep putting different fibers in it, they're finding that the strength potential of concrete is larger than previously thought."

Concrete as an economical construction material never really caught on in the United States until the advent of prestressed concrete in the 1930s. Prestressed concrete simply means that the mixture of cement, aggregate and other materials is tested for its strength before it is actually installed. By the 1950s, concrete had become perhaps the central construction material in new urban high-rises, bridges and airport runways.

But the cost of concrete began increasing faster than its strength. And structural engineers began to experiment with new formulas. The savings could be considerable if a concrete is so strong that columns could be 3 feet across, Frosch said.

More durable concrete will be more resistant to chemical attack from salt to buildings near oceans. "But it can also be more expensive,"

Meyn said. The newer, stronger material might sell for about $100 per (cubic) yard, while concrete with a PSI of 3,000 still goes for about $40 per yard.

Meyn added, however, that with a higher PSI concrete "You're going to need less of it, so that's a cost savings right there." Is there a market for high-strength concrete? Frosch said he hasn't given it much thought. The win, announced at a Toronto meeting, brought him $50 and recognition in Concrete International, a prestigious concrete industry publication.

"I hope construction firms will be interested in using something like this," he said. "I haven't thought about it that far." After all, he still has to get his degree.

By Garry Boulard
Contributing writer—Times Picayune

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Tulane University Scientist Awarded NIH Fellowship To Conduct Research in Switzerland

Dr. Kirk J. Bundy, Associate Professor of the Biomedical Engineering Department at Tulane University in New Orleans, has been awarded a fellowship to conduct research at the Swiss Research Institute, the Fogarty International Center of the National Institutes of Health has announced.

As a Senior International Fellow (SIF), Dr. Bundy will spend 5½ months working with Dr. Stephen M. Perren, Director of the Institute's Laboratory for Experimental Surgery, and his staff at Davos, Switzerland. Their project involves study of the fundamental scientific factors which affect the adhesion of soft tissue to materials used for making surgical implant devices. Knowledge of these factors ultimately could be used to fabricate implants which are less susceptible to complications due to infection than are the devices in use today.

The SIF program enhances the exchange of ideas and information about the latest advances in the health sciences by funding research projects of mutual interest to U.S. scientists and their nominating institutions and the foreign host scientists. About 35 fellowships a year are awarded by the Fogarty International Center, the NIH's international division, through competitive application.

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Faculty

Substances in Methane Fermentation Systems: Fate and Effect on Process Kinetics". He received an M.B.A. degree in 1989 from the University of Cincinnati; an M.S. in 1981 from IIT, Kampur, India; and a B.S. in 1978 from Jadavpur University.

From November 1986 until he came to Tulane, Dr. Bhattacharyya was an assistant research professor at the University of Cincinnati. In his research he was the principal investigator of several pilot-scale research projects at the U.S. EPA Test and Evaluation Facility in Cincinnati. In 1986 he was a post-doctoral research associate at the University of Iowa and Drexel University. He was a senior research assistant at Indian Institute of Technology, New Delhi, India from October 1978 to June 1979. He was a Project Engineer for Hindusthan Construction Co., Ltd., India in 1978.

He has received several honor awards, among them a gold medal in Public Health Engineering. He has numerous conference presentations, six refereed publications and ten published reports to his credit. He has done consulting work for Amearce Corp. and Environmental Resources Management, Inc.

Kenneth M. Mackenzie is a new instructor in the Department of Electrical Engineering as of 1/1/90. He received his B.S. and M.S. in electrical engineering in December 1989 from Massachusetts Institute of Technology. His thesis project was entitled "Integration Issues in a Receiver for Optical Fiber Communications" which included the design, fabrication and evaluation of a mixed analog/digital integrated circuit using the facilities of Tektronix, Inc.

He worked at Teradyne, Inc., Boston, MA from May 1984 to January 1988. While there he developed gate-level models of standard IC's to support Teradyne's LASAR logic simulation package.

He also worked at Tektronix, Inc., Beaver-
Volcanologist leads department

The new chairman of Tulane's mechanical engineering department has added another dimension to the mystery of volcanoes which someday might help scientists predict volcanic eruptions.

