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Outlook

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WINTER 2011

 **Washington**
University in St. Louis
SCHOOL OF MEDICINE

Knives for nerve studies

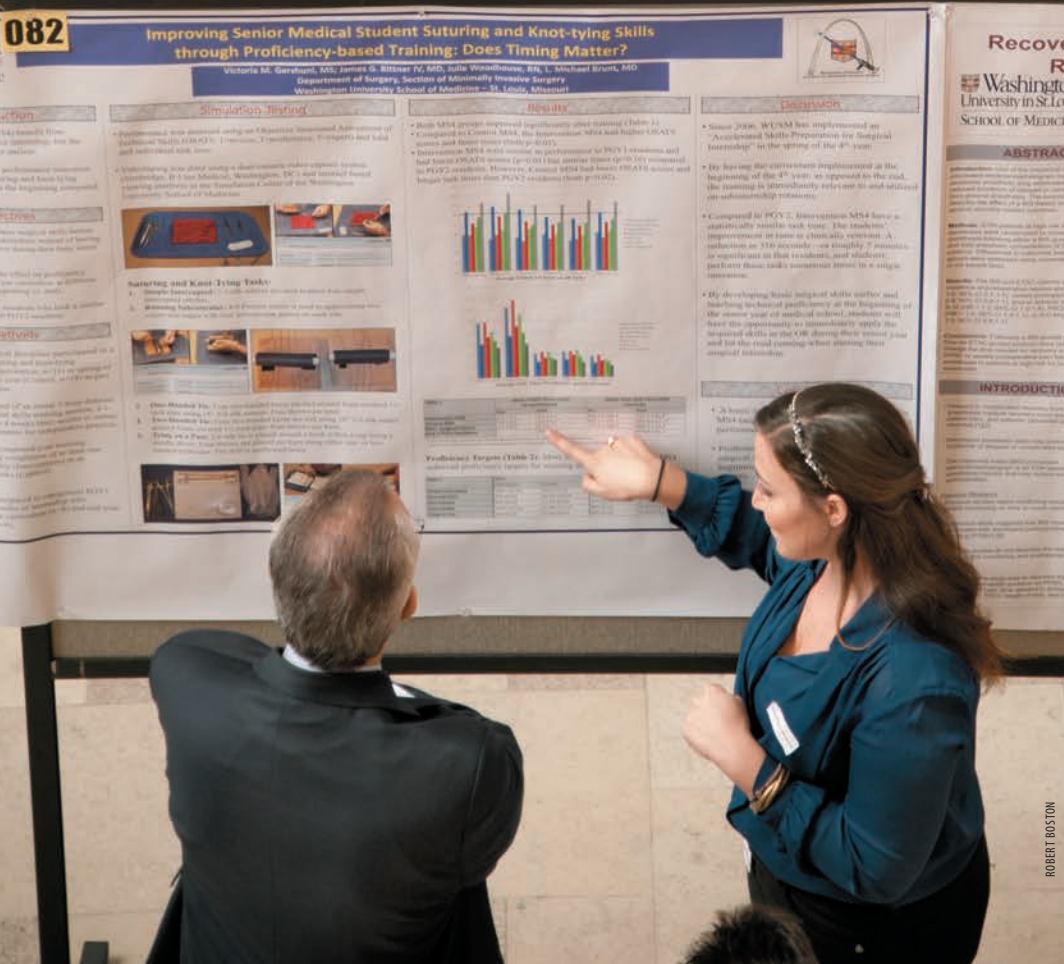
Maximizing a traditional
method for innovative results





Wanted: Posters

Members of the Washington University School of Medicine community gathered at the sixth annual Research Training Symposium and Poster Session held in October at the School of Medicine's Farrell Learning and Teaching Center. The event showcases basic, clinical and translational research projects by junior faculty, fellows, residents and training program students. It is cosponsored by the Clinical Research Training Center (CRTC) — a component of the university's Institute of Clinical and Translational Sciences (ICTS) — and the Office of Medical Student Research. The ICTS is part of a national consortium of medical research institutions working together to improve the way biomedical research is conducted across the country.



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Outlook Winter 2011

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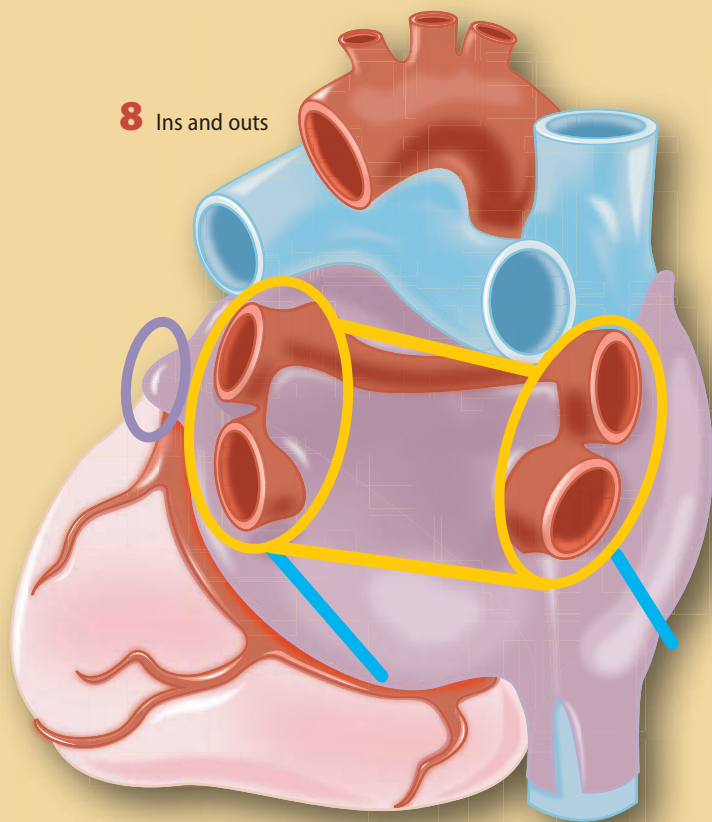
Washington University School of Medicine

OUTLOOK.WUSTL.EDU WINTER 2011



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16 Imaging techniques developed in the peripheral nerve lab set a standard for analysis of nerve regeneration.

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21 Bernard Becker, MD, a force at the School of Medicine for more than a half-century, remains one its biggest proponents.

COVER Daniel A. Hunter, a senior scientist in the Department of Surgery, uses an “old-school” technology to conduct cutting-edge research. His work in the laboratory helps clinicians and surgeons better understand the complexities of nerve injury and regeneration. To learn more, please turn to page 16.

