Cheaper ethanol one step closer

BY TONY FITZPATRICK

Cheaper ethanol through more efficient production and stronger wood are two possibilities resulting from research by Erik K. Nielsen, Ph.D., adjunct professor of biology in Arts & Sciences. The discovery, published in a recent edition of The Journal of Cell Biology, sheds new light on how some complex sugars in plants are funneled to the construction of cell walls.

"In plants, light energy is harvested to produce sugars, and some of these are processed into complex polymers for specific uses," Nielsen said. "My team identified a cellular trafficking pathway for some of the complex sugars that are used in the construction of cell walls. This should help us understand how some of these building blocks of cell walls are delivered and how these building blocks are put together."

Nielsen's research is the first to identify how the membrane trafficking steps in the deposition of cell wall components—a lightly researched area. His study is important because cotton, wood and other fiber plants that are vital to everyday life rely on the plant cell wall, which gives wood the strength needed for construction and furniture; among other uses, and cotton fibers the elasticity for use in cloth. The research could lead to crops with traits that can be used to produce biofuels more efficiently and with less waste.

The paper's novel scientific observation is the characterization of a membranous trafficking compartment believed to be involved in polar secretion of cell-wall components in plants. "In the paper, we describe the identification of a cellular component that is essential for the proper targeting/delivery of secretory cargo to the tips of growing root-hair cells," Nielsen said.

"Root-hair cells are a specific type of epidermal cell in roots that we have been using to monitor secretion pathways in plants. We use root-hair cells because during their development, they undergo a highly polarized expansion, in which deposition of new cell-wall components is restricted to the extreme tip of the growing root hair."

Ethanol is produced by fermenting cellulose and other poly saccharides from plant cell walls.

See Ethanol, Page 6

University addresses ways to ease Highway 40 woes

BY BETTI MILLER

The University continues to analyze various strategies to lessen the impact of the 64/Highway 40 re-construction project's impact on students, employees and patients. The $535 million project will rebuild I-64 from west of Spodee Road to east of Kingshighway Boulevard, including rebuilding the pavement, bridges and 12 interchanges in between. In addition, one lane will be added in each direction from west of Spodee Road to Interstate 170.

The project involves rebuilding the I-64/I-190 interchange in 2007, which will result in off-peak-hour closures on I-64 and I-170 and reducing I-170 from three lanes to two at I-64; closing I-64 completely from Ballas Road to Brentwood Boulevard and rebuilding interchanges in that area.

See Highway, Page 6

Marshall Scholarship goes to Arts & Sciences senior

BY TONY FITZPATRICK

Senior Jeffrey J. Marlow is one of 15 young Americans to receive a 2007 Marshall Scholarship, which provides full support for two or three years of study toward a second bachelor’s degree or advanced degree at any British university.

Marlow, a senior in James and Karla Marlow of Englewood, Colo., is pursuing a bachelor’s degree in earth and planetary science in Arts & Sciences. The Marshall Scholarship is named after WUSTL's first Marshall Scholar since 1953.

Marlow will join the University's newly elected Rhodes Scholars are Aaron J. Mertz and Leana S. Won next fall in the United Kingdom. This has been a great year for Washington University students,” Chancellor Mark S. Wrighton said. "We have three Rhodes Scholars and now a Marshall Scholar this year, which is evidence of the strength of WUSTL's community and its dedication to academic excellence. Jeffrey Marlow is an impressive young man with many accomplishments and a great future, and I know he will represent Washington University well.”

Marlow will enter Imperial College in London next fall to work on development and testing of the Urey Instrument, a component of the European Space Agency’s ExoMars mission. The instrument’s purpose is to collect Martian soil and analyze it for biological signatures.

Established in 1953, the Marshall Scholarship rewards leadership in school, government and community endeavors, as well as excellence in scholarship and personal achievements. Marlow has participated in WUSTL’s Pathfinder Program in Environmental Sustainability and contributed to multiple Mars missions.