Professor Statthis Michaelides has applied traditional engineering principles to develop a mathematical equation to help explain just what happens inside a volcano to cause it to erupt. His equation introduces the element of time, using a dynamic model to show how pressure inside a volcano increases. His model shows how when the pressure reaches a certain point the volcano will explode.

Michaelides' equation is the first to quantify the process that volcanologists have suspected brings about eruptions. Previously, only static models existed to explain why and how the pressure inside a volcano increases.

Alone, his model can't predict eruptions. But when volcanologists know enough about the materials in each volcano, they might be able to make predictions. "I'm confident that the mathematical model will predict volcanic eruptions," he said.

He developed a set of mathematical equations using mechanical engineering systems to explain how gases inside a volcano become pressurized and cause it to erupt.

Basically his model explains how hydrogen sulfide, carbon dioxide and water vapor inside the magma chamber rise into the upper parts of the chamber. There the gases find lower pressure and expand. Eventually, the equilibrium point is passed and pressure begins to build. If there are fractures in the rocks, the gases can escape. But if there is no place for the gas to go, it explodes.

Michaelides' research into volcanos has never been sponsored by any funding agency. Instead, it has started and grown as a hobby for him. His interest in volcanos began in 1987 while he was a student at the University of Delaware, where he taught for nine years before coming to Tulane in January.

All humans, animals and plants in the Nyos Valley in Cameroon, Africa, suddenly died in August 1986. Researchers later discovered that deadly gases from the volcanic Lake Nyos, located above the valley, had escaped and traveled downhill into the village, asphyxiating everything. No one understood why this occurred.

Michaelides was spending the year at the Centre National de la Recherche Scientifique (CNRS), a research laboratory near Paris, and joined the team of scientists studying the problem at the request of the French government. His role was to do a fluid mechanics study to explain how the gas escaped from the lake and traveled down into the valley.

"The lake was like a cork," he said, with carbon dioxide inside the rock beneath the lake. When the pressure of carbon dioxide became high enough, it went through the lake bottom and into the air. But because carbon dioxide is heavier than air, it then descended down the valley rather than rising upwards.

"I started thinking, 'Why would the carbon dioxide come out?"' he said. "I came up with a theory which explains the eruption of volcanos."

While he plans to pursue funding for his volcano hobby while at Tulane, he has long-term plans for boosting sponsored research and expanding the graduate program in the mechanical engineering department, which encompasses mechanics, robotics, thermal sciences and fluid mechanics.

As mechanical engineering head, Michaelides succeeds Harold Sogin, who retired last semester after 29 years in engineering at Tulane.

A native of Greece with a bachelor's degree from Oxford and a doctorate from Brown University, Michaelides' "serious research" is in multi-phase flows, heat transfer, experimental fluid mechanics and energy compression. He hopes to gain funding to study sediment flows in Louisiana waterways as part of a land erosion study he is planning with associate professor Mortaza Mehrabadi to understand the process that lifts particles from the land and transports them out into the water.

The department is hoping to obtain funding soon from the Department of Energy to take part in a study of global warming, which also would incorporate the erosion study.

Michaelides has started recruiting graduate students from Tulane and from other universities. He also plans to produce a sort of annual report of the department to aid in recruiting. More than just a course catalog, the report would contain information on research projects.

"When you want to attract research students, you've got to tell them the research opportunities," he said.

His goal is a graduate program with 30 to 35 fully supported students. Now the department has only nine full-time and about 25 part-time graduate students.

With some effort, Michaelides believes the mechanical engineering department can be ranked in the top 5 to 10 percent nationally.

"I think that the department has great potential. We have very good people and we are in a very good position to become one of the very good mechanical engineering departments of similar size institutions."

—Susan Januska
Inside Tulane—May 1990

Louisiana Regents' Awards

Tulane research projects in engineering, chemistry, computer science and education were approved for funding by the Louisiana Board of Regents at its May 24 meeting.