PHOTO BY ROBERT BOSTON

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26 Alumni Endowed Professorships

fixing knees

Sports medicine specialists at the School of Medicine are leading a national study analyzing why a second surgery to reconstruct a tear in the knee's anterior cruciate ligament (ACL) carries a high risk of bad outcome.

More than 200,000 ACL reconstructions are performed each year in the United States, and 1 percent to 8 percent fail for some reason. Most patients then opt to have their knee ligament reconstructed a second time, but the failure rate on subsequent surgeries is nearly 14 percent.

The Washington University group received a \$2.6 million grant from the National Institute of Arthritis and Musculoskeletal and Skin Diseases and is leading dozens of surgeons across the nation in one of the largest orthopedic, multi-center studies ever conducted: the MARS study (Multicenter ACL Revision Study).

"If I reconstruct the ACL in your knee, and you go back to sports, and three years later you pivot on a basketball court and tear it again, that subsequent surgery often does not have results equal to the original surgery," says Rick W. Wright, MD, the Dr. Asa C. and Mrs. Dorothy W. Jones Professor in Orthopaedic Surgery and the MARS study's principal investigator.

During ACL reconstruction, surgeons sometimes replace the torn knee ligament with a ligament transplanted from a cadaver. In other cases, the surgeon will move a piece of the hamstring muscle or the patellar tendon and attach it in place of the torn ligament.

Wright, who also is co-chief of Washington University's Sports Medicine Service and an orthopedic surgeon at Barnes-Jewish Hospital, and his colleagues are recruiting patients with a second ACL tear for the MARS study. The surgeons will note the condition of the knee and how the original surgery was performed to see whether that predicts problems with a subsequent operation. They also will make note of the surgical technique and source of the ACL graft used in the initial reconstruction.

The surgeons will compare rehabilitation techniques and whether particular approaches are related to better or worse outcomes. Patients will be surveyed about their knee function, the general state of their health, and their quality of life before and after a second ACL surgery.

Second ACL repairs aren't always successful — why?

Although mostly a sports injury, ACL tears — often caused by pivoting or landing from a jump — can also occur during rough play, motor vehicle collisions, falls and work-related injuries.



New diabetes research center to focus on high-risk patients

Grant to address disease, disparities

Washington University in St. Louis has received a five-year, \$3 million grant to establish a new center to develop better ways to prevent and treat type 2 diabetes in high-risk patients, including American Indians and Alaska Natives.

Funding for the Center for Diabetes Translation Research comes from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) at the National Institutes of Health (NIH). Washington University is one of seven institutions awarded funding to establish this type of center.

"The center is a unique opportunity to make sure cutting-edge science has an impact on real-world settings," says Debra Haire-Joshu, PhD, professor of public health at the university's Brown School and the School of Medicine and director of the new center. "This grant will enable us to support research that addresses the root causes of diabetes and disparities."

- communication
- implementation
- health policies
- high-risk patients

FOUR CORES

Type 2 diabetes is the most common form of diabetes, according to the American Diabetes Association. Millions of Americans have been diagnosed with high blood sugar — a hallmark of the disease — and many more are at risk of the disease because they are older, overweight or have a family history of the disease. Left untreated,

high blood sugar can lead to complications such as eye, nerve, kidney and heart damage.

American Indians and Alaska Natives have the highest diabetes prevalence of all U.S. racial and ethnic groups, according to the Centers for Disease Control and Prevention. The two groups are twice as likely as white adults to suffer from type 2 diabetes.

The center has four cores. The health communication and health literacy core will evaluate the best ways to communicate information to improve diabetes prevention and care. A second core will focus on how to translate research discoveries into better treatments and prevention. Another core will address health and economic policy, and the fourth core will support investigators working with American Indian and Alaska Native communities.

The new center will serve as a resource for investigators at Saint Louis University, the University of Missouri School of Journalism, and the National Congress of American Indians.

"Our goal," says Haire-Joshu, "is to significantly improve the prevention and care of diabetes in populations at increased risk of this devastating disease."



ROBERT BOSTON

A glimpse of DNA Undergraduate students visiting St. Louis for the Annual Biomedical Research Conference for Minority Students examine slides of DNA at the Genome Institute. The national conference, held in November, is designed to encourage undergraduate, post-baccalaureate and graduate underrepresented minority students to pursue advanced training in the biomedical and behavioral sciences. Washington University, under the leadership of its Division of Biology and Biomedical Sciences, hosted a visit for about 200 students. At the School of Medicine, they toured the Hope Center for Neurological Disorders, the Knight Alzheimer's Disease Research Center, the Center for Clinical Imaging Research, and the BJC Institute of Health at Washington University School of Medicine.

PSA testing remains viable for some

A draft recommendation by the U.S. Preventive Services Task Force calling for an end to routine PSA testing for healthy men age 50 and older goes too far, says a prostate cancer expert at the Alvin J. Siteman Cancer Center at Washington University School of Medicine and Barnes-Jewish Hospital.

"Mass screening is not the way to go," says Gerald L. Andriole, MD, chief of urologic surgery, who acknowledges that widespread testing has led many men with slow-growing tumors to be overdiagnosed and overtreated. "We have to take a more nuanced approach to determine which men should be screened in the first place, how frequently they should be tested, and whether their cancer warrants therapy."

Andriole, who also is the principal investigator of the National Cancer Institute's Prostate, Lung, Colorectal and Ovarian (PLCO) screening trial, argues that it would be a mistake to universally dismiss the PSA test. Rather, he says the decision to screen should be left up to patients and their doctors, who should take into consideration a man's overall health, age and other risk factors.

"Routine annual PSA screening is not necessary for most men. But men with a high risk of dying from prostate cancer — particularly African Americans and those with a family history of prostate cancer — should still be screened."

— Gerald L. Andriole, MD

Look for Outlook ONLINE

ENHANCED FEATURES



Understanding clinical studies

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Enjoy interactive elements and added content

Kopan, Sibley named to Wolff professorships in their fields

Honored for key medical research

Two leading members of the faculty have been named Alan A. and Edith L. Wolff Professors in their respective fields. Raphael Kopan, PhD, has been named the Wolff Professor of Developmental Biology, and L. David Sibley, PhD, has been named the Wolff Professor of Molecular Microbiology.

"Raphael Kopan's research is revealing new details of how an important protein guides the development of many of the body's tissues," says Larry J. Shapiro, MD, executive vice chancellor for medical affairs and dean of the School of Medicine.

"David Sibley studies a common parasite's role in causing illness, helping develop new insights into its deadly microbial sibling, the malaria parasite."

