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One of the greatest demonstrations of speed and power at Washington University is the ultra-high speed graphics computation in the School of Engineering and Applied Science. Engineers collaborating with scientists on both campuses have been able to revolutionize analyses of problems ranging from engineering design to cardiac and neurological disorders all through ultra-fast computation at many billions of calculations per second. The computers from Digital Equipment Corp. (DEC), Silicon Graphics and MasPar are so speedy and innovative that they can create "movies" of research situations similar to the computer-generated special effects of such Hollywood classics as "Star Wars" and "Jurassic Park."

A cross-disciplinary group uses the Laboratory for Computation and Control, directed by J. Norman Katz, Ph.D., professor and chair of Systems Science and Mathematics, to study heart muscle, specifically the left ventricle, and the physical fluctuations the muscle undergoes from a passive to a stressed state. To understand these effects in a computer model system, the researchers run a finite element analysis on powerful Silicon Graphics workstations called Indigo and Challenge. Finite element analysis involves subdividing an object into a very small mesh of pieces, or elements, and computing stresses and deformations for different conditions. Indigo is used for the graphics component of the research, Challenge, with two parallel processors that can compute billions of calculations per second, does the number-crunching. Parallel processing computers simultaneously divide several different computational tasks among more than one processor — the net effect a paraphrase of the old saying "many hands make light work."

While such a study appears to be strictly biomedical, the problem — the analysis of stresses and deformations — actually is one of mechanical engineering. The research draws together Michael K. Pascoe, M.D., professor of surgery, Julius M. Guccione, Ph.D., assistant professor of mechanical engineering, and mechanical engineering graduate students and surgery residents. It is supported by the Whitaker Foundation.

Ruth Okamoto, a graduate student on the heart muscle project, formerly worked at DEC on stress problems of solid substances such as steel. But the heart, she noted, is made of much different timber. "If you push on steel very, very hard, it eventually deforms a little, but the heart is very compliant," she explained. "As the heart is filling, it needs to stretch to accommodate the increased blood volume in the chambers. We use a program especially written for finite element analysis of the heart to see how much it deforms and where, specifically in the left ventricle, it deforms most."

Continued on page 7

Miller installed as Wilson professor

Michael I. Miller, Ph.D., professor of electrical engineering, was installed as the Newton R. and Sarah Louisa Glasgow Wilson Professor of Biomedical Engineering in a recent ceremony at the Lopata Hall Gallery. He is the first named professor of biomedical engineering in the School of Engineering and Applied Science.

An often-honored engineer, Miller is author of 45 articles and 13 book chapters. He co-wrote "Random Point Processes in Time and Space" with Donald L. Snyder; Ph.D., the Samuel C. Sachs Professor of electrical engineering. Miller joined the electrical engineering faculty in 1984. He also is a faculty member at the Institute for Biomedical Computing and the Mallinckrodt Institute of Radiology. In 1982, Miller was awarded the Institute of Electrical and Electronics Engineers Biomedical Engineering Award First Prize; the next year he won the Johns Hopkins Paul Ehrlich Graduate Student Thesis Award. In 1986, he was presented the National Science Foundation's Presidential Young Investigator Award.

Miller is conducting research in the areas of medical imaging, computational linguistics, computational neuroscience and automated target recognition. His group's projects all rely heavily on parallel computation strategies involving the integration of more than one high-speed computer to work on the same task. His laboratory is the location of a 16,000 processor MasPar machine, which is the most powerful supercomputer of its kind in the country (see above story).