The funds—totalling about $1.7 million—come from the Louisiana Education Quality Support Fund and include money for research and development, enhancement programs, equipment purchases and graduate recruiting.

Six research grants, including one joint project with Loyola University, were approved at a total of $532,804 over the next two to three years. A total of 47 research proposals statewide were funded from 291 submitted.

Tulane had the top-ranked project, by Frank Silbermann, assistant professor of computer science. He will receive $74,010 over two years to combine two programming paradigms into a language used in artificial intelligence. According to Silbermann, in the area of research called declarative programming two languages are used. He hopes to combine them so that the benefits of each are linked in one language.

Stephen Schwarz, assistant professor of mechanical engineering, was awarded $63,763 over two years to develop an inexpensive, rugged and easily manufactured sensor to measure the composition of gas mixtures.

Schwarz said the sensors can be used to cool components used in jet engines and turbines to make them more efficient. Previous methods have been complex and obtaining data was not automatic. The National Science Foundation and the U.S. Air Force have expressed interest in these types of sensors, he noted.

Gilbert Young, assistant professor of computer science, was awarded $74,728 over two years to study the "deterministic scheduling." Young's project is a continuation of the search for the optimal way to tell computers to schedule tasks. Most computers use first-come, first-serve or even random order for completing tasks. Neither method, Young says, allows tasks put in the end of a work queue to receive higher priority over earlier jobs or reassignment of priorities when a job is erased from a queue. He says more efficient decisions should be made by computers that sort and complete multitudes of jobs.

A grant of $80,894 over two years was given to Rob Peattie, assistant professor of biomedical engineering, to continue his studies on how gases are transported through the lung.

Using a model he developed, Peattie will look at the velocity field of the lung. The velocity partly measures how long a gas ishaled by the lung to enter the bloodstream.

His research may reveal the most efficient way to make a mechanical ventilator, a device used in surgeries to control the patient's breathing. It also may lead to diagnostic and treatment applications for lung diseases such as emphysema.

—Inside Tulane
July 1990
Building better bodies by computer

Senior biomedical engineering students studied topics from scoliosis to schizophrenia as part of their senior thesis projects this year, some of which were displayed during Engineering Day April 22.

Getting the curve straight

David Chan of Richmond, Calif., became interested in scoliosis (curvature of the spine) after suffering a compression fracture of his spine in a car accident during his freshman year. Doctors used rods inserted into his back, like the ones used for scoliosis patients, to correct his injury.

With research on clinical techniques, Chan designed a software called SpineRight that shows the best place to set the stainless steel rods and hooks used to surgically repair the abnormal curvature.

In developing his model, Chan drew on the Cotrel-Dubousset system, which is unique in allowing natural bend in the spine. Said Chan, "A lot of the curves are there for shock absorption and to allow you to bend."

Taking that system one step further, Chan designed a model that works on the major curve of the spine. If that can be corrected, he reasoned, the rest of the spine can follow.

Finger games

Guitarist Juan Sanchez of San Juan, Puerto Rico looked at the lowly finger for his analysis of motion.

He learned that as flexor muscles on the inside of the forearm work to flex a finger, extensor muscles on the outside exert an opposite force, called co-activation.

Using a computer to analyze co-activation more closely, Sanchez discovered that "during flexion [bending the finger toward the palm] and during extension [bending the back of the hand] the antagonist muscle has a higher co-activation. When a finger is flexed, the opposing extensor muscle works harder, compared to the same movement in the knee or elbow."

He also looked at the torque (force times distance) of the muscles. "There is a higher torque during flexion than extension," he said.

Better understanding of the normal workings of the hand will help doctors to design better artificial limbs, said Sanchez. "One day I hope I will be able to do an artificial arm that really resembles a human arm," he said.

Eye to Eye

Enrique Gelpi, also of San Juan Puerto Rico, looked through the human eye to study mental illness.

"A high percentage of people who suffered schizophrenia have eye tracking dysfunctions," he said. When they shift their focus from one object to another, the eyes show irregular, jerky movements called saccadic movements.