Kopan joined Washington University as an assistant professor of medicine and of molecular biology and pharmacology. He studies a protein called Notch that is instrumental in guiding embryonic cells' development into the body's many tissue types. Because Notch is present in so many cell types, Kopan's lab has contributed to medical research across an array of disciplines, from Alzheimer's disease to asthma to cancer.

Sibley was recruited as an assistant professor of molecular microbiology and was promoted to full professor in 2002. His lab focuses on *Toxoplasma gondii*, a parasite that may infect as many as one in every four humans. The parasite rarely causes symptoms but can become a potentially life-threatening infection if the immune system is weakened by illnesses such as HIV or suppressed to facilitate an organ transplant.

Sibley's studies reveal how *Toxoplasma* and its relatives, including the malaria parasite *Plasmodium falciparum*, infect cells in the human body and hence cause disease.

The late Alan and Edith Wolff supported medical research at the School of Medicine for more than three decades. In 2007, Edith Wolff gave \$20 million to Washington University School of Medicine to establish the Alan A. and Edith L. Wolff Institute, supporting biomedical research projects leading to the prevention, treatment and cure of disease.



Raphael Kopan, PhD



L. David Sibley, PhD



ROBERT BOSTON

Fresh faces Members of the medical school Class of 2015 gathered in August at the School of Medicine's annual White Coat Ceremony, at which they donned their white coats — long a symbol of the medical profession — and recited a newly penned class oath. Other programs, including the Division of Biology and Biomedical Sciences and the Programs in Occupational Therapy, Physical Therapy, and Audiology and Communication Sciences, held welcome celebrations that offered students the opportunity to meet one another as well as program faculty and staff.

OPHTHALMOLOGY AND VISUAL SCIENCES

African-Americans' risk for glaucoma

Measuring oxygen during eye surgery, investigators at the School of Medicine have discovered a potential explanation of why African Americans have a higher risk of glaucoma than Caucasians.

They found that oxygen levels are significantly higher in the eyes of African Americans with glaucoma than in Caucasians with the disease. The researchers, who reported their findings in the July issue of the *Archives of Ophthalmology*, suspect that more oxygen may damage the eye's drainage system, resulting in elevated pressure that can damage the optic nerve, causing blindness.

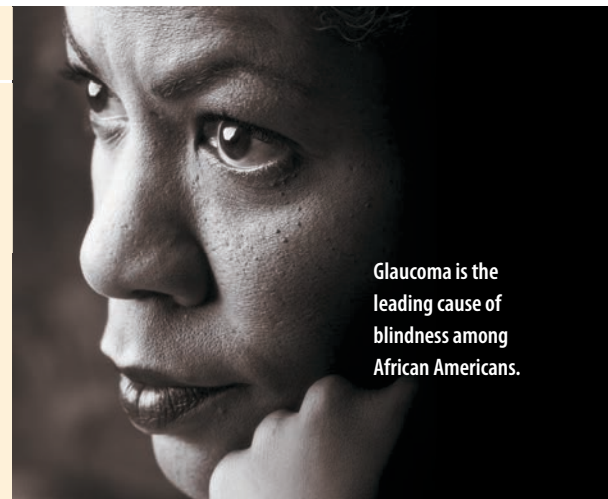
The study provides the first physiologic clue about the link between race and risk for glaucoma. Compared to Caucasians, glaucoma is about six times more common in African Americans, and blindness caused by glaucoma is roughly 16 times more likely.

"Our findings suggest there may be physiologic differences in oxygen metabolism between African Americans and Caucasians," says first author Carla J. Siegfried, MD. "In our

studies, we were not looking specifically at African Americans, but the racial difference in oxygen levels was significant, and we believe this observation deserves further study."

Siegfried, professor of ophthalmology and visual sciences, says it's not surprising that oxygen may play a big role in the development of glaucoma because it may be a source of free radicals that damage cells. Like cataracts, glaucoma is a disease associated with aging. Oxidative stress, an imbalance between these free radicals and antioxidants, is linked to the aging process and many other age-related conditions like cardiovascular and neurodegenerative diseases.

"We began studying oxygen in the eye after our basic studies showed that it was tightly regulated there, with the lowest levels near the lens," says David C. Beebe, PhD, the Janet and Bernard Becker Professor of Ophthalmology and Visual Sciences and professor of cell biology and physiology. "Clinical studies with Nancy Holekamp [MD, professor of clinical ophthalmology and visual sciences] and Ying-Bo Shui [MD, PhD,



Glaucoma is the leading cause of blindness among African Americans.

senior scientist] revealed that exposure of the lens to excess oxygen caused the most common kind of cataracts. And our discovery about cataracts led us, somewhat surprisingly, to glaucoma. Dr. Siegfried then joined us, confirming the connection between oxygen and glaucoma, and the link between oxygen and race was yet another surprise."

Siegfried says it is not yet possible to say whether the elevated oxygen levels cause pressure to rise and optic nerve damage to occur. Her team has received a four-year grant from the National Eye Institute to further investigate that association.



ROBERT BOSTON

Hands-on health care Mogboluwaga Oginni, left, learns how to apply a cast from orthopedic technician Jamie Palmer and April Nortrup, practice office manager of Orthopedic Tech Services located in the Center for Advanced Medicine. Oginni, a St. Louis University High School graduate now in his freshman year at Creighton University, recently spent six weeks at the School of Medicine as part of a paid internship program affiliated with the East Central Missouri Area Health Education Center. An aspiring physician, he was exposed to every aspect of Washington University Orthopedics — from shadowing physicians as they repaired shattered hips and dislocated shoulders to learning about patient billing.

Sanchez named Sicard professor

Luis A. Sanchez, MD, has been named the inaugural Gregorio A. Sicard Distinguished Professor of Vascular Surgery.

Sanchez is highly regarded for his expertise in vascular and endovascular surgery. He joined Washington University in 1999 as an associate professor of surgery and radiology. In 2011, he was named chief of the section of vascular surgery at the School of Medicine and Barnes-Jewish Hospital.

“Like Greg Sicard, Dr. Sanchez is an internationally known innovator of endovascular surgery,” says Timothy J. Eberlein, MD, the Bixby Professor and head of the Department of

Surgery, the Spencer T. and Ann W. Olin Distinguished Professor and director of the Alvin J. Siteman Cancer Center at Barnes-Jewish Hospital and Washington University School of Medicine. “His contributions have helped transform the field. We are looking forward to his leadership of our program in vascular surgery and keeping it the national leader that it is.”

Gregorio A. Sicard, MD, for whom the professorship is named, is the Eugene M. Bricker Chair of Surgery at Barnes-Jewish Hospital. Sicard has spent his entire medical career at Washington University, with numerous leadership roles in the Department of Surgery. He is now the department’s executive vice chairman.