The professorship is part of a final gift to Washington University from the Wilsons. Newton Wilson graduated from Washington University in 1879 and became a successful mining engineer and lumber company executive. He died in 1914. His wife died in 1938. After her husband's death, Sarah Wilson returned to St. Louis from Louisiana, and began a series of major gifts, which contributed to the construction of the Wilson Swimming Pool, the Newton R. Wilson Memorial Hall, and the Ann W. Olm Women's Building.
Key to survival

Gene critical for blood, nervous system development in mice embryos

Within the body's cells, death is an essential part of life. Through-out development and adulthood, millions of cells undergo programmed cell death to eliminate unnecessary cells or replace worn-out cells with new ones. Now researchers at the School of Medicine report that a gene responsible for blocking programmed cell death is critical for normal embryonic development. Mice embryos that lack this key gene die before birth, devastated by extensive cell death in the blood and nervous systems, the team reported in the March 10 issue of the journal Science.

The researchers, led by Dennis Y. Loh, M.D., professor of medicine, genetics, and molecular microbiology and a Howard Hughes Medical Institute associate investigator, found massive cell death in regions of the blood and nervous systems populated by immature cells. The report provides the first direct evidence that the gene bcl-x is necessary for the survival of immature cells in the blood and nervous systems. "The extent of cell death was impressive," said Kevin Roth, M.D., Ph.D., associate professor of pathology, assistant professor of molecular biology and pharmacology, and a co-author of the report. "We were surprised to see how extensive the cell death was and how critical bcl-x is to survival of the mouse embryos."

The investigators suspect the embryos died due to abnormalities in the development of mature red blood cells. Bcl-x, which was first identified in 1993, is a member of the bcl-2 gene family. Bcl-2 also inhibits programmed cell death. It has received considerable attention in recent years for its suspected role in cell death. It has received considerable attention in recent years for its suspected role in cell death. It has received considerable attention in recent years for its suspected role in cell death. It has received considerable attention in recent years for its suspected role in cell death. It has received considerable attention in recent years for its suspected role in cell death. It has received considerable attention in recent years for its suspected role in cell death. It has received considerable attention in recent years for its suspected role in cell death. It has received considerable attention in recent years for its suspected role in cell death. It has received considerable attention in recent years for its suspected role in cell death.

Scientists to study parasitic tropical diseases

School of Medicine researchers have received two grants totaling $1.5 million to study filariasis, a group of diseases that affects more than 100 million people in the tropical developing countries of Asia, Africa and Latin America. Filarial infections are caused by microscopic worm parasites. These tiny worms are the larvae of the filarial nematode worms, which is common in dogs throughout the United States.

Filariasis is transmitted by the bite of insects, namely mosquitoes and black flies that carry the worm parasites. Infection with the most common species of these tiny worms leads to elephantiasis, a condition characterized by grotesquely swollen legs and genitalia; another species causes skin disease and blindness.

"It is my hope that advances in our understanding of disease progression and block transmission of the infection to others. Improved diagnostic methods also will enable public health workers to boost surveil-lance of filariasis and identify areas where control efforts are most needed. Weil and co-workers at the Hospital for Special Surgery will look at filaria in the infant, fetal, and newborn period. They will assess the feasibility of developing tests for filarial infections that cause skin disease and blindness. They already have developed a sensitive diagnostic test for the parasite that causes elephantiasis."

The second grant will support Weil's effort to understand the development of protective immunity to filarial infections. The work may one day lead to vaccines for preventing filarial infections.

For this project, Weil's group will collaborate with researchers at Ain Shams University in Cairo, Egypt. Together, they will study villages near Cairo where filariasis is common. The researchers will study some 300 families to monitor the incidence of new filarial infections.

Dennis Choi receives grant to investigate nervous system injury

Dennis W. Choi, M.D., Ph.D., Jones professor and head of the Department of Neurology at the School of Medicine, has received a grant of approximately $5 million to continue work on injuries to the nervous system.

The five-year award comes from the Neurological Institute at the National Institute of Neurological Diseases and Stroke. Research teams led by Choi and eight other faculty in the School of Medicine's Center for the Study of Nervous System Injury will determine how interactions between neural cells contribute to damage when the brain is deprived of oxygen. The project will focus on receptors for glutamate, a substance that serves as a chemical messenger between neurons.

"It is my hope that results from these studies will aid the development of clini-cal treatments for patients who suffer from stroke and ca-diac arrest," Choi explained.

