University lands national imaging center

Washington University has been chosen as the site for a new National Center for Imaging Science, which promises to play a vital role in enhancing the science of image understanding in a variety of research endeavors. The work performed at the center will aid the development of automated algorithms for understanding complex, real-world scenes, including imaging in the biomedical, planetary and defense areas.

"We're excited to be part of a center that will bring together researchers in image representation and cognitive science to develop computational vision algorithms that are capable of recognizing and describing complex objects in real-world scenes, as well as deformable shapes," said Michael I. Miller, Ph.D., Newton R. and Sarah Louise Glasgow Wilson Professor of Biomedical Engineering and principal investigator of the center. "There are no existing vision systems capable of recognizing a human crossing through grass, a dog running across a field, or the subtle substructures of the human brain, for instance. There are many difficulties that have prevented this from becoming reality, including shapes and internal patterns that vary greatly because of viewpoint, lighting and other factors, and the complexities of real-world imagery consisting of multiple objects that are at least partially hidden and often deformed. However, revolutionary developments in remote sensing devices over the past two decades, combined with an emerging concept in mathematics and computational vision called pattern theory, give the center a strong basis to address the fundamental scientific difficulties of recognizing and understanding complex scenes. We're extremely pleased that the U.S. Army has selected Washington University as the site to fulfill this national mission."

Pattern theory is the foundation for the work to be conducted at the center. As applied to the center, pattern theory involves a three-fold process of representing a complex scene, then applying remote sensing techniques such as synthetic aperture radar (used in the Magellan Mission to Venus in remotely mapping the planet) and infrared sensing to the representation, and finally applying high-speed computing algorithms to recognize and understand the data. The problems the center will address, though a major challenge to the military, also are key to planetary and medical imaging processes. For instance, computed tomography (CT) allows doctors to gather physical information about the brain without actually having to enter the brain. However, one current problem is that the brain is extremely complex and different brains are exactly alike and computer representations can miss subtle features of varying anatomical representations.

Ulf Grenander, Ph.D., professor of mathematics at Brown University and internationally renowned as the "father of pattern metric theory," will serve as consultant to the center.

Miller and his colleagues have concentrated on biomedical computer-imaging projects in recent years, with one major emphasis being the development of a computerized textbook map of biological variation. Such a map would serve as a basis for neurosurgeons and neurologists to compare with the biologically coordinates of a real brain.

Miller said the representation component of the imaging center involves making the data and then transforming it. He used a human analogy to explain representation.

Continued on page 6

Joel Siegel, entertainment editor for "Good Morning America," interviews Olympic gold medalist Jackie Joyner-Kersee and her coach/husband, Bob Kersee, at Francis Field. Siegel's segment, scheduled to air Wednesday, Nov. 15, focuses on the 1994 World's Fair and Olympics. "Good Morning America" crew also taped Russ Roberts, Ph.D., director of the Management Center of the John M. Olin School of Business, for a feature on the economic turnaround of Quincy, Ill. That segment also is scheduled to air Nov. 15.

ABC's 'Good Morning America' visits Hilltop

ABC's morning news program, "Good Morning America" (GMA), devoted a story to the University of Washington on two separate occasions to tape segments for its Wednesday, Nov. 15, show, scheduled to be broadcast from St. Louis' Union Station.

On Oct. 12, Tyler Mathis, an economist for GMA, interviewed Russ Roberts, Ph.D., director of the Management Center of the John M. Olin School of Business, for a feature on the economic turnaround of Quincy, Ill. Early that Thursday morning, Mathisen, Roberts, a GMA producer, and a camera crew departed from the business school and headed for Quincy.

The focus of the visit to Quincy was the former Motorola Inc. plant, which had sat vacant for years after its purchase and subsequent closing by Japanese interests. When the plant closed in 1976, 3,500 jobs were lost, and the economy of Quincy felt the blow.

However, during the last 20 years, Quincy, like many other Midwest cities, has made the transition from a traditional manufacturing base to high-tech industries and services, Roberts said. The result is a more diverse and vibrant economy.

Roberts had researched the economic impact of the Motorola plant closing and subsequent reopening for his book "The Choice: A Fable of Free Trade and Protectionism." Using Quincy as an example, Roberts was able to discuss with Matthew how Quincy and other Midwest economies have responded to the economic changes of the past 20 years.

Joel Siegel, GMA's entertainment editor, was at Francis Field Oct. 27 interviewing Olympic gold medalist Jackie Joyner-Kersee and her coach/husband, Bob Kersee. Siegel's Nov. 15 segment focuses on the 1994 World's Fair and Olympics, which were held in St. Louis.

Francis Field and Gymnasium were the sites of those Olympic games—the first held in the Western Hemisphere. And the four buildings surrounding Brookings Quadrangle, and seven other Hilltop Campus buildings, were leased to the Louisiana Purchase Exposition Co. for the World's Fair.
Medical Update

Brain centers that trigger emergency response identified by study

A study published in the Oct. 27 issue of the journal Science identifies the command centers of the brain that trigger the fight-or-flight response, which causes adrenaline to flow and the heart to pump vigorously. This sudden change prepares the body for emergency responses.

“This is the first time anyone has been able to identify the specific regions of the brain that are capable of producing widespread visceral responses,” said Arthur D. Loewy, Ph.D., professor of anatomy and neurobiology. Research assistant Arthur S.P. Jansen and other members of Loewy’s group developed a novel technique that was weaker than viruses to trace brain pathways. The research may provide a silver-broad for studies of medical problems in which the fight-or-flight reaction may operate, such as the anger response that possibly can trigger heart attacks. It also could aid in understanding disorders such as hypertension because blood pressure is regulated by these same brain centers.