Luis A. Sanchez, MD, left, and Gregorio A. Sicard, MD

TIM PARKER

Licensed gene linked to cancer spread in melanoma patients

May yield diagnostic test for metastasis

Washington University in St. Louis has licensed to Castle Biosciences Inc. the exclusive use of a gene to detect the spread of cancer in melanoma patients.

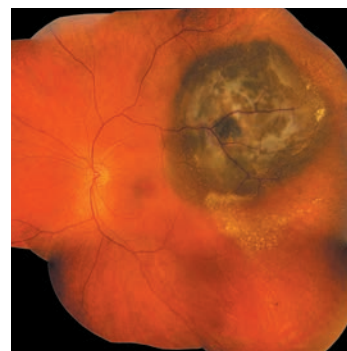
A link between the BAP1 gene and cancer metastasis was discovered by Washington University scientists J. William Harbour, MD, an ophthalmologic oncologist, and Anne M. Bowcock, PhD, a geneticist. Their research, published in 2010 in the journal *Science*, showed that BAP1 mutations occurred in 84 percent of melanomas that developed in the eye and later spread, but were rare in eye tumors that did not metastasize.

The researchers also have identified one individual with a germline BAP1 mutation, indicating that this mutation can be inherited and give rise to a familial cancer syndrome. Mutations in the BAP1 gene have been found in skin melanomas, mesotheliomas, meningiomas and cancers of the breast, ovary, kidney and lung.

Harbour, the Paul A. Cibis Distinguished Professor of Ophthalmology and Visual Sciences, and Bowcock, professor of genetics, pediatrics and medicine, worked closely with the university’s Office of Technology Management, which filed patents related to the BAP1 discovery, giving the university the option to license the technology. “This is a win-win situation for the university,” says Bradley J. Castanho, PhD, director of the university’s Office of Technology Management. “Licensing the technology maximizes the opportunities for WUSTL scientists and the university to take this discovery to the market, where it could be developed into a diagnostic test for cancer metastasis.”

Castle Biosciences, based in Texas, is validating the BAP1 technology for use in both ocular melanoma and melanoma that develops on the skin. The company plans to incorporate BAP1 as a target in a clinical test for melanoma metastasis.

The new license is the second between the university and Castle Biosciences for technology developed by Harbour. The first exclusive license, in 2009, was related to technology to predict the risk of metastasis in patients with ocular melanoma. The company has completed technical and clinical validation studies, and the assay is now part of the standard of care for patients with the disease.



A cancerous melanoma tumor (dark area, upper right) is seen below the retina.

HARBOUR LABORATORY

Tread the Med is on the move

A new walking initiative sponsored by the School of Medicine's Wellness Committee attracted about 1,200 people to its official launch in September. Dean Larry J. Shapiro, MD, left center, James P. Crane, MD, associate vice chancellor for clinical affairs, right center, and Gregg

Evans, human resources consultant (not pictured), led the group on a brief walk around Hudlin Park to kick off the program. Designed to encourage members of the medical school community to incorporate more walking into their lives, thereby improving overall health, Tread the Med boasts 118 teams with more than 2,000 participants.

more information
healthyliving.wustl.edu



ANESTHESIOLOGY

Preventing memory of surgery

Cheaper option is better

Anesthesiology researchers have shown that a device approved by the Food and Drug Administration to reduce the risk that patients will recall their surgery does not lower the risk of the problem, known as intraoperative awareness, any more than a less expensive method.

The new study, published Aug. 18 in *The New England Journal of Medicine*, involved more than 6,000 surgical patients at Washington University School of Medicine, the University of Chicago and the University of Manitoba in Winnipeg.

Unintended intraoperative awareness, also known as anesthesia awareness, occurs when a patient becomes aware during surgery and remembers being in pain or feeling distress during the operation. Between one in 500 and one in 1,000 surgery patients experience awareness during anesthesia. Those with such memories often need psychological help, and some even develop post-traumatic stress disorder.

"We were testing whether a protocol based on a device called a bispectral index or BIS monitor, which measures brain activity to determine how deeply a patient is anesthetized, could more effectively prevent intraoperative awareness than an alternative approach that measures anesthetic levels in a patient's breath," says first author Michael S. Avidan, MB, BCH, professor of anesthesiology.

The study, called the international BIS or Anesthetic Gas to Reduce Explicit Recall (BAG-RECALL) trial, focused on a subset of patients at high risk for awareness. They include patients undergoing cardiac surgery, those who regularly consume large amounts of alcohol or take sedatives or certain types of pain-killing drugs. Patients who previously have had episodes of awareness also are at high risk.