"These eye movement irregularities are probably the only reliable trait-markers for schizophrenia," said Gelpi. A traitmarker is not a diagnosis of a disease but an indication that the disease is likely to be present.

Gelpi worked with the Tulane Psychiatric Neuro-Physiology Clinic to come up with a device that would more accurately distinguish between saccadic and normal eye movements.

Gelpi constructed a digital integrated circuit device to work with the computers, manual tests and eye-tracking device already in use at the clinic. "It serves as a good indicator of whether or not there are some signs of schizophrenia present," he said.

His circuit compares the signal received from an eye-tracking device with a reference point and interfaces it with a computer. "It detects when a movement was larger than allowed and will tell what causes it to be larger than allowed," he said.

Workout wear

Michael Hew of New Orleans was skeptical about claims that a workout shoe called the Strength Shoe could really make a person run faster and jump five to nine inches higher—as claimed.

"The shoe comes with an exercise plan, so I tried to design a training regimen that would come up with comparable results," he said.

Hew tested his thesis on 12 subjects divided into three groups. One group followed an exercise regimen wearing the Strength Shoe, another did the Strength Shoe exercises without the shoe, and the third wore ordinary athletic shoes while performing Hew's exercises based on plyometrics.

"Plyometrics exercises are characterized by a lengthening of a muscle, followed by a rapid contraction," he said.

After six weeks, results from his regimen were comparable to those of the Strength Shoe. The group wearing the Strength Shoe was able to jump 1.3 inches higher on average, while those using plyometrics gained 1.25 inches. The group doing the Strength Shoe exercises without the shoe gained only .96 inches on average, he said.

Inside Tulane—June 1990

Special chairs for special children

Ergonomically designed chairs for children with cerebral palsy competed for first place in Tulane's annual Engineering Day April 22.

It was a close contest, said faculty adviser Ron Anderson, but the winner finally emerged: the Posture Perfection Seating System.

This year's challenge for senior biomedical engineering students was to design a chair that could be adapted to the needs of children with varying degrees of cerebral palsy. Currently, because each child has a unique set of limitations, chairs are designed for specific patients.

Nine teams of students designed chairs to fulfill a given set of criteria. All chairs were to have separate, adjustable supports for the head, sides, seat and torso; sufficient back support and structure to provide stability; a detachable tray for eating and play; adaptability to accommodate size variation and growth; use of electric motors; and modularity.

Describing the winning chair, Anderson said, "The edge it had is that it addresses all the design criteria very well. And the use of motors was well thought out and well executed."

"It can fit all sizes of children," said winning team leader Marta Villarraga.

"You can select what you want to use" of the various features, she said in describing the project.

"All of the kids with cerebral palsy are so different," she said. For instance, "not all need a lot of head support," she noted.

So Villarraga and her team put together a chair that has removable support features for the head, sides and legs to encourage upright posture. The chair, like the other designs, is motorized and allows the feet to be elevated at a 45-degree angle. And a play table, also removable, can be used for intellectually stimulating activities.

The other team members were: Daniel Larsson of Ystad, Sweden; Antonio Flores of Miami, Fla.; and Michael Hew of New Orleans.

Judging the projects were biomedical engineering faculty; Jonel Parker, a physical therapist at Children's Hospital; and Jim Glaes of J. E. Hanger Inc., a New Orleans manufacturer of orthopedic devices and aids for the handicapped.

Anderson said Glaes believes at least two of the chairs could be introduced to the marketplace with some improvements and modifications.

The research was funded by a National Science Foundation grant.

-S.J.
Computers

microcomputers including Apple, IBM and IBM compatible PCs complete the array of systems in the department.

Electrical Engineering

The Department of Electrical Engineering currently maintains a cluster of SUN workstations, Macintoshes, and PC compatibles. The computers are interconnected via an Ethernet local-area network and connected to Internet. Faculty systems are connected to laboratory systems via a campus wide network which spans from the Percival Stern building through the Engineering Complex to the Richardson building and on to Gibson Hall.

Computers are used for data acquisition, image processing and computer graphics, systems analysis and modeling, and circuit design and analysis. Access to a campus supercomputer system is possible via departmental computers.