Scientists long have recognized that specialized areas of the brain regulate heart rate and blood pressure, but until Loewy’s laboratory developed the viral tracing technique, there was no way to pinpoint the exact brain regions that control these vital functions. Even sophisticated imaging techniques, like PET (positron emission tomography) scanning, fail to do the job because they cannot distinguish minute brain areas. “We have developed a tremendously powerful and highly specific technique for identifying the functional sets of brain cells,” Loewy explained.

The researchers genetically engineered a herpes virus to make two forms, each of which produced a unique marker protein. They injected one of the viruses into the adrenal gland of rats and the other into the nerve ganglion that controls the heart. After several days, the viruses sequentially infected the chains of neurons in the brain that control these two organs. Because the infections were very mild, the neurons remained intact, so the researchers were able to use antibodies to detect the two different marker proteins. Select sets of neurons in specialized centers of the brain displayed both markers, indicating that they regulate both the heart and adrenal gland. The specialized centers were found in the brain stem, midbrain and hypothalamus.

“This research provides the foundation for future research on how the brain controls stress, which has clinical implications,” said Loewy.

Yokoyama joins faculty as director of rheumatology division

Wayne M. Yokoyama, M.D., has been named director of the Division of Rheumatology at the School of Medicine and director of rheumatology for The Jewish Hospital of St. Louis and Barnes Hospital. He joins the medical school faculty as professor of medicine and as the first occupant of a new endowed chair, the Sam J. Levin professorship, named in honor of his late father, Sam J. Levin, who was internationally known for his contributions to art museums in the United States and Israel. Locally, they contributed paintings and sculptures to Washington University Art Museum and the Saint Louis Art Museum.

Audrey Levin was Audrey Levin was internationally recognized philanthropist and art collector who contributed many works to art museums in the United States and Israel. Locally, she contributed paintings and sculptures to Washington University, Saint Louis University and the Saint Louis Art Museum.

Wayne M. Yokoyama

Levin, her husband, Sam J. Levin, were internationally recognized philanthropists and art collectors who contributed many works to art museums in the United States and Israel. They were also internationally known for their contributions to art museums in the United States and Israel. Locally, they contributed paintings and sculptures to Washington University, Saint Louis University and the Saint Louis Art Museum.

Wayne M. Yokoyama

Levin, a highly successful real estate firm, and she was a member of Washington University’s William Greenlaw Elliot Society.

“We are extremely pleased to welcome Dr. Yokoyama, an outstanding researcher, to our faculty. His investigations will enhance our efforts in a very important area of research,” said William A. Peck, M.D., executive vice chancellor for medical affairs and dean of the School of Medicine.

Yokoyama comes to St. Louis from the Mount Sinai School of Medicine in New York, where he was an associate investigator at the Howard Hughes Medical Institute and an associate professor of medicine, microbiology and molecular biology. At Mount Sinai, Yokoyama was heavily involved in formulating a new doctoral program in immunology and in instituting a new immunology center.

Yokoyama studies a component of the immune system called natural killer cells, or NK cells. NK cells have the ability to kill tumor cells and infected cells but generally do not attack normal body cells. Yokoyama’s group is credited with several major discoveries that help explain how NK cells recognize their targets. Under Yokoyama’s direction, the Division of Rheumatology will expand its efforts in basic and clinical research. New efforts will focus on understanding the cause of autoimmune diseases.

Yokoyama is an advisory editor for the Journal of Experimental Medicine and a member of the National Institutes of Health’s Allergy and Immunology Study Section in the division of research grants.

FDA approves laser surgery for treatment of nearsightedness

On Oct. 20, the U.S. Food and Drug Administration approved use of the excimer laser for the treatment of nearsightedness. This laser vision correction device is known as Photorefractive Keratectomy (PRK).

During the past four years, use of the laser has been under study at 10 sites in the United States, including the School of Medicine. Jay S. Pepose, M.D., Ph.D., professor of ophthalmology and visual sciences and associate professor of pathology, has used this technique to treat more than 130 patients.

First developed by IBM in 1976 to etch computer microchips, the excimer laser reshapes the cornea using a highly concentrated beam of cold ultraviolet light. The laser is guided by a sophisticated computer, and it can vaporize tissue one molecular layer at a time.

PRK is performed on an outpatient basis, using anesthetic eyedrops, removing very thin layers of tissue from the cornea. The laser’s computer determines the location, the number of pulses and the surface area to be corrected based on the optical properties of the patient. In the cornea retains its original strength because the laser removes only a layer of tissue more slender than a human hair.

Pepose, who also is director of the Betty and Tudor B. Levin Graduate Immunology Program at Washington University, said the laser surgery offers a new approach for patients whose options in the past have been limited to radial keratotomy, where a diamond knife is used to make incisions in the cornea.

“Because incisions are not made in the cornea, it is not weakened; and the four-year results suggest excellent quality of vision over time,” Pepose said. “In our study, over 99 percent of patients achieved 20/40 vision, 75 percent achieved 20/25 vision, and 66 percent, or two-thirds, achieved 20/20 vision without glasses or contact lenses.”

The excimer laser rapidly should become the preferred choice for those who opt for surgery to correct nearsightedness, he added. “Estimates vary, but there may be up to one-half million excimer PRKs performed during the next 12 to 18 months in the United States. It’s not clear where the laser has been introduced, it quickly becomes the preferred treatment choice for myopia (nearsightedness).”
When Mike Vannier was 10, he dis- 
mantled 3-D images of objects they wish to 
construct, such as aircraft, bridges and buildings. But 
Vannier realized it also might provide geometrically 
accurate images of patients’ heads. “Children with facial 
deformities have very distorted anatomy,” he said. “But 
even during surgery, you are only a small part of the 
underlying problem.”