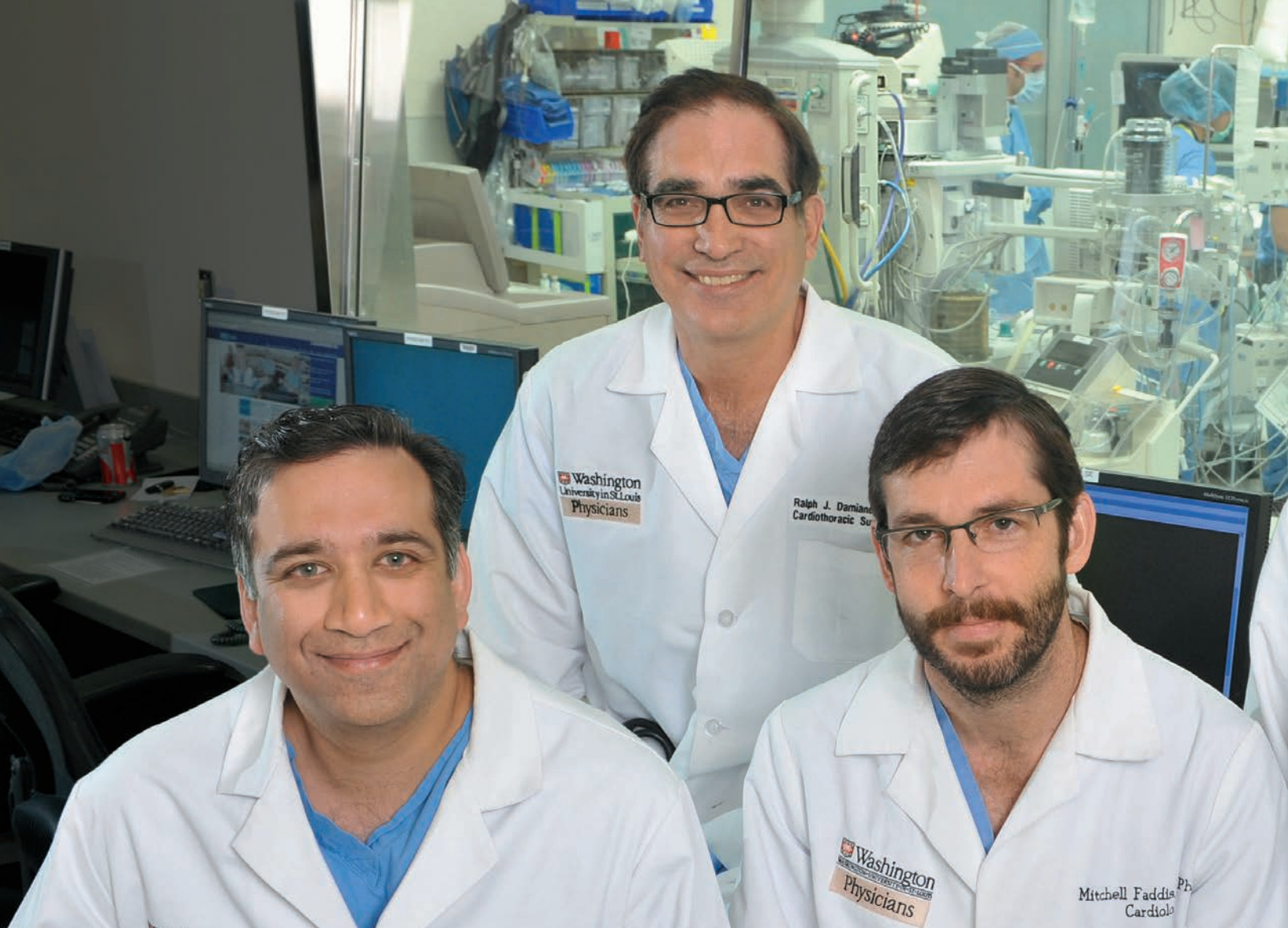
Because the study showed that the structured approach to using BIS monitoring is no better than one based on measuring exhaled anesthetics, Avidan and



The bispectral index (BIS) monitor tracks brain activity.

co-investigator Alex S. Evers, MD, the Henry E. Mallinckrodt Professor and head of the Department of Anesthesiology, say the current, widespread use of the bispectral index in operating rooms should be re-examined.

"New technology has to prove its superiority over more cost-effective alternatives," Avidan explains. "Our trial showed, compellingly, that the protocol based on the bispectral index is not superior."



it takes a team

**Two minimally invasive techniques
in one procedure — an effective option
for a common heart arrhythmia**

BY JULIA EVANGELOU STRAIT

AS HE SAWED A BACKYARD TREE,

Steve Gaal felt his heart start to race, and somehow it didn't feel right. Over the next month he experienced more of these worrisome episodes. Sometimes the frantic beats stopped after a few minutes; other times they lasted more than an hour.

"If I was walking up stairs when it started, I could finish the staircase," he says. "I could force myself through it, but I felt like I shouldn't do anything while it was happening. Most of the time, I would just sit and wait for it to run its course."

An active retiree, the former president and CEO of Delta Dental of Missouri sought the advice of his doctor, who referred him to a cardiologist. A heart monitor revealed the problem — atrial fibrillation, the heart's most common irregular beat.



Pioneers in surgical techniques for treating atrial fibrillation, from left: Hersh S. Maniar, MD, Ralph J. Damiano Jr., MD, Mitch N. Faddis, MD, PhD, and Phillip S. Cuculich, MD. Inset: Patient Steve Gaal and his wife, Gina.



After standard treatments failed, Gaal's doctors at the School of Medicine suggested a new "hybrid" procedure. The approach combines minimally invasive surgical techniques with the latest advances in catheter ablation, a technique that applies scars to the heart's inner surface to block the signals that cause the heart to misfire. The two-pronged approach gives doctors access to both the inside and outside of the heart at the same time, helping to more completely block the erratic electrical signals that cause atrial fibrillation.

Atrial fibrillation affects more than 2 million Americans. While not fatal in itself, patients who suffer from atrial fibrillation are at increased risk of stroke and congestive heart failure. And many, especially those like Gaal who feel the fibrillations, have shortness of breath, chest pain, fatigue and feelings of anxiety, among other problems.

"For some patients, it's a difficult way to live," says Phillip S. Cuculich, MD, assistant professor of medicine and a cardiac electrophysiologist who treats patients with atrial fibrillation at Barnes-Jewish Hospital.

Atrial fibrillation occurs when the upper chambers of the heart, called atria, get irregular electrical signals that disrupt the coordinated pumping of blood through the heart to the

rest of the body. Instead of a normal beat, these signals cause the heart to quiver, preventing adequate blood flow to the ventricles, the heart's main pumps.

Despite its prevalence, atrial fibrillation remains tricky to treat. Medications that maintain a normal heart rhythm often stop working after a period of time.

"I tried medication," Gaal says. "They thought it was working. But within a day or two after they released me from the hospital, I felt the fibrillations starting up again."

When medication fails, doctors typically recommend catheter ablation, which involves threading long, thin tubes through a vein in the groin into the heart. The tips of these catheters can be heated, allowing doctors to perform a series of ablations, or burns, on the heart's inner surface. The goal of ablation therapy is to create scar tissue that isolates the irregular electrical signals and blocks them from

spreading over the heart and causing fibrillation. After a catheter ablation procedure, about 70 percent of patients remain free of symptoms after one year.

Although success rates for catheter ablation are higher than medication, it doesn't always work; some patients may require a second or third procedure to achieve a successful result. And it does not work well for patients with an enlarged left atrium, like Gaal.

For these hard-to-treat patients, doctors may recommend the Cox-Maze surgical procedure, developed in 1987 by James L. Cox, MD, at Washington University.

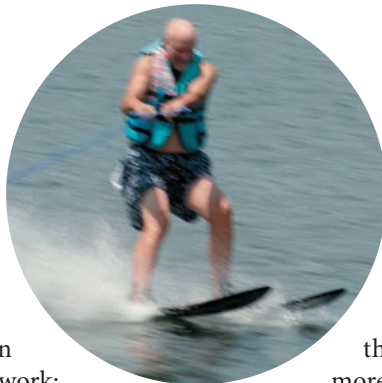
With a high success rate, the Cox-Maze procedure is considered the gold standard of atrial fibrillation treatment. The original Cox-Maze procedure has been refined by Ralph J. Damiano Jr., MD, the John M. Shoenberg Professor of Surgery, and is effective in 90 percent of patients. Damiano has made the procedure easier to perform and more widely available. But many patients consider it too invasive.