Since summer 2005, he has been an Athena Team student collaborator on NASA Mars Exploration Rover Mission and has studied hazardous sites at potential landing sites for NASA's Phoenix Mars Lander.

From summer 2004-05, he worked with NASA scientists to characterize the groundwater system of the northern plains of Mars to investigate groundwater distribution and pinpoint areas of interest for the Phoenix Lander mission.

In 2005, he was a summer research fellow at California Institute of Technology, in 2006, he was a summer research fellow at Woods Hole Oceanographic Institution in Massachusetts. In addition, Marlow has researched microbial organisms in extreme environments in an attempt to understand biological adaptations that could be relevant in the search for life beyond Earth. He has co-authored four publications.

Marlow’s numerous scholarly include a Berry M. Goldwa.
Himadri B. Pakrasi, Ph.D., has been named the George Willard Mclean Professor of Biology in Arts & Sciences. An installation will occur during the 2007-08 academic year, according to Edward S. Stroz, Ph.D., executive vice chancellor, dean of Arts & Sciences, and Daniel J. Bernardo and John Thomas Distinguished Professor in Arts & Sciences, who made the announcement.

"Some of my happiest moments are recognizing and rewarding outstanding faculty members' achievements," Macias said. "Himadri Pakrasi's achievements in biology are outstanding, and I am very successful at bridges to several fields beyond biology and beyond Arts & Sciences."

Pakrasi's keen interest in biology, the differences between the biological and physical sciences, and the contribution of membranes to biology to biology doctoral students. His teaching activities have focused on biochemistry and microbiology.

Pakrasi's research involves systems biology, synthetic biology, membrane biology, membrane homeostasis and genome studies. Several funding agencies have recognized Pakrasi's work. He received a Microbiological Society Grand Challenge award for understanding phototrophic organisms. Pakrasi is a partner between the University and the W.R. Wiley Laboratory of Molecular Sciences Laboratory at the Pacific Northwest National Laboratory. Pakrasi's team has demonstrated leadership in the field of biology.

In his report to the trustees, Wrighton congratulated the Department of Athletics for continuing improvements and new facilities.

"The trustees reviewed a detailed report on buildings and grounds for continuing improvements and new facilities. It is particularly gratifying to see the tremendous increase in the number of scholarships this year. The two will pursue the NCAA national championship in women's soccer this year."

For more information, e-mail ggb@ggbgroups.wustl.edu.

**Faculty achievement**

Emil H. Unanue, M.D. (left), the Paul and Ellen Lacy Professor of Pathology at the School of Medicine, and Gordon W. Phlpott, Ph.D., the Distinguished Alumnus Award winner at the School of Social Work, received the University's annual Faculty Achievement Awards at a Dec. 2 ceremony at the Farrell Learning and Teaching Center. Sheldon S. Macias, Ph.D., executive vice chancellor, dean of Arts & Sciences, and Daniel J. Bernardo, Ph.D., the Thomas Distinguished Professor in Arts & Sciences, who made the announcements.

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**Asthma Center established through $7.7 million grant**

BY GWEN ERICSON

A $7.7 million grant from the National Institute of Allergy and Infectious Diseases (NIAID) will establish a asthma research center at the School of Medicine.

Led by Michael J. Holtzman, M.D., the Selma and Herman B. Rapaport Professor of Medicine, the center will investigate the causes of asthma and develop new treatments for the disease.

Named the Asthma and Allergy Research and Treatment Center, the center will conduct research specifically focused on how the body's protective mechanism, the inflammatory system, contributes to asthma.

"Normal immunity is under tight control," said Holtzman, "but the immune response — not only the one that causes asthma, but also the ones that protect you from pathogens."

Furthermore, steroid therapy is not a cure for asthma, Holtzman said. Research at the new center will seek asthma-specific anti-inflammatory treatments and therapies that modify the underlying causes of the disease in stead of simply masking symptoms.