The primary long-term goals are to develop ways to protect the brain and spinal cord from injury due to disease and trauma and to promote recovery after injury has occurred. The studies relate to a wide range of disorders, including stroke, cardiac arrest, head trauma and many neurodegenerative diseases.

In addition to the Choi, the eight other faculty in the federally funded project are: Laura L. Dugan, M.D., instructor of neurology, and of neurobiology, Chung Y. Hsu, M.D., Ph.D., professor of neurology, Michael A. Province, Ph.D., associate professor of biostatistics, William D. Snider, M.D., assistant professor of neurology, Kevin A. Yamaoka, M.D., assistant professor of neurology and of pediatrics, and Shawn-Ping Ya, M.D., Ph.D., research assistant professor of neurology.
Unanue's experiments showed that when macrophages are exposed to foreign proteins, the immune system generates an active response. "It soon became apparent that the macrophage was a meaningful component of the immune system," Unanue said. Researchers began to suspect that the immune system recognized and was responsive to the presence of macrophages, and might play a dual role in which they actively participate in the functioning of the immune system. The work began in 1968 when Unanue was in London. At the time, macrophages were thought to be accessory cells that supported the immune system's operations. Unanue, however, found that macrophages, under the appropriate conditions, could stimulate the immune system. They could stimulate the immune system to produce antibodies, for example, or to react against specific antigens. This work led to the development of vaccines that could be used to combat infectious diseases.

Unanue's contributions have put multiple sclerosis and arthritis in the spotlight as potential targets for immunotherapy. "I was impressed with his work," Benacerraf said. "He was one of the early immunologists who recognized the importance of the immune system in the development of autoimmune diseases." Benacerraf encouraged Unanue to pursue his research, and Unanue soon began to focus on the role of macrophages in the immune system. He developed a theoretical model that explained how macrophages could stimulate the immune system, and this model has since become the foundation for understanding the role of macrophages in the immune system.

Unanue's research was recognized with the Nobel Prize in Physiology or Medicine in 1980, the highest honor in the field. "It was a tremendous moment," Unanue said. "I felt like I had accomplished something important for science." The work has since been applied to the development of new treatments for autoimmune diseases, and has led to a better understanding of how the immune system works.

Unanue's research is just a glimpse of the incredible advances that have been made in the field of immunology. From the discovery of the role of macrophages in the immune system, to the development of vaccines and treatments for autoimmune diseases, immunology has had a profound impact on medicine and science. "I am incredibly proud of the work that we have done," Unanue said. "It is a source of great satisfaction to see the impact that our research has had on the world."
Exhibitions

"The Matter of History: Selected Works by Annette Lemieux." Mixed media art addressing the Holocaust and the many personal ways in which war alters the lives of individuals. Opened on the life of Miles Davis, the St. Louis Jew. 12th Floor, 917 Locust Street. Hours: 9 a.m.-5 p.m. weekdays; 1-5 p.m. weekends.

First-year M.F.A. Exhibition." Mixed media, paintings, installation, sculpture, print, photography, ceramics and glass created by first-year master of fine arts students. Every Thursday of the school year, Design Center. Hours: 9 a.m.-5 p.m. weekdays.

Calendar guidelines

Events sponsored by the University—its departments, schools, centers, organizations and its recognized student organizations— are published in the Calendar. All events are free and open to the public, unless otherwise noted. Calendar submissions should state date, time, place, sponsor, role of event, name of speaker(s) and affiliation, and costume code. Quality promotional photographs with descriptions are welcome. Send items to lady Rose, 12701 (or via fax: 314-935-4225). Submission forms are available by calling 935-0425.

The deadline for all entries is noon Tuesday one week prior to publication. Late entries will be given one-column wide space. Monday deadlines are every Thursday during the school year, except holidays, and monthly during the summer. If you are uncertain about a deadline, holiday schedule, or any of the above, please call 935-4926.

Calendar

Miles Davis Conference April 6-8 Room 149 McMillan Hall 935-5219.