"If you have other open-heart cardiac surgery that you need, like bypass surgery or valve surgery, and you have atrial fibrillation, the Cox-Maze procedure is an excellent choice to do at the same time," Cuculich says. "But most of my patients just have atrial fibrillation."

After medication failed and since he had no other heart problems, Gaal's doctors determined he would be a good candidate for the hybrid procedure. Available at only a handful of U.S. medical centers, the hybrid approach attempts to recreate the success rates of the Cox-Maze procedure with the minimally invasive nature and shorter recovery times associated with catheter ablation.

Because catheters enter through a vein, electrophysiologists only have access to the inside of the heart. A surgeon, in contrast, can provide access to the outside.

"By applying the energy to make scars from both the inside and outside of the heart, we're better able to achieve



Steve Gaal tries out his newly revised heart.

a full-thickness ablation," says Hersh S. Maniar, MD, assistant professor of surgery, who performs the new hybrid procedure and the Cox-Maze. "A complete scar that crosses through the full thickness of the heart wall will more permanently block atrial fibrillation signals."

To avoid open surgery, the hybrid procedure is performed through three small incisions under both of the patient's armpits. The surgeons view their work by inserting a small camera into one of the incisions.

After the surgeon has performed the ablations on the outside of the heart, the electrophysiologist uses the catheters inside the heart to attempt to induce a fibrillation, testing the integrity of the ablation lines. If the atrial fibrillation persists, the electrophysiologist can touch up the ablation lines inside the heart until fibrillation can no longer be induced. Finally, the surgeon closes off the left atrial appendage, the area of the heart where most stroke-causing blood clots originate.

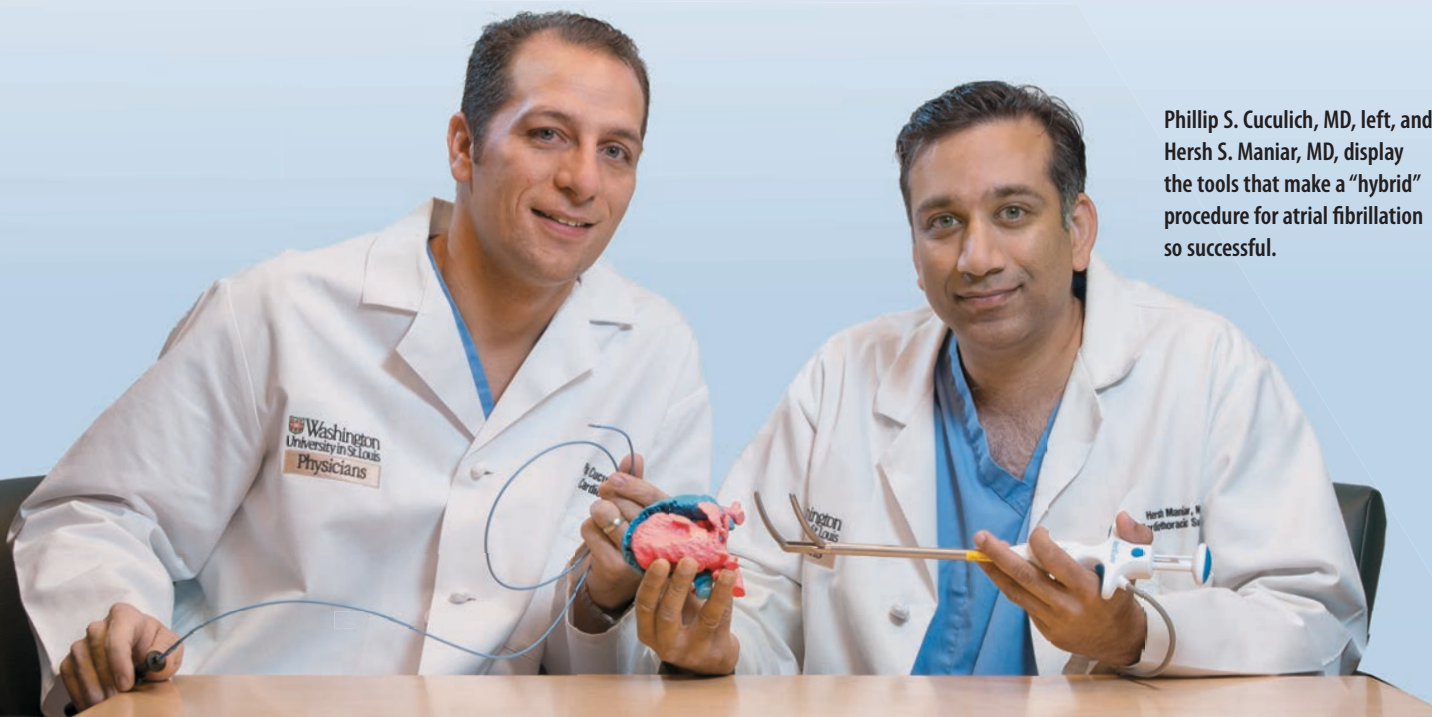
A clinical trial is planned to compare the new hybrid procedure to catheter ablation in patients whose atrial fibrillation is persistent, meaning it does not start and stop on its own, and whose left atrium is enlarged. This group of patients has not done well historically with catheter ablation.

But outside the clinical trial, the procedure is now available to any patient with atrial fibrillation after consultation with his or her doctor.

"Right now we're doing this for people who have persistent atrial fibrillation and for people who have had a failed catheter ablation procedure," Cuculich says. "I think this is an important step forward in improving patient quality of life in a less invasive way than traditional surgery."

Gaal is pleased with the results.

"I've had no recurrences of the fibrillations since the procedure," he says. "I feel good and I know in the next few months I'm going to be that much better. I'm looking forward to it." □



Phillip S. Cuculich, MD, left, and Hersh S. Maniar, MD, display the tools that make a "hybrid" procedure for atrial fibrillation so successful.

Atrial Fibrillation

Ins & Outs

Washington University physicians at Barnes-Jewish Hospital pioneered the surgical treatment of atrial fibrillation. The original procedure involved opening the chest, stopping the heart and applying a “maze” of incisions. Although this proved highly effective, researchers continued to seek less disruptive approaches. Incisions can be replaced by controlled scars, called ablations, created with electrical currents applied in or on the beating heart. However, the limited depth of such scarring permits tissue to regrow, and fibrillation can recur. Now, a team of specialists has joined forces to perform inner and outer ablations during one minimally invasive surgery, offering effective treatment and quicker recovery.