He had spent his evening cracking 
the secrets of the Mallinckrodt institute’s new CT (computed 
tomography) scanner, which constructed images of sec-
tions through the body from X-ray data. Over the next 
few weeks, he wrote software to stack the scanner’s 2-D 
images into a 3-D picture of the skull — as if he were 
reassembling a sliced tomato.

“When I got started, people thought I was wasting my 
time,” he recalled. “Now, 3-D medical imaging has 
been used all over the world.”

Vannier’s early life is a moving story: nine different 
schools and a string of uncles for whom he 
racked up 300 semester hours before getting an 
degree in engineering in 1971 from Colorado State Uni-
versity. Because he had to 
earn his own board and tuition, he also designed 
computer systems and did programming for NASA. “I came in the token.”

Thus, from vacuum-tube to 
transistorized machines,” he explained. “So I was 
able to learn from hands-on experience.

After two years of medical 
study at the University of Kentucky in 
Lexington, Vannier took leave for more computer 
projects. After he finished medical school in 1976, his 
work brought him briefly to Washington University, where Ronald 
G. Evans, M.D., head of 
radiology, encouraged him to apply for a radiology resi-
dency. Evans also is Elizabeth E. Mallinckrodt Professor 
and director of the Mallinckrodt Institute of Radiology.

Head and face images 
Vannier and his residency at the Mallinckrodt Institute of Radiology in 1978 and joined the School of Medicine faculty in 1982. Assigned to pediatric radiology in 1981, 
he adapted computer-aided design software to 
create 3-D images of the faces of children with deformed 
faces. Learning that Jeffrey L. Marsh, M.D., professor of sur-
gery and of radiology and associate professor of pediat-
rics, had disfigured the films, he asked Marsh 
planned surgery to correct birth defects of the face and 
head. “Jeff said he would do an X-ray 
movie of the child’s skull with the flesh stripped away. “It was exactly 
what I needed,” he recalled. “I wanted to make up 
surgery based on the patient rather than on a drawing in a 
book or a museum specimen of a normal skull.”

Marsh ordered CT scans of the face or head of each 
patient whom he planned to operate on. “We found that a lot of the previous descriptions were based on incomplete or erroneous data,” Vannier said. “So many of the surgical 
procedures to correct these disorders were flawed.”

March and Vannier now have the world’s largest 
collection of craniofacial images, having saved all of their 
data since 1982. By recording outcomes over time, the 
collection shows which procedures are most beneficial to 
patients.

The electronic library also includes multiple cases of 
very rare syndromes, which the researchers are analyzing for 
hallmark features. “We are discovering a great deal 
about the human body, just as anatomists did in the 16th and 
17th centuries,” said Marsh. “But we are using 
computer-assisted technology to look at patients instead of 
studying corpses.”

The craniofacial imaging took an unexpected twist in 
1983, when Glenn C. Corroy, Ph.D., professor of 
anatomy and neurobiology and of anthropology in Arts and 
Sciences, walked into Vannier’s office with a fossil 
skull. In a collaboration that has had a major impact on 
the study of human evolution, Corroy adapted his imaging 
techniques to uncover hidden details of some of the 
world’s most important fossils.

Surface scans 
In 1992, a local company lent Vannier a device 
that makes 3-D images of the body surface. The technology, 
which proved too expensive for its intended use, enabled 
photographic portraits to make sculpted busts of its customers.

Sensing a medical application, Vannier obtained a 
grant from the National Institutes of Health to improve 
the fitting of artificial limbs, which must hug the con-
tours of the limb remnant to be comfortable and func-
tional. At present, prosthetists must plaster casts of 
relevant limbs and use wax to create trial custom 
sockets and then manually adjust the socket.

Vannier fashioned the optical device into a limit 
scanner. To the surface images, he adds pictures of underlying 
bone and flesh. Subtracting the image of the socket 
shows how the flesh is deformed by the socket. “By testing patients with 
limbs that fit well and poorly, Vannier and his collaborators are developing imaging 
techniques that will help us figure out if we can we can see which type of socket works best,” he explained,

“Vannier also was asked to join a computing 
group at Washingto on 3-D anthropometric 
measurements of the human body. The group 
has developed imaging techni-
ques for a forthcoming NATO 
anthropometry database. “The images 
are so realistic that it’s like being 
in the entire context of care.”

Linda Sage
All Filmboard movies cost $3 and are shown in Room 100 Brown Hall. For 24-hour Filmboard hotline, call 935-5983.

November 8
7 and 9:30 p.m. Filmboard Feature Series. "Disneys," (1946), (1953), and (1964), with English subtitles. (Also Nov. 16, same times.) Room 219 South Dining Hall. Hours: 10 a.m.-4:30 p.m., weekdays; 1-5 p.m. weekends. 535-4590.

November 9
7 p.m. Film "Bulleit," directed by F. Gary Gray. (1987), in Italian with English subtitles. (Also Nov. 16, same times.) Room 219 South Dining Hall. Hours: 10 a.m.-4:30 p.m., weekdays; 1-5 p.m. weekends. 535-4590.

November 10

November 11
3:30 p.m. Linguistic studies seminar. "When Moral Worlds Collide: The Application of Intuitionism to Specific Legal Problems," George Lakoff, prof., dept. of linguistics and of political science, California Institute of Technology. 935-8590.

November 12

November 13

November 14
7 p.m. Film "Sangha," (1983), distributed by Tham Khai Productions. (See story, page 2.) Room 8841 Clinical Sciences Research Building. 362-9526.

November 15
7 p.m. Film "Vocesияs," (1989), produced by Krasnaya Rossa, assoc. prof. of anthropology. Room 305 Bryan Hall. 935-5565.

November 16
2:30 p.m. Linguistic studies seminar. "Where Did the Inconvenience Advantage in US House Elections Grow?" Daniel M. Perfect, prof., dept. of political science, California Institute of Technology. Room 200 C Eliot Hall. 935-5822.