The researchers will look at signals that cells use to rev up antiviral defenses. They suspect disruptions in the signals between cells to shut down the immune response could be the root cause of an excessive and prolonged inflammatory response.

Comparing deficient cell responses with excessive responses in genetically engineered experimental mice will help the researchers uncover biomarkers — proteins that can serve as indicators of the immune response to viral infection. The biomarkers can reveal the level of specific immune responses in children with viral infections to help isolate the cause of asthma.

"We will be able to take what we find in the mice and immediately translate that into what we study in patients," Holtzman said. In addition to Holtzman, key investigators in the center include John P. Atkinson, M.D., the Samuel Grant Professor of Medicine and professor of molecular microbiology; Jonathan M. Green, M.D., associate professor of medicine and pathology and immunology; and Kenneth M. Murphy, M.D., PhD., professor of allergy.

The center is part of a cooperative research network funded by NIAID and set up to look for causes and treatments for asthma.

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**Anti-inflammatory boosts liver damage in mice with mutant gene**

BY GWYN ERICSON

Alpha-1-antitrypsin (AT) deficiency isn't a term that rolls off the tongue, but people diagnosed with this genetic disorder learn its potential effects quickly.

They know they shouldn't smoke or be around smokers because they are at increased risk for developing emphysema at a young age. In addition, some patients with alpha-1-antitrypsin deficiency can develop serious liver damage even before they are 40 years old.

New research sheds possible to predict who is at risk.

The findings, published in a recent issue of *Science*, show that alpha-1-AT deficiency may be another example where environmental factors such as smoking and air pollution can influence the development of liver injury.

**Top notch**

Marc J. Bernstein, M.D. (left), instructor in clinical medicine, receives the Stanley Lang Lecturer of the Year Award from Wale Adeniran, president of the School of Medicine Class of 2006. The medical school classes of 2007, 2008 and 2009 awarded nearly 50 Distinguished Service Teaching Awards to faculty at the Eric P. Newman Education Center.

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**School of Medicine Update**

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**Scientific American’ honors 3 Alzheimer’s disease researchers**

BY MICHAEL C. PURDY

Three Alzheimer’s disease researchers at the School of Medicine have been named to the 2006 Scientific American 50, an honorary list of the year’s "prime movers" in a variety of scientific disciplines. The magazine’s board of editors chose David Holtzman, M.D., the Andrew B. and Gretchen P. Jones Professor of Neurology and associate chairman for Research in Neurology; Edward Bushby, Ph.D., assistant professor of pediatrics and molecular biology; and Kenneth M. Murphy, M.D., associate professor of allergy and environmental medicine; according to their "outstanding contributions to understanding how Alzheimer's disease originates in and affects the brain."

Their work is funded by the National Institute on Aging, the National Institute of Neurological Disorders and Stroke, the Alzheimer’s Association, the Washington University Alzheimer’s Disease Research Center (ADRC), the Center for Neurological Disorders, the Blanchet House Rockefeller Fund and the National Park Foundation.

"We know the more severe the infection is, the more likely a patient is to develop asthma later. We want to know at the cell level what determines the severity of the infection and how we can intervene to prevent asthma," Holtzman said.

Inflammation is the first response of the immune system, and current asthma treatments, includinginhaled steroids, and asthma sufferers suffer from a chronic inflammation. Unfortunately, steroids affect more than asthma symptoms.

"Steroids are flame-thrower drugs," Holtzman said. "They inhibit many aspects of the immune response — not only the one that causes asthma, but also the ones that protect you from pathogens."

Furthermore, steroid therapy is not a cure for asthma, Holtzman said. Research at the new center will seek asthma-specific anti-inflammatory treatments and therapies that modify the underlying causes of the disease instead of simply masking symptoms.

This research on mice shows that NSAIDs affect human alpha-1-ATZ protein — the version of protein-digesting enzymes in functional mice. The scientists have discovered that these drugs should be avoided."