7 and 9 p.m. Filmboard Feature Series." "Pulp Fiction" (1994), starring Rosanna Arquette, John Travolta and Bruce Willis. (Also March 25, same time and place. Hours: 9 a.m.-5 p.m. weekdays; 1-5 p.m. weekends.

Midnight. Filmboard Midnight Series," "Spaceballs" (1987), a comedy Star Wars parody directed by Mel Brooks. (Also April 1, same time.) Room 100 Brown Hall Cost: $3.

Thursday, March 23

7 and 9 p.m. Filmboard Feature Series." "The Major and the Minor" (1942, B&W), a screwball comedy set in Near Eastern Languages and Literatures. 7 p.m. Japanese Film Series. Brown Hall. Cost: $3.

Institute in conjunction with the upcoming 1995 St. Louis Festival of Brit- ish Columbia, Vancouver. Room 199 Cupples I. 935-8586.

Friday, March 24

7 and 9:30 p.m. Filmboard Feature Series. "Saturday Night Fever" (1977), starring John Travolta. (Also March 25, same time, and March 26 at 7 p.m.) Room 100 Brown Hall Cost: $3.

Monday, March 27


1:30 p.m. Psychology colloquium. "Phenomenal Externalism: If Meanings Ain't in the Head, Where Are Qualia?" Fred Dretske, prof., Dept. of Philosophy, U. of California, San Francisco. Room 216 Urbain Hall.


Wednesday, March 29

12:30 p.m. Math colloquium. "Transversally Homogeneous? (cont.)" Ron Nerad, prof., math department. Room 200 Steinberg Hall.


Lectures

Thursday, March 23


11:15 a.m. Social work lecture. "Overview of Mental Health Care Reform." Diane McFarland, director, St. Louis Mental Health Care Reform Diffuser, director, Great Rivers Mental Health Services, St. Louis Mental Health Board, Second Floor Conference Room, Adminis- trative Bldg., 1130 S. Hampton Ave.


2:30 p.m. Mechanical engineering seminar. "Ceramic-Based Materials for High Temperature Applications." Pratap Dasgupta, assoc. prof., mechanical engineering, School of Engineering and Applied Science.


Friday, March 24

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4 p.m. Jazz Film Series. "A Man Called Adam." (1966), starring Sammy Davis Jr., is loosely based on the life of Miles Davis. Sponsored by the American Culture Studies Institute in conjunction with the upcoming 1995 St. Louis Festival of Brit- ish Columbia, Vancouver. Room 199 Cupples I. 935-8586.


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Tuesday, March 22


9:30 a.m. Pediatric Grand Rounds. "The Physician's Role in Promoting Breastfeeding." Susan R. Hodes, assoc. prof., BC Health System Breast Feeding Task Force, School of Nursing, School of Medicine, and Division of Maternal, Infant and Child Health, St. Louis Children's Hospital. Clopton Aud., 4950 Children's Hospital. 935-5622.


Tuesday, March 28


Wednesday, March 29

7 p.m. Jazz Film Series. "A Man Called Adam." (1966), starring Sammy Davis Jr., is loosely based on the life of Miles Davis. Sponsored by the American Culture Studies Institute in conjunction with the upcoming 1995 St. Louis Festival of Brit- ish Columbia, Vancouver. Room 199 Cupples I. 935-8586.
Music
Friday, March 24 4 p.m. Notes: chamber music performance. Washington University Opera presents "Houy and the Beast" by Victorino Giannini, and the laboratory of Stephen Paulson. (Also March 25, same time.) Sponsored by the Dept. of Music. Graham Chapel. Cost: $3.95. 5355.881.


Performances
Friday, March 17 8 p.m. Performing Arts Dept. presents "The Illusion," adapted by Pulitzer Prize-winning playwright Terrence McNally and directed by Arnold C. Blatt. The play offers social commentary on Volatile Bodies: Toward a Corporate Feminism," by Elizabeth Barnett, Georgi Hotel, Lounge 201 Duncker Hall.