November 17

November 18

November 19
7 p.m. Film "An Artist's View," (1989), distributed by Riverside Films. (See story, page 1.) Room 8841 Clinical Sciences Research Building. 362-9526.
I. Introduction

The president's National Drug Control Strategy, issued in September 1989, proposed that Congress pass legislation to require schools, colleges, and universities to implement and enforce drug prevention programs and policies as a condition of eligibility to receive federal financial assistance, including student financial aid. On December 12, 1989, the president signed the Drug-Free Schools and Communities Act Amendments of 1989, Public Law 101-226. That law also requires institutions receiving federal financial assistance to prevent the illegal use of alcohol by students and employees.

The law requires that, as a condition of receiving federal funds, Washington University must certify that it has adopted and implemented a program to prohibit the unlawful possession, use or distribution of illicit drugs and alcohol by students and employees on its property or as part of any of its activities. Accordingly, Washington University has instituted this policy, which became effective on and after October 1, 1990.

II. Policy Statement

It is the goal of Washington University to protect the public health and environment of members of the University by promoting a drug-free environment.

In accordance with the mandate of the federal legislation, the manufacture, distribution, possession or use of illicit drugs, and the unlawful possession, use or distribution of alcohol by students and employees on its property or as part of any of its activities is prohibited.

Violations of the policy will be handled according to existing policies and procedures covering the conduct of administrators, faculty, students, and staff.

A. Standards of Conduct — Illicit Drugs: The unlawful manufacture, possession, distribution or use of illicit drugs on Washington University property or as part of any of its activities by University students, employees or their guests is prohibited.

B. Standards of Conduct — Alcohol: Federal legislation prohibits the unlawful possession, use or distribution of alcohol. Therefore, the possession and use of alcohol by non-intoxicated persons twenty-one (21) years of age or older is, according to Missouri law, lawful. University policies limit the lawful use of alcohol to appropriate occasions. Undergraduate students should contact the Office of Student Affairs for standards governing student parties and student use and possession of alcohol. Graduate students should contact their Dean's office. Contact the Office of Human Resources on either campus for specific standards governing non-academic employees.

III. Legal Sanctions

A. Drugs: The manufacture, possession, sale, distribution and use of illicit drugs is prohibited by city and county ordinance, state law and federal statute. Punishments range from fines of $50 to life imprisonment. The statutes and ordinances define the drugs deemed "illicit." Attached, as Appendix A, is a summary of federal sanctions. Chapter 195 of the Revised Statutes of Missouri addresses illicit drugs. Section 195.214 of the Missouri statutes specifically prohibits the distribution of any controlled substance on University property. Persons convicted of this offense can be sentenced to imprisonment for not less than ten (10) years. To review specific provisions of applicable ordinances and statutes, contact the Office of the General Counsel (935-5152).

B. Alcohol: Missouri's Liquor Control Law makes it illegal for a person under the age of twenty-one years to purchase, attempt to purchase, or possess any intoxicating liquor. Section 311.325 RSMo. Violation of this provision can subject one to a fine between $50 and $1000 and/or imprisonment for a maximum term of one year. County and municipality ordinances contain similar prohibitions and sanctions. To review specific provisions of applicable ordinances and statutes, contact the Office of the General Counsel (935-5152).

IV. Health Risks

A. Drugs: Severe health risks, including death, are associated with the use of illicit drugs. Some are stated in Appendix B. For further information, contact the Center for Chemical Abuse Prevention Education (CAPE) (935-4062) or the University Health Services (Hilltop Campus — 935-6666) (Medical Campus — 362-3523).
B. Alcohol: Abuse of alcohol can produce severe health risks, including death. Alcohol consumption causes a number of marked changes in behavior. Even low doses significantly impair the judgment and coordination required to drive a car safely, increasing the likelihood that the driver will be involved in an accident. Low to moderate doses of alcohol also increase the incidence of a variety of aggressive acts, including spouse and child abuse. Moderate to high doses of alcohol cause marked impairments in higher mental functions, severely altering a person's ability to learn and remember information. Very high doses cause respiratory depression and death. If combined with other depressants of the central nervous system, much lower doses of alcohol will produce the effects just described.

Repeated use of alcohol can lead to dependence. Sudden cessation of alcohol intake is likely to produce withdrawal symptoms, including severe anxiety, tremors, hallucinations, and convulsions. Alcohol withdrawal can be life-threatening. Long-term consumption of large quantities of alcohol, particularly when combined with poor nutrition, also can lead to permanent damage to vital organs such as the brain and the liver.

Women who drink alcohol during pregnancy may give birth to infants with fetal alcohol syndrome. These infants have irreversible physical abnormalities and mental retardation. In addition, research indicates that children of alcoholic parents are at greater risk than other youngsters of becoming alcoholics. For further information, contact the Center for Chemical Abuse Prevention Education (CAPE) (935-4062) or the University Health Services (Hilltop Campus — 935-6666) (Medical Campus — 362-3523).

VI. Disciplinary Sanctions

Different disciplinary procedures are applicable to faculty, staff and students. Violations of the standards of conduct will be dealt with on a case by case basis with the imposition of discipline being appropriate to the severity of the violation. For each group comprising the University community, there are certain common sanctions that could be applied in an appropriate case. These common sanctions include letters of reprimand, probation and severance of ties with the University, through expulsion or termination. Normally, opportunity for referral to an appropriate rehabilitation program occurs and is usually associated with a first offense. Referral for prosecution will undoubtedly occur only for the most serious violations.

A. Faculty: Faculty discipline is normally administered, in the informal manner, by the faculty member's department head, dean or by the provost. Faculty members can be terminated for cause only after a hearing conducted before a panel of faculty peers.