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A stage adaptation of children's book Hana's Suitcase opens Jan. 11 back-and-forth between two narrative threads. As Fumiko and her class pursue clues from Tokyo to Prague, Czecho-Slovakia and ultimately the United States, we learn Hana's fate — we also see glimpses of the Brady family, whose suitcases have also been lost. But not traumatizing them with too much brutal detail. It's really a huge task,

As Fumiko and her classmates struggle to save the records of their classmates, led by their teacher, Fumiko Ishioka, set out to uncover Hana's fate — we also see glimpses of the Brady family, whose suitcases have also been lost. But not traumatizing them with too much brutal detail. It's really a huge task,

was translated into 27 languages and published in 25 countries, and it has been performed on television and in the theater in 10 other languages

Tuesday, Dec. 12

Jan. 14, 1 p.m. The School of Medicine's Office of Diversity and Social Responsibility in Medicine will host a screening of the documentary "Hana's Suitcase."

Thursday, Oct. 5

New, Genetic Seminar Series. "Gene-Environment Interactions in Psychiatric Disease." Date: TBA.

Monday, Dec. 11

battered luggage was the German Theatre Company.

Wednesday, Jan. 18

BY LIAM OTTEN
Washington University in St. Louis

University Events

The University's 20th annual celebration honoring Martin Luther King Jr. takes place at 7 p.m. Jan. 15 in Graham Chapel. The event kicks off a semester-long celebration of Dr. King's life and legacy.

Thursday, Dec. 14

Tuesday, Dec. 5

Tuesday, Dec. 19

Wednesday, Dec. 13

Monday, Dec. 18

Wednesday, Dec. 13

Monday, Dec. 21

film

Friday, Dec. 8

Theatre, music and dance — can also be tremendous tools for learning.

After, "there's really a huge task," McGlothlin said. "Other than the other, the child can go on to do something of his/her own life and hopefully give some glimmer of hope, some affirmation of life. And that's why the book is so meaningful, not just traumatizing them with too much brutal detail. It's really a huge task.

We are thrilled to be partnering with Edison Theatre to bring this powerful play to St. Louis audiences," North said. "Emil Schiir's script weaves past and present in a seamless theatrical journey that takes us through the darkness of the Holocaust and into the light of hope. I'm so moved by Fumiko Ishioka's quest to find answers for children who needed to know the truth of Hana's story. She is my inspiration as we prepare Martin Theatre Company's production.

Performances are at 7:30 p.m. Friday, Dec. 15 and Saturday, Dec. 16 and 2 p.m. Sunday. Tickets prices range from $8-$35. For more information, call 935-3437 or visit edisontheatre.com.


Tuesday, Dec. 19

The celebration, which is led by Haruna Tsuchiya as Fumiko and Leah Schumacher as Hana, also will spark conver-
Sing-along and concerts round out the year

By ELM LIPPMAN

The Department of Music in
Mozart's contemporaries: Franz
— will celebrate the 250th an-
Rape ofLucretia
portions of three 20th-century
Haydn's popular Piano Trio in G
n the 250th an-

The program of chamber music includes works by two of Mozart's contemporaries: Franz Joseph Haydn (1732-1809), a fel-
Austrian who served as a member of the Universal Schola and who was an advocate of the Johann
(1772-1842), a German composer who was a forerunner of the Romantic

The University's annual
sang along with Mozart's sonata in A
Mozart's contemporaries:

The Wheel ofChange,
- 935-4259

The School of Law's Center for
versity, is designed for law-

Free travelers' safety
ensuring they have a safe trip over

The workshop, co-sponsored
CERL and Northwestern Uni-

Music

Thursday, Dec. 7
 8 p.m. Jazz at Holmes.
 935-4841 or e-mail staylor@wustl.edu

Friday, Dec. 8
 8 a.m. Washington University Opera.
 514-2581.

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 514-2581.

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 8 a.m. Washington University Opera.
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Soccer

Men's soccer wins two at Classic
The women's basketball team had a solid showing, totaling 21 NCAA provisional qualifying, two

WUSTL women's soccer program

Volleyball to be featured on

Men's tennis ranked

Free vehicle inspections

Five soccer players earn all-region honors

Wheaton Invitational in Illinois.