ELECTRO-PHYSIOLOGIST
Inserts electrical catheters through veins in the groin; operates the catheters inside the heart

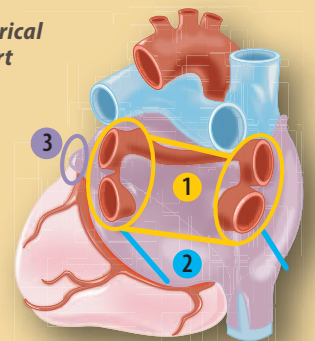
SURGEON
Operates an electrical clamp on the heart

Outside the heart

A surgeon performs a series of ablations on the heart's outer surface (**step 1, right**). These burns surround the pulmonary veins, where the erratic signals that cause atrial fibrillation often originate.

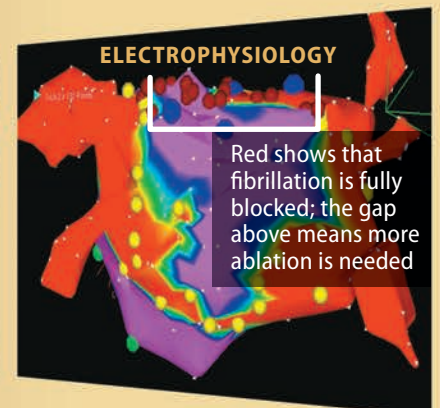
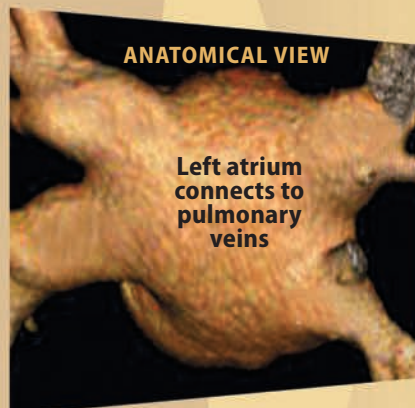
Inside the heart

An electrophysiologist uses catheters to perform ablations on the inner surface (2) to further contain the signals.



Final steps

The electrophysiologist tests the heart to see if fibrillation is impeded; more work may be needed (**see below**). Lastly, the surgeon removes the left atrial appendage (3), a point of origin for blood clots that can cause strokes.



After the MD

Once that piece of paper goes on the wall, residents and fellows go to work in varied programs that fire passions for medicine

BY HOLLY EDMISTON

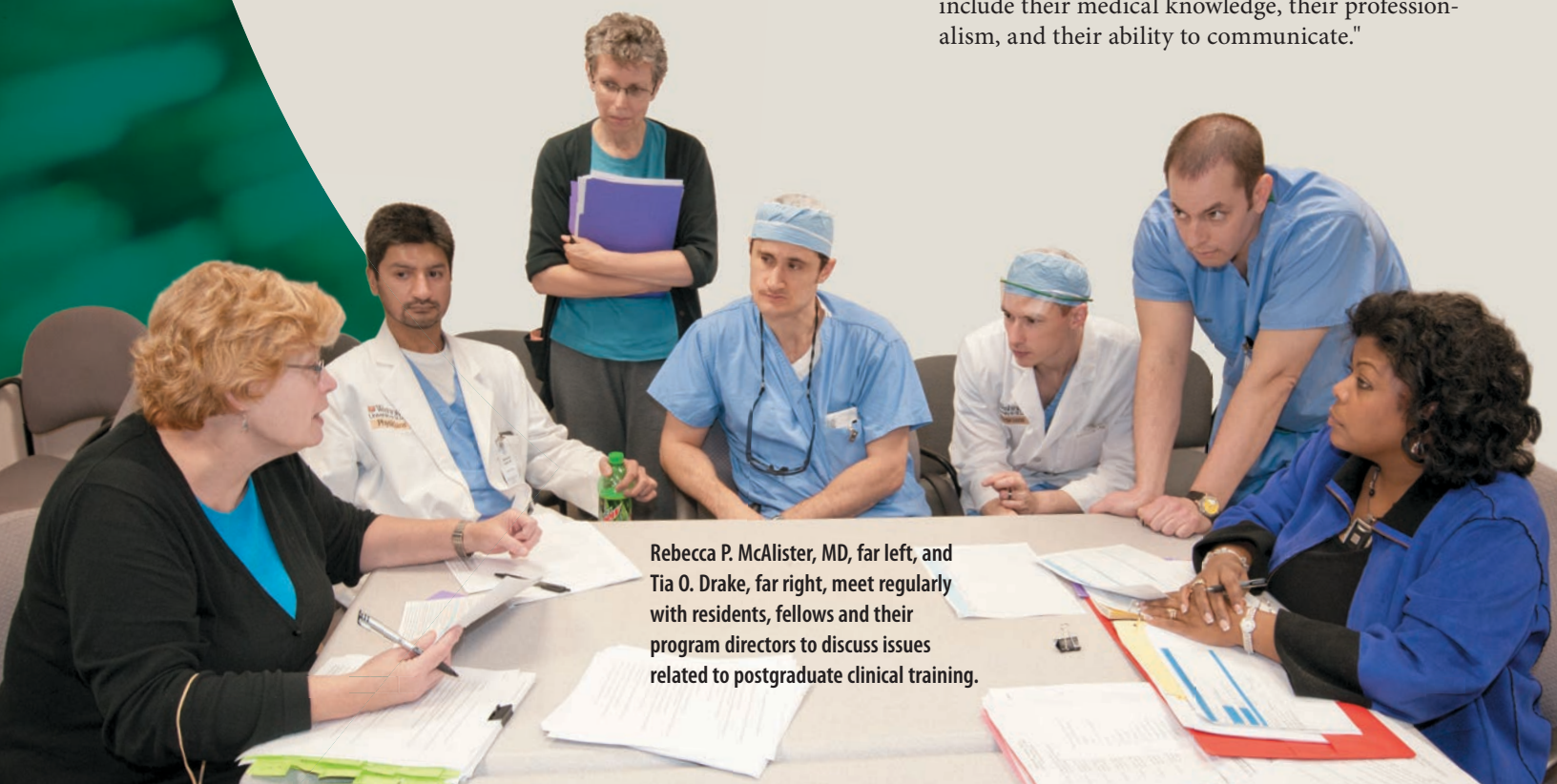
Medical school may teach the basics, but it is postgraduate education that truly prepares young physicians to independently practice medicine. The Accreditation Council for Graduate Medical Education (ACGME) is the main accrediting body for U.S. residency and fellowship programs. At Washington University School of Medicine, the Office of the Associate Dean for Graduate Medical Education (GME) maintains oversight of accreditation for all postgraduate clinical training.