Wednesday, March 29 4 p.m. Internationally renowned clarinetist, Dr. Robert Smith, performs with the St. Louis Symphony.

Miscellany
Thursday, March 23 8 p.m. Writer's conference. "Multicultural Literature in Contemporary German Literature: A Writer's Conference" opens with a reading in German. Conference commemorates the 10th anniversary of the University's Center for Contemporary German Literature. St. International House. Continue through March 30. Sponsored by the Office of Student Activities and the German Department. Cost: $3.95. 5355.881.

Festival features student-produced films
"The Exploitation," a feature-length film produced by and starring Washington University students, will be the centerpiece of the Second Annual Student Film Festival. The festival runs March 30, through April 1 in May Auditorium, behind Carthage College.

The film presentation will begin nightly at 7:30 p.m. with a showing of six student-produced films. Following an intermission and the showing of "Neapolitan," a story of social polarity among 40 students took part in production, than 40 students took part in production, and chair, Dept. of Asian and Near Eastern Studies, speaks at anthropology forum. Bixby Gallery, Bixby Hall. Cost: 3.95. 5355.881.

Jeffries-El, "Neapolitan" is the story of diverse friendship and its backdrop are individuals who meet freshman. The film explores how the friendship is tested by interaction with and interaction with and exposed to racism and social groups on campus. The film highlights how the exchange board includes producers Meisha Liebowitz and Brian Kamman, both juniors, and cinema- and drama teacher Jason Hudnall, Mt. Vernon, 111., who starred in his first feature film and the art film and art historical film director. Bixby Gallery, Bixby Hall. Cost: 3.95. 5355.881.

Outdoor track teams open with strong outs
The outdoor track and field season opened March 18 at the Rhodes College Invitational. The men's team surged to a one-point victory over University of Missouri-Rolla in the seven-team field, while the women's finished a second behind Clarksville College.

In 1977 The Washington Post Writers Group decided to nationally syndicate Raspberry's column, which now appears in 175 newspapers nationwide, confronting issues such as drug abuse, education, crime, justice and housing and urging readers to submit proposals for answers to end social problems. Raspberry rejoined The Washington Post in 1986 as a teletype operator and worked his way up through the newspaper as diverse as obituary writer, police and court reporter, copy editor, general assignment reporter. In 2001, Okinomma, Missouri, Raspberry graduated from the degree in history from Indiana Central College.

This lecture is co-sponsored by the Assembly Series, George Warren Stone Fund, Inc. and the Washington University Political Society. For more information, call 353-5297.

Woman's Club dedicates butterfly garden to Elizabeth \textit{Ibby} Danforth

There were butterflies on the invitation and in the centerpieces. Guests listened to poetry and songs about gardens. But it still came as a surprise to \textit{Elizabeth "Ibby"} Danforth when, at the end of a March 3 luncheon, members of the Woman's Club announced that they were planting an on-campus butterfly garden in her honor. 

Danforth, wife of Chancellor William H. Danforth, after Woman's Club president Jan Kardos presented her with the Medallion of the Woman's Club since her husband, who has announced plans to retire June 30, became chancellor 23 years ago.

The Woman's Club of Washington University was founded in 1910 by a group of faculty wives from the School of Medicine and Hilltop Campus to stimulate friendships. Almost 95 years later, the club has more than 260 members, primarily composed of wives of faculty and administrators, as well as women who teach and work at Washington University. Club members are involved in myriad activities, including art appreciation, book discussion, cooking, literature, music appreciation, needlecraft, aerobics and movie discussion groups.

The club also sponsors an annual Austin Film Festival, contributes to the Olin Library fund, grants a scholarship to an academically deserving female student — a gift that would remind all of the joy and warmth you have brought to Washington University.

Danforth was named an active member of the Woman's Club since her husband, who has announced plans to retire June 30, became chancellor 23 years ago.