Winningest named UAA Defensive Player of Year

Wheaton women's volleyball to be featured in NCAA championship match

Wheaton women's volleyball team was named a Top 10-21

Soccer

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Wheaton named UAA Defensive Player of Year

Soccer defensive lineman Drew Waggener capped his 2022 career by being named the UAA Defensive Player of the Year.

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NIH mandates proposals to be filed electronically

BY BETS MILLER

Researchers applying for $101 million in funding from the National Institutes of Health (NIH) will have to start using electronic forms, hours copying and collating paper is history. The NIH has mandated that all proposals be filed electronically, starting with the February 1, 2008 submission period.

The NIH application is the most prevalent NIH funding request. Typically, the February submission period has generated the highest volume of submissions.

Because of the heavy volume of proposals expected for the NIH’s Feb. 5 deadline, the Research Office at the Danforth Campus and Grants & Contracts at the School of Medicine will need at least 10 full working days to process each proposal before it can be considered for funding. John Michnowicz, director of Grants & Contracts, said this time will allow the University to address any potential issues s first round of Electronic Submission System (ESS) training more than 400 employees, including the two campuses. Michnowicz said, "In addition, there will be specific training for faculty members who focus on uploading the research plan, viewing specific sections of the research plan and the approval process for submitting the proposal.

"Electronic filing has a lot of positive implications," Stanley said. "It will ultimately reduce paper, help facilitate the reviewing process and allow us to track submissions.

"Like any other major change, there will be some growing pains, but the team has done a tremendous job at identifying problems and pitfalls," Stanley added. "But there are special circumstances, and because the massive change we have to move the deadline up,

To prepare for the transition from paper submission to electronic submission, an e submission class will be held with members from both campuses was established in March.

Marlow from Page 1

Throughout his college career, Marlow has participated in a number of community service and school program initiatives in order to introduce students to inquiry-based learning.

Marlow also participated in student government, served as a mentor for transfers. For instance, from spring 2005 to spring 2006, he was one of two student representatives who serves to the Board of Trustees, sitting on several committees and discussing University concerns with trustees. He researched the state of the intellectual community.

by fermenting starch from plant seeds. Fermenting starch from plant seeds is the preferred method because it is easier, but it is expensive because starch has other uses, such as food. Cellulose fermentation is not as efficient as fermentation of starch. The other cell-wall polysaccharides are more readily available to the microorganisms that make cellulose have to be somehow be delivered by membrane trafficking pathways that are involved in cell-wall degradation.

"If we could modify the content of the plant cell wall, we may be able to improve the cellulose and other cell-wall poly- saccharides that are not available for fermentation," Nielsen said. "It is important for us to figure out how to make cellulose to make cellulose-based ethanol fermentation more efficient.

"A real problem is that we really don’t know much about how plant cell walls are put together," Nielsen said. "While cellulose, the major load-bearing polysaccharide in plant cell walls, is synthesized at the plasma membrane, most of the other cell-wall polysaccharides and cell-wall proteins are synthesized in the Golgi complex. Those then have to be delivered by membrane trafficking pathways to the correct places at the right times in order for normal growth and development to occur.

Even the cell-wall enzymes that make cellulose to be sorted and delivered properly using membrane trafficking pathways, but Nielsen’s research group might be doing something different.

"We really have no idea how all this sorting and packaging of cell-wall components is accomplished," Nielsen said. "So what we’ve done with this system is to finally characterize some of the packaging and membrane-trafficking pathways that are involved in cell-wall degradation.

"In addition, a Faculty Advisory Committee was formed in Aug. to provide the faculty's perspective.

In October and November, the Research Office and Grants & Contracts, in coordination with the Administrative Information Systems, trained more than 400 employees — who had proposals due Nov. 6 or Dec. 1 — on the new electronic filing system.

In February, the database should have been online.