Chemical Engineering

Very few facets of chemical engineering are untouched by computers. In tight of this, the department has vigorously pursued implementing computer systems to meet the every changing needs of the faculty and students. Every faculty member has one or more computer systems in their office. Each laboratory in the department has several computers which are used for data acquisition and to operate equipment. Data analysis and plots of the data frequently occur as the experiment proceeds. All reports and plots are produced by the computers. There are three computer laboratories within the Chemical Engineering Department. One is used almost exclusively for the preparation of undergraduate reports and graduate dissertations. Another is used primarily for process design and reactor design. The third laboratory is a control laboratory with work stations connected to the Tulane Computer Center. The ACS (Automated Control Systems) software from IBM is used in the study of various control design. Each course has numerous problems which require computer solutions. In addition, students have a need to interface computers with equipment.

The Department of Chemical Engineering is currently in the process of expanding its computer facilities with the implementation of an Ethernet local area network which will connect Macintosh systems, IBM PC's and compatibles, and IBM Unix based workstations using TCP/IP. An IBM RISC System/6000 will act as a network server as well as doubling as a mini-computer for use by students and faculty either via the network or by directly attached ASYNC terminals.

- Faculty

(Continued from Page 3)

Dr. Robert Goldman has joined the Computer Science department as an Assistant Professor, beginning July 1990. Dr. Goldman comes to Tulane from Brown University in Providence, RI.

Dr. Goldman received his B.A. in Philosophy from Yale College in 1983 graduating Magna Cum Laude. He received his M.Sc. in Computer Science in 1988, and his Ph.D. in Computer Science in 1990, at Brown University. His thesis research was in Artificial Intelligence.

Dr. Goldman had been working on applying probability theory to AI problems, and his thesis concerns the techniques he has developed and their application to natural language understanding.

Among other awards and honors, Dr. Goldman received the Graduate Research Prize, Brown Chapter of Sigma Xi in 1990.

During the summer of 1986 Dr. Goldman was a Research Assistant at Brown University.

He has worked for Multi-mate, Inc. as a system analyst and programming in C, as well as for Compu-Teach, Inc. working on game design and programming in C.

There have been numerous articles written by Dr. Goldman as first author with the most recent being Dynamic Construction of Belief Networks, to appear in the proceedings of the 1990 Conference on Uncertainty in Artificial Intelligence. He was also the invited speaker at the Rockwell International Science Laboratories, in October of 1989; and most recently at the SRI, in October of 1990.

From the fall of 1986 to the spring of 1989 he worked as Lab Assistant and Graduate TA for M.I.T.'s Electrical Engineering Department.

He has gained considerable experience in analog, digital and software design in pursuit of hobby interest. An ongoing microcomputer project has entails hardware and software design with Z80 microprocessors including a multitasking kernel, interactive monitor programs, device drivers and packet-switched network drivers.

He is a native of Idaho and enjoys backpacking, skiing, mountain-skiing and rock climbing.

Dr. George Lee Zimmerman is the newest addition to the faculty in the Electrical Engineering Department. Dr. Zimmerman received his Ph.D. in Electrical Engineering in 1988 from the University of Minnesota, and his B.S.E.E. (Cum Laude) from the University of Utah.

Before coming to Tulane, Dr. Zimmerman worked as a Post-Doctoral Fellow at Harvard University, a Research Assistant and Teaching Assistant at the University of Minnesota.

Donald P. Gaver is a new Assistant Professor in the Biomedical Engineering Department as of January 1990. He received his Ph.D. degree in 1988 and his M.S. degree in 1985 both from Northwestern University in Theoretical and Applied Mathematics. In 1982 he received two degrees: a B.S. in Applied Physics from California Institute of Technology and a B.A. in Physics from Occidental College.

Before coming to Tulane he did pulmonary research at the University of Chicago. He did graduate research for General Motors Research Laboratories on the immunological response of T-cell deficient mice to exposure of ozone and also he measured the aerosol oil mist concentration within a manufacturing facility. He assisted in flood analysis of North Carolina at Tetra Tech. Inc. and at Arizona State he studied the onset of instability of swirl and countercurrent flows. He has teaching experience from Northwestern and while there was a guest lecturer.