B. Staff: The non-academic staff is subject to disciplinary procedures administered by the staff member's department in consultation with the human resources offices on the Hilltop and Medical campuses. The normal range of personnel actions could occur. Staff members are entitled to hearing and redress by a panel of peers.

C. Students: The University Judicial Code governs students' conduct and establishes procedures for adjudicating complaints against students. Expulsion is the most severe sanction possible. In addition, residence halls (including fraternity houses) can impose discipline upon residents. The University may terminate the residence hall contracts of students violating its standards.
## CONTROLLED SUBSTANCES — USES AND EFFECTS

<table>
<thead>
<tr>
<th>DRUGS/CSA SCHEDULES</th>
<th>TRADE OR OTHER NAMES</th>
<th>MEDICAL USES</th>
<th>DEPENDENCE</th>
<th>TOXICITY</th>
<th>USUAL METHODS OF ADMINISTRATION</th>
<th>POSSIBLE EFFECTS</th>
<th>EFFECTS OF OVERTURE</th>
<th>WITHDRAWAL SYNDROME</th>
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<tbody>
<tr>
<td><strong>NARCOTICS</strong></td>
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<tr>
<td>Opium</td>
<td>II III V</td>
<td>Analgesic, antidiarrheal</td>
<td>High</td>
<td>Yes</td>
<td>Oral, smoked, injected</td>
<td>Euphoria, dryness, respiratory depression, constipated pupils, nausea</td>
<td>Slow and shallow breathing, clammy skin, convulsions, coma, possible death</td>
<td>Watery eyes, runny nose, yawning, loss of appetite, irritability, tremors, panic, cramps, nausea, chills and sweating</td>
</tr>
<tr>
<td>Morphine</td>
<td>II III</td>
<td>Analgesic, Antitussive</td>
<td>High</td>
<td>Yes</td>
<td>Oral, injected</td>
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<td></td>
<td></td>
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<tr>
<td>Codeine</td>
<td>II III V</td>
<td>Analgesic, antitussive</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Oral, injected</td>
<td></td>
<td></td>
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<tr>
<td>Heroin</td>
<td>I</td>
<td>None</td>
<td>High</td>
<td>Yes</td>
<td>Oral, injected</td>
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<td></td>
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<tr>
<td>Hydromorphone</td>
<td>II</td>
<td>Analgesic</td>
<td>High</td>
<td>Yes</td>
<td>Oral, injected</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Meperidine (Pethidine)</td>
<td>II II</td>
<td>Analgesic</td>
<td>High</td>
<td>Yes</td>
<td>Oral, injected</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Methadone</td>
<td>II</td>
<td>Analgesic</td>
<td>High</td>
<td>Low</td>
<td>Oral, injected</td>
<td></td>
<td></td>
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<tr>
<td>Other Narcotics</td>
<td>III IV</td>
<td>None</td>
<td>High-Low</td>
<td>High-Low</td>
<td>Variable</td>
<td>Oral, injected</td>
<td></td>
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<tr>
<td><strong>DEPRESSANTS</strong></td>
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<tr>
<td>Chloral Hydrate</td>
<td>IV</td>
<td>Hypnotic</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Yes</td>
<td>Oral</td>
<td></td>
<td>Slurred speech, disorientation, drunken behavior without odor of alcohol</td>
</tr>
<tr>
<td>Barbiturates</td>
<td>II III IV</td>
<td>Anesthetic, anticonvulsant, sedative, hypnotic, veterinary euthanasia agent</td>
<td>High-Moderate</td>
<td>High-Moderate</td>
<td>Yes</td>
<td>Oral, injected</td>
<td>Shallow respiration, clammy skin, dilated pupils, weak and rapid pulse, coma, possible death</td>
<td>Anxiety, insomnia, delirium, convulsions, possible death</td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>IV</td>
<td>Antianxiety</td>
<td>Low</td>
<td>Low</td>
<td>Yes</td>
<td>Oral, injected</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methaqualone</td>
<td>I</td>
<td>Sedative, hypnotic</td>
<td>High</td>
<td>Yes</td>
<td>Oral, injected</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Glutethimide</td>
<td>III</td>
<td>Sedative, hypnotic</td>
<td>High</td>
<td>Moderate</td>
<td>Yes</td>
<td>Oral, injected</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Depressants</td>
<td>IV</td>
<td>Antianxiety, sedative, hypnotic</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Yes</td>
<td>Oral, injected</td>
<td></td>
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<tr>
<td><strong>STIMULANTS</strong></td>
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<tr>
<td>Cocaine</td>
<td>II</td>
<td>Local anesthetic</td>
<td>Possible</td>
<td>High</td>
<td>Yes</td>
<td>Oral</td>
<td>Increased alertness, excitation, euphoria, increased pulse rate &amp; blood pressure, insomnia, loss of appetite</td>
<td>Agitation, increase in body temperature, hallucinations, convulsions, possible death</td>
</tr>
<tr>
<td>Amphetamines</td>
<td>II</td>
<td>Attention deficit disorders, narcolepsy, weight control</td>
<td>Possible</td>
<td>High</td>
<td>Yes</td>
<td>Oral, injected</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phentermine</td>
<td>II</td>
<td>Weight control</td>
<td>Possible</td>
<td>High</td>
<td>Yes</td>
<td>Oral, injected</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methylphenidate</td>
<td>II</td>
<td>Attention deficit disorders, narcolepsy</td>
<td>Possible</td>
<td>Moderate</td>
<td>Yes</td>
<td>Oral, injected</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Stimulants</td>
<td>III IV</td>
<td>Weight control</td>
<td>Possible</td>
<td>Moderate</td>
<td>Yes</td>
<td>Oral, injected</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HALUCINOGENS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LSD</td>
<td>I</td>
<td>None</td>
<td>None</td>
<td>Unknown</td>
<td>Yes</td>
<td>Oral</td>
<td>Illusions and hallucinations, poor perception of time and distance</td>
<td>Longer, more intense &quot;trip&quot; episodes, psychosis, possible death</td>
</tr>
<tr>
<td>Mescaline and Peyote</td>
<td>I Mescaline, Peyote</td>
<td>None</td>
<td>None</td>
<td>Unknown</td>
<td>Yes</td>
<td>Oral, injected</td>
<td></td>
<td>Withdrawal syndrome not reported,</td>
</tr>
<tr>
<td>Amphetamine variants</td>
<td>II II</td>
<td>None</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Variable</td>
<td>Oral, injected</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phenylcyclidine</td>
<td>II</td>
<td>Unknown</td>
<td>High</td>
<td>Yes</td>
<td>Days</td>
<td>Smoked, oral, injected</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phenylcyclidine analogues</td>
<td>II II</td>
<td>None</td>
<td>Unknown</td>
<td>High</td>
<td>Yes</td>
<td>Smoked, oral, injected</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Hallucinogens</td>
<td>I</td>
<td>None</td>
<td>None</td>
<td>Unknown</td>
<td>Possible</td>
<td>Smoked, oral, injected, sniffs</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CANNABIS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marijuana</td>
<td>I Grass, Reefer, Sinsemilla, The Sticks</td>
<td>None</td>
<td>Unknown</td>
<td>Moderate</td>
<td>Yes</td>
<td>Oral</td>
<td>Euphoria, relaxed inhibitions, increased appetite, disoriented behavior</td>
<td>Fatigue, paranoia, possible psychosis</td>
</tr>
<tr>
<td>Tetrahydrocannabinol</td>
<td>II THC, Marihuana</td>
<td>cancer chemotherapy antinauseant</td>
<td>Unknown</td>
<td>Moderate</td>
<td>Yes</td>
<td>Oral</td>
<td></td>
<td>Insomnia, hyperactivity, and decreased appetite occasionally reported</td>
</tr>
<tr>
<td>Hashish</td>
<td>I Hash</td>
<td>None</td>
<td>Unknown</td>
<td>Moderate</td>
<td>Yes</td>
<td>Oral</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hashish Oil</td>
<td>I Hash Oil</td>
<td>None</td>
<td>Unknown</td>
<td>Moderate</td>
<td>Yes</td>
<td>Oral</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1Designated a narcotic under the CSA. 2Not designated a narcotic under the CSA.
Federal Trafficking Penalties