"Those interested in obtaining a Nytor p-value can apply online at the Parking and Transportation Service website at parking.wustl.edu.

A Metro system map, schedule online for MetroLink and Metrolink service, along with a list of stops and stops on these routes. These are available online at www.metrostlouis.org.

The team also plans to set up a 511 telephone number for motorists to get traffic updates and travel times and to maintain electronic overhead signs on major highways that will provide traffic advisories.

Highway

Metro, RideFinders offer commuters options from page 3

In 2008 and closing a 94-com- pletely from Hanley Road east to Kingshighway and rebuilding in- terchanges in that area in 2009. By Dec. 31, 2009, all lanes on I-44 and I-170 are expected to be completed and open, with final work complete by July 31, 2010. Landscaping should be complete by the end of October 2010 to help ease traffic on alter- rate routes. MoDOT will begin an additional lane in each direc- tion on Interstates 70 and 44. It also will upgrade signals on Page Avenue, olive Boulevard, Mer- chester Road and Lindberg Boulevard to help traffic flow.

University faculty, staff, stu- dents and patients need to start thinking now about alternative routes or modes of transporta- tion. Benefits-eligible employees and full-time students can renew the Metro Universal Pass for the spring semester, which provides free access to the MetroLink and Metrolink services.

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Highway

Metro, RideFinders offer commuters options from page 3

In 2008 and closing a 94-com- pletely from Hanley Road east to Kingshighway and rebuilding in- terchanges in that area in 2009. By Dec. 31, 2009, all lanes on I-44 and I-170 are expected to be completed and open, with final work complete by July 31, 2010. Landscaping should be complete by the end of October 2010 to help ease traffic on alter- rate routes. MoDOT will begin an additional lane in each direc- tion on Interstates 70 and 44. It also will upgrade signals on Page Avenue, olive Boulevard, Mer- chester Road and Lindberg Boulevard to help traffic flow.

University faculty, staff, stu- dents and patients need to start thinking now about alternative routes or modes of transporta- tion. Benefits-eligible employees and full-time students can renew the Metro Universal Pass for the spring semester, which provides free access to the MetroLink and Metrolink services.

Those interested in obtaining a Nytor p-value can apply online at the Parking and Transportation Service website at parking.wustl.edu.

A Metro system map, schedule online for MetroLink and Metrolink service, along with a list of stops and stops on these routes. These are available online at www.metrostlouis.org.
WUSTL, SIUE combine to host research exposition

BY ANDY CLENDENNING

In a unique joint effort, the National Institutes of Health recommended that the third National Institutes of Health (NIH) Roadmap Initiative and the WUSTL, SIUE combine to host a research exposition. The conference is the first of what is hoped to be a biennial event and is intended to facilitate faculty research opportunities and stimulate broad-based increases in sponsored research and interdisciplinary collaborations and institutional partnerships.

"We find that spouses, both faculty and graduate students, are driven to crosscutting research that demonstrates effective and collaborative efforts throughout the campus and the world, not just deals or structu- ral advancement. It is a prime time for a proposal deadline," said Cindy White, director of WUSTL’s Research Office. "We hope that this kind of event will spark ideas and conversations that lead to great research partner- nerships in the future."

Washington University will host the event in Whitaker Hall. Chancellor Mark S. Schlissel, Ph.D., will deliver opening remarks, and Samuel L. Stan- ley Jr., M.D., vice chancellor for medical affairs, will introduce the day’s first session and deliver closing re- marks at the end of the day.

Barbara A. Schaal, Ph.D., the Spencer T. Olin Professor in Arts & Sciences and vice president for the national president of the American Association of University Women, will deliver the keynote address. The event will feature three presenters in the "Fostering Innovation in Research" concurrent session on Day 1.

In another session, Marty Igel, associate professor of pediatrics, will moderate the "Seeking Foundation Support." For more information, visit research.wustl.edu/ResearchDay/con- ference.htm.