In 1982 he won the Stedman's Memorial Travel Award from Caltech and in 1988 he won the National Research Service Award from the National Institutes of Health. He has had several publications and technical reports and eight abstracts.

Dr. Richard D. Gonzalez has been appointed the Herman and George R. Brown Professor of Chemical Engineering effective July 1990. Dr. Gonzalez comes to Tulane from the University of Illinois at Chicago where he held position as Professor of Chemical Engineering since 1985. Dr. Gonzalez received an award for teaching excellence in 1989. Dr. Gonzalez has been invited to talk or lecture at forty-six national and international functions. He has also chaired or co-chaired nineteen sessions at national meetings, as well as supervised two M.S. theses, thirteen doctoral dissertations, and seven post-doctoral research projects. Along with holding office in numerous professional organizations in the area of catalysis, he is also reviewer for six granting agencies, including NSF, DOE, and ONR.

Dr. Gonzalez received his B.Ch.Eng., from Rensselaer Polytechnic Institute in 1961 and moved on to The Johns Hopkins University where he received his M.A. in 1962 and his Ph.D. in 1965.

Along with the many other prestigious awards and honors received by Dr. Gonzalez is the medal of Good Conduct from the Armed Forces in 1957 and the United States Air Force Service Medal (Korean Conflict) in 1953.

On July 1, 1990 Dr. Kim C. O'Connor joined Tulane University's Chemical Engineering Department as an Assistant Professor. Dr. O'Connor is a graduate from the California Institute of Technology where she received her Ph.D. in 1987. She also attended Rice University receiving a B.S. in Chemical Engineering (Magna Cum Laude) in 1982. Dr. O'Connor has maintained membership in many honor societies such as Sigma Xi, Tau Beta Pi and Phi Lambda Upsilon. She is also a member of the American Institute of Chemical Engineers. She has published numerous articles in well respected journals, and has done presentations at meetings such as the 1986 Annual Meeting of the American Institute of Chemical Engineers. Her list of awards and honors include, Weyerhaeuser Company Foundation Pre-Doctoral Fellowship, Texas Society of Professional Engineers' Outstanding Engineering Student, President's Honor Roll, along with other merit scholars.

Dr. Robert Goldman has joined the Computer Science department as an Assistant Professor, beginning July 1990. Dr. Goldman comes to Tulane from Brown University in Providence, RI.

Dr. Goldman received his B.A. in Philosophy from Yale College in 1983 graduating Magna Cum Laude. He received his M.Sc. in Computer Science in 1988, and his Ph.D. in Computer Science in 1990, at Brown University. His thesis research was in Artificial Intelligence.

Dr. Goldman had been working on applying probability theory to AI problems, and his thesis concerns the techniques he has developed and their application to natural language understanding.

Among other awards and honors, Dr. Goldman received the Graduate Research Prize, Brown Chapter of Sigma Xi in 1990.

During the summer of 1986 Dr. Goldman was a Research Assistant at Brown University. He has worked for Multi-mate, Inc. as a system analyst and programming in C, as well as for Compu-Teach, Inc. working on game design and programming in C.

There have been numerous articles written by Dr. Goldman as first author with the most recent being Dynamic Construction of Belief Networks, to appear in the proceedings of the 1990 Conference on Uncertainty in Artificial Intelligence. He was also the invited speaker at the Rockwell International Science Laboratories, in October of 1989; and most recently at the SRI, in October of 1990.
Alumni News...

Charles A. Bender Jr. (BE in CE ’23) is a retired Gulf Oil Executive. He enjoyed the 1983 homecoming celebration and 60th class reunion Oct. 20, 21, 11
G. Elmer May (BE ’26, ME) retired from NOPS. Says retirement is great if you have good health and keep close to your profession and associates, and have plenty of hobby interests.

Alfred Lippman (BE ’29) retired as a General Director of Research of Reynolds Metals. 60th class reunion at President Kelly’s home was wonderful. Tulane shows its closeness for its graduates.