<table>
<thead>
<tr>
<th>QUANTITY</th>
<th>DESCRIPTION</th>
<th>FIRST OFFENSE</th>
<th>SECOND OFFENSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,000 kg or more; or 1,000 or more plants</td>
<td>Marijuana Mixture containing detectable quantity*</td>
<td>Not less than 10 years, not more than life. If death or serious injury, not less than 20 years, not more than life. Fine not more than $4 million individual, $10 million other than individual.</td>
<td>Not less than 20 years, not more than life. If death or serious injury, not less than 20 years, not more than life. Fine not more than $8 million individual, $20 million other than individual.</td>
</tr>
<tr>
<td>100 kg to 1,000 kg; or 100-999 plants</td>
<td>Marijuana Mixture containing detectable quantity*</td>
<td>Not less than 5 years, not more than 40 years. If death or serious injury, not less than 20 years, not more than life. Fine not more than $2 million individual, $5 million other than individual.</td>
<td>Not less than 10 years, not more than life. If death or serious injury, not less than 20 years, not more than life. Fine not more than $4 million individual, $10 million other than individual.</td>
</tr>
<tr>
<td>50 to 100 kg</td>
<td>Marijuana</td>
<td>Not more than 20 years. If death or serious injury, not less than 20 years, not more than life. Fine $1 million individual, $5 million other than individual.</td>
<td>Not more than 30 years. If death or serious injury, life. Fine $2 million individual, $10 million not individual.</td>
</tr>
<tr>
<td>10 to 100 kg</td>
<td>Hashish</td>
<td>Not more than 5 years, not more than 20 years. If death or serious injury, not less than 20 years, not more than life. Fine not more than $250,000 individual, $1 million not individual.</td>
<td>Not more than 10 years. If death or serious injury, not less than 20 years, not more than life. Fine not more than $500,000 individual, $2 million not individual.</td>
</tr>
<tr>
<td>1 to 100 kg</td>
<td>Hashish Oil</td>
<td>Not more than 10 years. If death or serious injury, not less than 20 years, not more than life. Fine $1 million individual, $5 million other than individual.</td>
<td>Not more than 20 years. If death or serious injury, not less than 20 years, not more than life. Fine not more than $4 million individual, $10 million other than individual.</td>
</tr>
<tr>
<td>50-99 plants</td>
<td>Marijuana</td>
<td>Not more than 5 years.</td>
<td>Not more than 10 years.</td>
</tr>
<tr>
<td>Less than 50 kg</td>
<td>Marijuana</td>
<td>Fine not more than $250,000, $1 million other than individual.</td>
<td>Fine $500,000 individual, $2 million other than individual.</td>
</tr>
<tr>
<td>Less than 10 kg</td>
<td>Hashish</td>
<td>Fine not more than $500,000 individual, $2 million not individual.</td>
<td></td>
</tr>
<tr>
<td>Less than 1 kg</td>
<td>Hashish Oil</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Includes Hashish and Hashish Oil
(Marijuana is a Schedule I Controlled Substance)
Fiction writer Amy Tan to lecture


To prior writing fiction, Tan worked as a developmental language consultant to program managers and as a volunteer, children and as a freelance business writer. For more information, call 935-5285.