Scott Saunders, to associate professor of pediatrics
Ralf Weisel, to associate professor of physics
Jeffrey M. Zacka, to associate professor of psychology

Promotion with tenure
Heather Cocoran, to associate professor of medicine
Michael Diamond, to associate professor of immunology
Martin Jacobs, to associate professor of psychiatry
Phyllis J. Hanson, to associate professor of computer science and engineering
Wayne Im, to associate professor of computer science and engineering

Appointment with tenure
Jeffrey F. Blankenau, to associate professor of biology and of chemistry
Scott Proctor, to assistant professor of philosophy

Granting of tenure
Ingrid B. Borecki, to associate professor of genetics

Track and title change
Mark F. Jacobi, to professor of neurology with tenure

Chisolm, professor emeritus of biology, 73

BY BETTY MILLER

Patrick Flynn, clinical research nurse coordinator in the Department of Psychiatry, has been named Missouri Nurse of the Year by the Missouri Nurses Association Third District. Flynn has worked in the field for 28 years, receiving her associate degree in nursing, Dec. 30, 1978. Flynn has worked in the field for four years, receiving her associate degree in nursing, Dec. 30, 1978. Flynn has worked in the field for four years, receiving her associate degree in nursing, Dec. 30, 1978. Flynn has worked in the field for four years, receiving her associate degree in nursing, Dec. 30, 1978. Flynn has worked in the field for four years, receiving her associate degree in nursing, Dec. 30, 1978. Flynn has worked in the field for four years, receiving her associate degree in nursing, Dec. 30, 1978. Flynn has worked in the field for four years, receiving her associate degree in nursing, Dec. 30, 1978. Flynn has worked in the field for four years, receiving her associate degree in nursing, Dec. 30, 1978. Flynn has worked in the field for four years, receiving her associate degree in nursing, Dec. 30, 1978. Flynn has worked in the field for four years, receiving her associate degree in nursing, Dec. 30, 1978.
An interest in psychiatry led Keith S. Garcia, M.D., Ph.D., to a change of mind

But then he learned about a combined M.D./Ph.D. program and started thinking about applying science to real-world problems. "I thought medicine could be like the applied science of biology, that becoming a doctor was some how similar to becoming a biologist," Garcia says. "So when I got into the program, I realized that at times being a psychiatrist was a little like being a bus driver/plumber. They can be two completely different things.

While learning that medicine wasn't simply "applied biology," he also discovered how enjoyed interacting with patients. In fact, he really liked psychiatry. Garcia did neuroscience research while earning a doctorate. He found that in psychiatry, he could apply some of that basic research and also listen to people tell their stories.

The same sort of thing attracted his brother, Donald, to the field. Back when Keith was interviewing for medical school, he told his mother that an interest in psychiatry is as secretive. She didn't realize it, but his brother, a third-year medical student at the time, had decided on a similar career path. Later, he learned his father had originally wanted to be a psychiatrist, but when he went to Tulane University for undergraduate training, there were no pre-med scholarships available, so he took an engineering scholarship instead.

"Maybe there's psychiatry gene in my family," Garcia says.

Garcia spent most of his time in the clinic, seeing patients every 10 months each year. He also spends a lot of time teaching medical students and psychiatry residents. He came to the University as a university medical student and eventual-ly became chief resident. Now, he directs the resident clinic and runs a patient psychiatry clinic at Barnes-Jewish Hospital. "He's one of our best clinical teachers," says Barry A. Hong, Ph.D., professor of psychiatry. "He just does a wonderful job with the residents. And in those rare cases where he has trouble teaching them to be better psychiatrists, he's able to help in other ways. He throws these legendary Texas barbecues that keep many of the resi-dents both happy and well-fed.

Applying science

Although his work on the brain as a basic researcher is behind him, the assistant professor of psychiatry hasn't left research behind completely. Garcia is involved in several studies investigating trans cranial magnetic stimulation (TMS) as a potential treatment for a number of problems, especially depression.