Hatley N. Harrison, Jr. (CE ’32) is President of Hatley N. Harrison, Inc. Still going strong at 81. In addition to his civil engineering practice he is a Poetologing (if you know what that means).

J. B. Eaten, Jr. (CE ’34) is retired from Texas Seamen Transmission as Chief Engineer of Dredging. Wife Marie died in January 1988. Recently remarried to Merle Vicker. Edward J. McNamar (BE ’39) retired nine years ago as Vice President of Research and Development at Freeport McMoran, for world-wide activities. Is active with his own consulting business, Consulting Engineers, Inc.


Alvin G. Gottschall (BE in ME ’43) is retired from PPG Industries, Inc., but still consults for several firms. Alvin now lives on the Eastern Shore of Mobile Bay, Alabama.

Harold A. Timken (BE in EE ’43) is president of Medix Data Health Services, Inc. (MHIS Inc.). Harold now lives in Rockville, Maryland and attended the 50th anniversary of Alice Forler High School class reunion.

Warren Ibele (BS in ME ’44) is Professor of Mechanical Engineering at the University of Minnesota. Warren received the George Taylor/IT Alumni Society Distinguished Teaching Award 1988 in recognition of outstanding teaching in the Institute of Technology University of Minnesota.


Herman Prager, Jr. (ME ’46) is Chairman of the Board of Prager, Inc. Herman was told by Dean Roberts in 1946 that he should choose another field and is glad he did not take his advice.

Carter Robinson (BE in ME ’46) formed Carter Robinson Company in 1986, in Houston, Texas, providing international personnel consulting services and personnel recruitment for operations in the UK, France, Middle East & Far East, Canada & USA, primarily in the engineering & executive fields.

Irwin Isaacson (BE in ME ’47) is Chairman of IMC Consulting Engineers. After 40 years at Weil & Moscot, formed a new firm in 1988.

Luther Waller (BE in ME ’48) is retired from practice of law.

Vincent L. Goodman (BS in EE ’51) Formerly President and CEO of Goodman Engineers Inc. Now in private practice as Forensic Engineer and Court Expert. Accepted into the American Academy of Forensic Scientists, 1989.

Randall K. Nichols (BS in Chem ’67) was recently promoted to Assistant Division Manager — ADT for Reynolds Metals Company. Nichols is in charge of Computer Modeling and Process/Corporate studies for Sherwin and Worsley Aluminum Plant.

Amaury Piedra (BS in EE ’67, MS, MBA) is President and CEO of Silicon Corp. Moved to Washington in June, 1988 on a seven acre piece in Issaquah. Enjoying the open spaces and animals. Attended 25th reunion and had a great time with old friends and professors. Did not sleep for 48 hours.

Jamaal H. Keppler, III (ME in ME ’72) is Senior Facilities Engineer for Shell Offshore, Inc. Elected chairman of the North American PDMS Users Group at its first annual meeting May 1989. PDMS is a sophisticated 3D CAD system developed for plant design modeling, drawings, and other benefits from its 3D database. Current position with Shell is as the Safety Engineer for the Offshore West Division Health, Safety and Environment organization.

Emmett J. Mayer, Jr. (MS in CE ’73) is an associate in charge of the New Orleans operations for Berger, Barnard & Thomas, Inc.

Ed Rhew (BS in ME ’73) is Coordinator for Florida Power & Light. Spoke at ASCE meeting in Ft. Lauderdale, Florida in September.