Football Bears wrap up record-setting season

En route to only its second win in the program's history, the 189th-ranked Washington University football team finished the regular season with a 20-0 victory Saturday against the University of Missouri-Rolla. The Bears, sparked Washington in its two NCAA Division III Midwest Regionals, the 20th-ranked Bears entered the meet ranked 15th overall (2,949 yards). Harris, finishing the game with seven receptions, a career-best 184 yards and three touchdowns, was the new single-season leader for receptions (50) and receiving yardage (967). Sally broke the Bears' interception mark with his ninth of the season. Clinging to clinch playoff hopes, the Bears will learn their postseason fate on Saturday, Nov. 12.

Current record: 9-1

Men's soccer snare seventh regional crown

The ninth-ranked men's soccer team captured its seventh NCAA regional championship last weekend and now advances to the next round of the national tournament. Freshman Josh Haza, a reserve midfielder for the Bears, sparked Washington to a regional crown, setting up the Bears' only goal in their shootout win against Rhodes College (Memphis, Tenn.). Haza and junior cornerback Chris Nailey, who set singles-game bests with 18 completions, 22 passing yards and 32 touchdown passes, earned regional honors. The Tritons scored 135 and total offense (2,949 yards). Harris, finishing the game with seven receptions, a career-best 184 yards and three touchdowns, was the new single-season leader for receptions (50) and receiving yardage (967). Sally broke the Bears' interception mark with his ninth of the season. Clinging to win playoff hopes, the Bears will learn their postseason fate on Saturday, Nov. 12.

Current record: 9-1

Swimmers making early season waves

The Washington swimmers and divers churned out a combined 1-4 record last weekend, with the men providing a victory against Northeast Missouri State University (Kirksville, Mo.) and the women a pair of 1-2 finishes against Washington University and Edgewood College. Both the discussion and book-signing are free and open to the public. Tan's first work of fiction, "The Joy Luck Club," was published in 1989 and


To prior writing fiction, Tan worked as a developmental language consultant to program managers and as a volunteer, children and as a freelance business writer. For more information, call 935-5285.
Michael I. Miller, Ph.D., (right) discusses the new Center for Imaging Science with Jagdish Chandra, Ph.D., (left) director of the mathematical and computer sciences division of the Army Research Office (ARO), and Rudy Buser, director of the ARO's Night Vision Laboratory.

University natural site for center — from page 6

"As things stand now, the Army has no overriding theory for image analysis," said Guenter. "The problem is that whatever computer recognition technology we now have has been developed from a trial-and-error approach. While it might work for one specific problem, if variability is introduced into the scene, there's no guarantee it will find the right target.

A 1997 University of Maryland study of our combat deaths were from friendly fire. We certainly want to avoid the problem of shoot- ing ourselves. The Army will be very pleased with the center if it can come out with a theory that will help us improve present models and create new ones."

Key collaborators

The central role will involve the collaboration of the Army's chief technical officer, which is responsible for overseeing the Army's research and development work. The Army Research Office participates in the collaboration and their specialities are Joseph Blasi, director of the Department of Electrical Engineering, specializing in engineering and information theory; and Donald L. Snyder, Ph.D., and Carlos S. Jara, Ph.D., professors of electrical and computer engineering, specializing in signal processing and algorithms.

The principal investigator from the University of Maryland is David T. Konig, Ph.D., professor of computer science and engineering, specializing in signal processing and algorithms. The other researchers are working on signal processing and algorithms.

Four debates scheduled for 96 — from page 1

$500,000 needed to host the event can be raised, just as it was in 1992 — thanks to public-spirited support from local businesses and individuals who gave so generously of their time and support to compress a multi-week project into only a few hours. It was another hard-fought battle.

Prior to his retirement as chancellor at the end of June, William H. Danforth, who gave so generously of his time and support to compress a multi-week project into only a few hours, wrote and asked the commission to consider returning in 1996, and then Chancellor La Pierre has made presentations at the ALCU conference almost every year. "I believe it is important that we let all students and law students, but for non-lawyers, too," he said. "It is important that non-lawyers have an understanding of their legal system. Besides, these high school teachers are fairly, which makes a lively, fun group to talk to."

Among Konig's points were that, in colonial times, riots were not anti- government but occurred only when the colonists felt that they didn't have enough legal power to do what was needed for the community. Some examples Konig gave were quiet events that occurred in the middle of the night, rather than in the daytime. In these cases, police force was more common than violence.

Freedom of religion

La Pierre discussed some recent First Amendment cases that have been decided by the Supreme Court. These cases involved issues such as the denial of access to school meeting rooms to religious groups but not to other groups. The First Amendment protects the right to speech and freedom of religion, but it also requires them to avoid promoting religion. Some schools have interpreted that to mean that religious groups can't meet on school property because that would imply the school supported that particular religion.

In his presentation, La Pierre drew a distinction between a religious group and a non-religious group. By allowing, for example, a doctors group, but not a religious group, to speak on child rearing, the school would be in violation of the First Amendment's viewpoint discrimination," La Pierre said. Because there are all kinds of perspectives on how to raise children, the school group's parent should be allowed to have a voice.

"Schools implement the Constitution for students eight hours a day," said La Pierre. "You are the line officers. The way you understand freedom of religion and the Constitution affects your understanding of the deeper task of understanding language itself.

Beyond a reasonable doubt

Goldwasser tied her talk into the recent O.J. Simpson case. She gave the group a historical perspective on juries. For example, juries once comprised only people who already knew something about the case and the participants. And the jury included only white, male landowners. Goldwasser said that the concept of "beyond a reasonable doubt" This very demanding standard was set intentionally, she said, because of the country's philosophy that it is much worse to convict one innocent person than let many guilty one go free.

Konig and Goldwasser were new to the conference this year, and a lot of the presentations this year have been done on computer science rather than on history and politics.