The treatment involves placing a magnet on a patient's head and stimulating key regions of the brain with electromagnetic fields. Garcia and colleagues aim the magnetic pulse at the brain's pre-frontal cortex, but he says in the brain, everything tends to be connected to everything else, so additional brain regions also are stimu-lated. Patients get daily 45-minute treatments for about two weeks. "It seems to work faster than antidepressant drugs," Garcia says. "Generally, by the end of two weeks, people start noticing improvements in their symptoms, but once a patient's depression goes into remission, we try to maintain them with medication because we don't really know how many peo-ple need to repeat TMS treatments to remain symptom-free.

Currently, only about half of patients treated with antidepressant drugs get better following a single course of treatment. Even after several rounds of drug thera-py, between 10 percent and 15 percent of patients remain depressed. In a study of patients who had already been helped by antidepressant drugs, Garcia and other investiga-tors found that without any med-i-cation, about a third get better with TMS treatment alone. That's a pretty good percent-
age," he says. "I imagine we might be able to help even more people if we started investigating protocols that would combine medication with TMS.

The TMS research program has been under way at the University for more than 45 years, Garcia, who was still a resident when the program began, inherited several studies when Keith E. Isenberg, M.D., associate professor emeritus, recently left. Department head Charles R. Harber, M.D., says Garcia is a good fit for the research program.

TMS, vagal nerve stimulation and other investigational tech-niques we're studying may offer help to people whose depres-sion doesn't respond to currently available treatments," says Zurum- ski, the Samuel B. Gouge Professor of Psychiatry. "Keith's background in neuroscience, physiology and psychiatry really matches up well with this type of clinical research.

Garcia says TMS often is com-pared to electroconvulsive therapy (ECT), which delivers an electric current to the brain. ECT re-quires anesthesia, but because TMS is less invasive, Garcia and other investigational tech-niques may be an alternative for patients who wouldn't want "to drink before treatment and often can drive themselves to and from their treatment sessions. The se-duction caused by ECT also pose problems, including memory loss and cardiovascular risks. It's an ef-fective therapy, but Garcia says he thinks if TMS could provide simi-lar results, most people would prefer it. He's testing that idea now as the principal investigator for the WUSTL portion of a multi-center grant comparing the two thera-pies. Other TMS studies include using it as a treatment for people with tinnitus, the condition that causes unexplained ringing in the ears.

From studies involving pa-tients with schizophrenia, it turns out you may be able to lessen the severity of auditory hallucinations by using TMS," Garcia explains. "The idea is that in tinnitus, the ringing in the ears is kind of a hallucination because there's not really any stimulus. So we're using TMS to stimulate auditory areas of the cortex to see whether it can reduce or eliminate ringing in the ears.

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He's also looking at TMS at a potential treatment for new mothers with postpartum depression. Many don't want to take antide-presant drugs because those med-i-cations are secreted in breast milk. Garcia says the evidence suggests that antidepressants in breast milk probably won't harm the baby. "But that TMS can be done by just one doctor without drugs, many mothers would prefer to not take chances," he says.

He hopes to recruit by Febru-ary about 10 new patients for a study of postpartum depression to see whether the therapy can help them feel better and more fully enjoy those first few weeks of bonding with their babies.

Fidel and Dad in Havana

Garcia knows his father was from Cuba, but he didn't know some of the amazing details of the elder Gar-cia's story. Not much was said about how he had escaped from that island by being smuggled onto a KLM jet. English was the official language in the Garcia house. His father was fluent, and his mother was fluent in Spanish, albeit with some of an Al-banian accent.

Garcia's father was at Tulane University when Castro took over in Cuba. Young Keith didn't know it dur-ing his childhood, but his other Donald, actually returned to Cu-ba for several years as part of a long saga of his father's exploits in the United States. "I would love to write a story about his experiences someday," Garcia says. "My dad even met Ernest Hemingway at the Havana Yacht Club, where Hemingway was used to hang out. Funny thing is, we never talked about the whole thing when I was growing up."