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Denise Ward-Brown, assistant professor of art, will be the featured speaker at the annual Review of Mathematics' "Currents" exhibition, which will open on April 18. Ward-Brown, ninth solo exhibitor, will also include her work titled "Headed East and East," a dedication to the Middle Passage. The boat voyages from Africa to the United States. Ward-Brown also presents a press conference to the book "Gumbo Ya Ya: Anthology of Contempo- rary African and Caribbean Artists" published by Midmarch Press. 

Elizabeth B. Wattenberg, a senior biochemist at University of Peace Corps. On June 7 Wattenberg will travel to Togoland, where she will work on a health extension assignment, focusing on maternal care and problems of chronic kidney disease. Wattenberg will receive the $1,000 award on April 18 during the American Physical Society's meeting in Washington, D.C.

University supercomputer is integral to pioneering biomedical research computing... From page 1

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"Now that we have the ability to make a movie of the heart muscle, we can begin to understand the processes and explain the basis for the heart's function," he said. "This is a new way of thinking about the heart, and it is revolutionary." The research is supported by the National Institutes of Health under grant R01 HL-51385-07, which is intended to support the University of Washington's research in this area.

Using fluid data transfer

"There is a whole new field of research in the air with the electronic Systems and Signals Re- search Laboratory, Room 426 Jolly Hall, directed by Donald C. Shaffer, who is currently collaborating with Samuel C. Sachs Professor of electrical engineering. It is the most powerful supercomputer in the world, called on to do massively parallel supercomputer MemRay making its billions of calculations per second. The Washington University's MasPar, the most powerful supercomputer in the world, is integral to the work of Michael L. Miller, professor of electrical engineering, of radiology and of biomedical computing. On a recent morning, Miller's colleague, Gary Christensen, Ph.D., research instructor in surgery, was calling up brain images on the Onyx workstation, which is a part of the supercomputer that makes such amazing life-like images in "Jurrasic Park." However, Christensen said, "I don't think we would have been able to create these images without the supercomputer's help." Christensen went on to say that the Onyx allowed him to see images of the brain at different resolutions, and that the Onyx's ability to produce images in only a few seconds is crucial.

"Currents" exhibition, which will open on April 18, will be part of the ongoing "Radbruch on Unjust War" conference held at the State House in Malawi. The conference will be held May 2-5, and the president of the Republic of Malawi has invited delegates to attend. The conference will focus on the role of parliament in the new political system of Malawi.

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**Medical Campus**

The following is a partial list of positions available at the Medical Campus. Interested persons who are interested in submitting a transfer request should contact the Associate Director, Department of Medical Education and Research at the University of Washington, Room 126, 4200 Eastlake Avenue East, Seattle, WA 98195, for further information.

1. Medical Secretary II 950675-R
2. Medical Secretary II 950673-R
3. Medical Secretary II 950674-R

**Addressing employee questions concerning the Washington University community**

Q: 1. In the Feb. 16 issue of the Record that there is an employee fitness program over the lunch hour for Medical Center employees. Are there any employee fitness programs (i.e., organized aerobic programs) offered at the Athletic Complex for Break School?

A: The Department of Athletics is currently offering a step aerobics class that is open to employees.

Q: 2. How can I purchase an applied science degree and graduate school?

A: The cost for faculty and staff is $55. A step aerobics class is offered from 5-6 p.m. Mondays and Wednesdays, March 20 through April 24, in the Wydown Multipurpose Room. The cost for faculty and staff is $40. A "Tone and Tone" class is offered from 12-1:30 p.m. Mondays and Wednesdays, March 20 through April 24, in the Wydown Multipurpose Room. For information, call Webb at 935-9520.

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In addition, the Campus Y is offering three different fitness classes for the second spring session. Participants can join after the initial session. Y-Hibrite Intermediate Aerobics offers a seven-class course, meets three times a week from 5-6 p.m. Tuesdays and Thursdays, March 20 through April 24, in the Wydown Multipurpose Room. For information, call 935-5520.

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