Michael I. Miller, Ph.D., (right) discusses the new Center for Imaging Science with Jagdish Chandra, Ph.D., (left) director of the mathematical and computer sciences division of the Army Research Office (ARO), and Rudy Buser, director of the ARO's Night Vision Laboratory.

Four debates scheduled for 96 — from page 1
Hiilpott Campus:

Rachel Roberts, Ph.D., assistant professor of mathematics and Statistics, comes from the California Institute of Technology in Pasadena, where she was the Harry Bateman Instructor in Mathematics. Among her research interests are topology and knot theory. She received her B.S. degree in mathematics and computer science in 1983 from Memorial University in Newfoundland, her M.A. degree in mathematics in 1988 and a doctorate in mathematics in 1992 from Cornell University.

Medical Campus:

Jeffrey Drenb, M.D., Ph.D., assistant professor of surgical psychiatry, is an instructor in the surgical sciences section at the Johns Hopkins University School of Medicine in Baltimore and an attending surgeon and chief of service in general and trauma surgery at Johns Hopkins Hospital and the Johns Hopkins Bayview Medical Center. He received his B.A. degree in biology in 1979 from Oberlin (Ohio) College. He received a doctorate in medicine from Harvard University and a medical degree from Harvard Medical School, both in 1987.

Kevin Ho, M.D., assistant professor of ophthalmology and Visual Sciences, received his M.D. from the University of Medicine and Dentistry of New Jersey in 1994. He did a fellowship in neuro-ophtalmology and neuro-ophthalmic surgery at the University of California, San Francisco, and is a member of the American Academy of Ophthalmology.

For the Record contains news about a wide variety of faculty, staff and student scholarly and professional activities.

Carter Reward, Ph.D., professor of English in Arts and Sciences, delivered a paper titled "Millen as Muse for Keats, Shelley, and Robert Browning" at the International Milton Society conference in Bangor, North Wales, Great Britain. He also presented a paper titled "French Romances in the Privy Wardrobe: Book- borrowing at the Court of Catherine de' Medici" at the 1230-30 at the International Courtly Literature Society conference in Belfast, Northern Ireland, United Kingdom.

Michael Valente, Ph.D., associate clinical professor of otarologyng, presented two papers at the Private Practice Association's annual meeting in Canada's second annual meeting in Phoenix, Nova Scotia. His papers were titled "A Fitting Protocol to Improve User Satisfaction With Hearing Aids" and "Experiences With Programmable Hearing Aids." In addition, he presented a paper on "Recent Trends in Hearing Aid Verification Procedures" during the Amplification Update meet- ing at the University of California, San Francisco.

Kristof E. S. Zapata, Ph.D., assistant professor of history in Arts and Sciences, delivered the Miller Memorial Lecture for 1995 at the University of Missouri-St. Louis. The lecture was en- dorsed in commemoration of one of the university's founders. It was titled "Self as Subject: Martin Luther's Contribution to the Construct of a Modern Identity." In addition, she chaired two sessions at the Sixteenth Century Studies Conference in San Francisco.

On assignment

Scott A. Miswotz, M.D., associate professor of radiology at the School of Medicine, was appointed chair of the American College of Radiology, was appointed chair of the American College of Radiology's Magn- etic Resonance Professional Self- Evaluation Test and Syllabus Committee. He also was named as the editorial Board of Academic Radiology, a journal pub- lished by the Association of University Radiologists.

William D. Owen, M.D., professor of anesthesiology, was elected president of the American Society of Anesthesiology. He has served on the group's board of directors for 11 years, three as secre- tary-treasurer.

Leila Sadat Wexler, LL.M., associate professor of law, was named chair of the International Law Association's Committee on International Criminal Law. The Committee on International Criminal Law was created by Curtis J.

To press

Andrew D. Dimarogonas, Ph.D., William Palm Professor of Mechanical De- sign, was appointed editor in chief of a new interdisciplinary journal titled SYNOPSIS, The Greek Studies Index, which will be published by the University of Hawaii and Gordon and Breach Publishers of New York this fall. Members of the editorial advisory board are: George Robert D. Lambertson, Ph.D., associate professor of history, comparative literature in Arts and Sciences, and Sarantis Symanoglou, Ph.D., professor of art and history in the College of Arts and Sciences. Susan I. Rotzow, Ph.D., professor of Arts and Sciences, was named associate editor for Hellenistic studies.

An article written by Marvin E. Levin, M.D., professor of clinical medicine, was published in the October 1995 issue of Diabetes Care, a journal published by the American Diabetes Association. In addition, he wrote a chapter titled "Exercise in Diabetic Patients With Foot Complica- tions," that is featured in the new Handbook of Diabetes and Exercise, which also is published by the diabetes association.

Vital Statistics

For The Record contains news about a wide variety of faculty, staff and student scholarly and professional activities.

For more information, call the Inter- national Office of Alumni and Development at 410-516-5910.

Kristina Niederhaus named interim judicial head

Kristina Niederhaus, a Washington University alumna, has been named interim University judicial administrator in the Division of Student Affairs, Janet A. Carroll, dean of student affairs, has announced.

Niederhaus succeeds John Lowery, who is now director of residential life at Adelphi University in Garden City, N.Y.

As interim University judicial admin- istrator, Niederhaus will be responsible for dealing with matters relating to campus judicial code, which governs student academic and behavioral misconduct.

She also will be responsible for the University Judicial Board, which issues binding decisions in matters relating to the University Judicial Code, which governs student academic and behavioral misconduct.

She also will be responsible for the University Judicial Board, which issues binding decisions in matters relating to the University Judicial Code, which governs student academic and behavioral misconduct.
The following is a list of positions available at the University of Missouri. Information regarding these and other positions may be obtained in the personnel office of the University of Missouri -- Columbia, Missouri 65211.