Joseph Wall, Jr. (BSE ’73) is Director of New Product Development for Rosemount,
Alumni News (con't)...
Inc. in Minnesota. Son, Joseph E. Wall, III, is a sophomore in Engineering at Tulane and enjoying having some of the same faculty his Dad had.
Dr. Hal C. Becker (BE '42, MS '54, PhD '74) lives in Fort Collins, Colorado. Wife Pat and Hal are learning to outsmart rainbow trout in the Colorado waters, & surgeon in the Columbia River (Oregon) with the enthusiastic help of two neat grandsons ages 6 & 8 years. Hal sends greetings to everyone.
Charles Curtis Mann (ME in ME '74) is Chief Building Official for the City of New Orleans. Appointed in November as Chairman of the Southern Building Code Congress, Int. (SBCCI) Code Compliance Committee; also serving as member of the National Evaluation Service Committee of the Council of American Building Officials (CABO).
Stephen L. Sallman (BSE '74) is Vice President of Hunt Properties, Inc. in Dallas, Texas. First child, a boy, born to Mary and Steve on March 28, 1989.
H. Brinson Miles III (ME in ChE '75) is Division Manager for McDermott International. Worked overseas from 1975-1989. Transferred to McDermott Morgan City Operations and living in Thibodaux, LA.
Tony Benigno (ME in Eng. Mgmt. '77) is Staff Manager for South Central Bell in Birmingham, AL. Project Manager for the installation of a new 3000 line telecommunications system for the Alabama State Capitol Complex in Montgomery, AL.
Steven L. Dehlow (BS in ChE '78) lives in Hinsdale, Illinois and is Executive Vice President for Great Lakes Terminal & Transport Corp. Wife Shirley (Tulane Business '78) just gave birth to second child and first son, Nicholas Wade Dehlow, born April 1, 1989.
James V. Reuter, III (BS in ME '78) is
Assistant Mechanical Department Head for Leo S. Weil & Walter B. Moses, Inc. in New Orleans. He and wife Jewel had their second child, a boy, James IV, in November, 1988.
Richard G. Sellers, M.D. (BS in ChE '78) is a partner in the Sports Medicine Clinic of Tampa and team physician for University of Tampa & Tampa Bay Rowdies (professional soccer).
Joseph E. Bavaria, M.D. (BS in ChE '79, MD '83) is Surgery Resident at University of Pennsylvania. Completing chief residency in surgery at the University of Pennsylvania, Philadelphia. Recently completed a research fellowship in Cardiac Physiology and Bio-engineering at the University of Pennsylvania.
Mostafa F. Khosravani (DE in Eng. Mgmt. '79) is Telecommunications Network Coordinator for the State of Louisiana DOTD. Wife Donna and three children reside in Baton Rouge, LA.
Dave Reinmuth (BS in CE '79) is Senior Sales Consultant for Project Software Development, Inc. (PSDI) in Dallas, Texas. Married Darrow Cronin, November 25, 1989.
Joan Jackman Becket (BS in ChE '84) married David M. Becket in February of 1987 and is currently working in Gaylord, Michigan for Ward Lake Energy, Inc., an independent gas producer, as Director of Engineering.
Patrick T. LeBlanc (BS in ME '84, MBA '85) is Project Engineer for Exxon Chemical Company. Recently became head instructor of the LSU Taekwondo Club.
Beatrice Gonzalez (BS in ChE '85) is presently working as Production Engineer for Union Carbide in Texas City, Texas.
Jane Kotecki (MS in BME '85) graduated from the University of Illinois College of Medicine in May 1989, and currently undergoing an Emergency Medicine Residency at Methodist Hospital in Indianapolis, Indiana.
Jeanine C. Jankowski (BS in CE '86) is currently employed by Parson's Brinckerhoff Quade & Douglas as a civil engineer in New York City. She married Michael J. Marchelletta, also a civil engineer, in Sept. 1989 and is residing in New York.
Tom Dendy (BS in ChE '87) is stationed on the nuclear powered attack submarine, USS Sam Houston (SSN-609) in Pearl Harbor, Hawaii. Completed an extended deployment in the western Pacific last year, visited Japan, Hong Kong, Korea, the Philippines and Guam.
Geoffrey G. Baldwin (BE in CE '89) is in graduate school at the University of Massachusetts at Amherst (Environmental Engineering).
Madan M. Kamboj (ME in CE '89) is Vice President of Laurence L. Lambert Engineers. Elected Vice President for A.C.I. Louisiana Chapter for year 1989 after serving two years as secretary/treasurer for ACI Louisiana Chapter. Tulane students are welcome to join local chapter at student rate of $5/year.