That effort is headed by Rebecca P. McAlister, MD, professor of obstetrics and gynecology and associate dean for graduate medical education, and Tia O. Drake, director, graduate medical education.


"The job of the ACGME and our office is to ensure that our programs meet established standards," says McAlister. "We ensure that we maintain a quality educational environment for all upper-level trainees in any of the residency and clinical fellowship training programs at the university or our affiliated hospitals."

The GME office heads the Washington University Barnes-Jewish Hospital St. Louis Children's Hospital Educational Consortium. Postgraduate trainees can be employed at any of the three institutions, but the oversight for the educational environment resides with the GME office, while the hospitals focus on patient care and the physical environment.

"Our primary goal is to ensure that the people we turn out at the end of their training are competent in an array of areas," says Drake. "These include their medical knowledge, their professionalism, and their ability to communicate."



Rebecca P. McAlister, MD, far left, and Tia O. Drake, far right, meet regularly with residents, fellows and their program directors to discuss issues related to postgraduate clinical training.



Enjae Jung, MD,
in the OR.

A bond of trust

Fourth-year surgery resident Enjae Jung, MD, is actually in her sixth year of post-MD training. After earning her medical degree at Washington University School of Medicine in 2006, she completed two years of residency, followed by two years conducting basic research.

According to Mary E. Klingensmith, MD, the Mary Culver Distinguished Professor of Surgery and director for the general surgical residency program, it is not uncommon among surgery residency programs for trainees to spend two years conducting dedicated postdoctoral research. This training builds a foundation for future academic research and funding; it also gives residents an edge when applying for competitive fellowship positions.

Jung's passion for surgery was ignited when she shadowed a surgeon as an undergraduate. She applied to medical school intent on specializing in surgery and has never wavered from that goal.

"I love the bond I share with my patients," says Jung. "There's a lot of trust in allowing someone to operate on you, and there's a lot of emotional investment when you've operated on someone."

She credits the people who run, teach and participate in the surgery residency program at Washington University with making her experience so successful, and she notes that the GME office also plays an important role.

"The Department of Surgery leadership has put measures into place that maximize our learning while remaining compliant with ACGME restrictions, such as restriction of duty hours," says Jung.

Compliance with duty hours and maintenance of a quality educational environment for trainees is a primary focus for the GME office. According to Klingensmith, McAlister and Drake are readily available for advice and insight when daily challenges in running a residency program arise.

Jung plans to take advantage of an early specialization program, an opportunity offered for physicians interested in doing a fellowship in vascular surgery. As she completes her fifth year of general surgery, she will begin a two-year fellowship in vascular surgery.

Other aspects of the program also support the transition from training to beginning a career.

"The faculty are national leaders, yet they are approachable and interested in my education and training," says Jung. "I also have great colleagues; my fellow residents are supportive, and we definitely look out for each other."

"The faculty are approachable and interested in my education and training."

— Enjae Jung, MD



Amit Patel, MD, left, and Melvin S. Blanchard, MD, examine patient Janet Garner.

Combining interests

Amit Patel, MD, a second-year resident in internal medicine and a 2010 graduate of the School of Medicine, has a passion for research.

While patient care remains his focus, he currently is participating in CSTAR (Clinical Science Training and Research), a residency training pathway that allows for three months of uninterrupted, dedicated clinical research time.

"The GME staff does a terrific job. They stand ready to ensure that our education is both expansive and fair."

— Amit Patel, MD

"When you're on clinical rotations, our demanding hours can make it difficult to partake in research," says Patel. "CSTAR offers residents interested in clinical research the opportunity to learn how to prepare proposals and conduct research that will assist them in becoming successful clinician-investigators."

Like his research mentor, C. Prakash Gyawali, MD, professor of medicine, Patel plans to specialize in gastroenterology. The field includes an interesting array of procedures and emerging technologies, but will still allow Patel to build long-term relationships with his patients.

Patel also serves on the Washington University Institutional Review Board and is co-authoring several chapters in the *Washington Manual Subspecialty Consult Series*, and serves as a senior staff writer at iMedicalApps.com.

"We have a number of special programs, including career and research mentorship, training in how to conduct clinical research, training in quality improvement, and education in global health," says Melvin S. Blanchard, MD, FACP, associate professor of medicine, chief of the Division of Medical Education, and director of the Internal Medicine Residency Program.

Programs like these are what make residency opportunities at Washington University School of Medicine unique. The educational oversight of the GME office ensures that every clinical program offered meets ACGME guidelines.

That's a safeguard Patel appreciates.

"The GME staff does a terrific job," he says. "They stand ready to ensure that our education is both expansive and fair."

Blanchard concurs, saying: "Dr. McAlister and Tia Drake are very responsive, efficient and enthusiastic. They are very supportive of our educational programs and curriculum, and their oversight helps us facilitate the sharing of ideas across the 82 training programs at Washington University."

Even with protections in place, residency training remains a challenging and difficult endeavor.

"You have to love what you do," says Patel. "No doubt residency can be exhausting at times, but if you love taking care of patients and making them feel better, you embrace its challenge and finish each day with a sense of fulfillment."

Figuring out the etiology of a patient's presenting symptoms is what drew Sara W. Dyrstad, MD, to radiology, a specialty that requires careful study of anatomy and pathology using an array of imaging techniques and procedures.

Now in her fourth and final year of residency, Dyrstad plans to continue her training as a breast imaging fellow at the Center for Advanced Medicine at Washington University Medical Center.

"Radiology is a fascinating, challenging field that allows me to have focused patient interaction and to communicate with clinicians from a variety of specialties," says Dyrstad, who earned her medical degree in 2007 at Southern Illinois University in Springfield, Ill. "No day is ever the same."

Throughout residency training, Dyrstad has channeled her passion for problem-solving beyond medical issues to those that arise outside the imaging suite.

Representing the Missouri State Medical Association as a section delegate for the Resident and Fellow Section of the American Medical Association (AMA), she has been active in the national discourse about postgraduate education.

"Sara's involvement with the AMA underscores her commitment to radiology and the future of medicine," says interventional radiologist Jennifer E. Gould, MD, assistant professor of radiology and diagnostic radiology residency program director. "That commitment, coupled with her level-headed approach to issues, made her an easy choice as a resident representative to the GME Consortium committee."

For the past year and a half, Dyrstad and three other postgraduate trainees have served on the committee, composed of GME and hospital administrators, residency and fellowship program directors, and residents and fellows. Most recently, they have focused on providing a peer forum for postgraduates to help address any possible concerns that may arise during their training.

"It's great to be a contributing member to the GMEC," says Dyrstad.

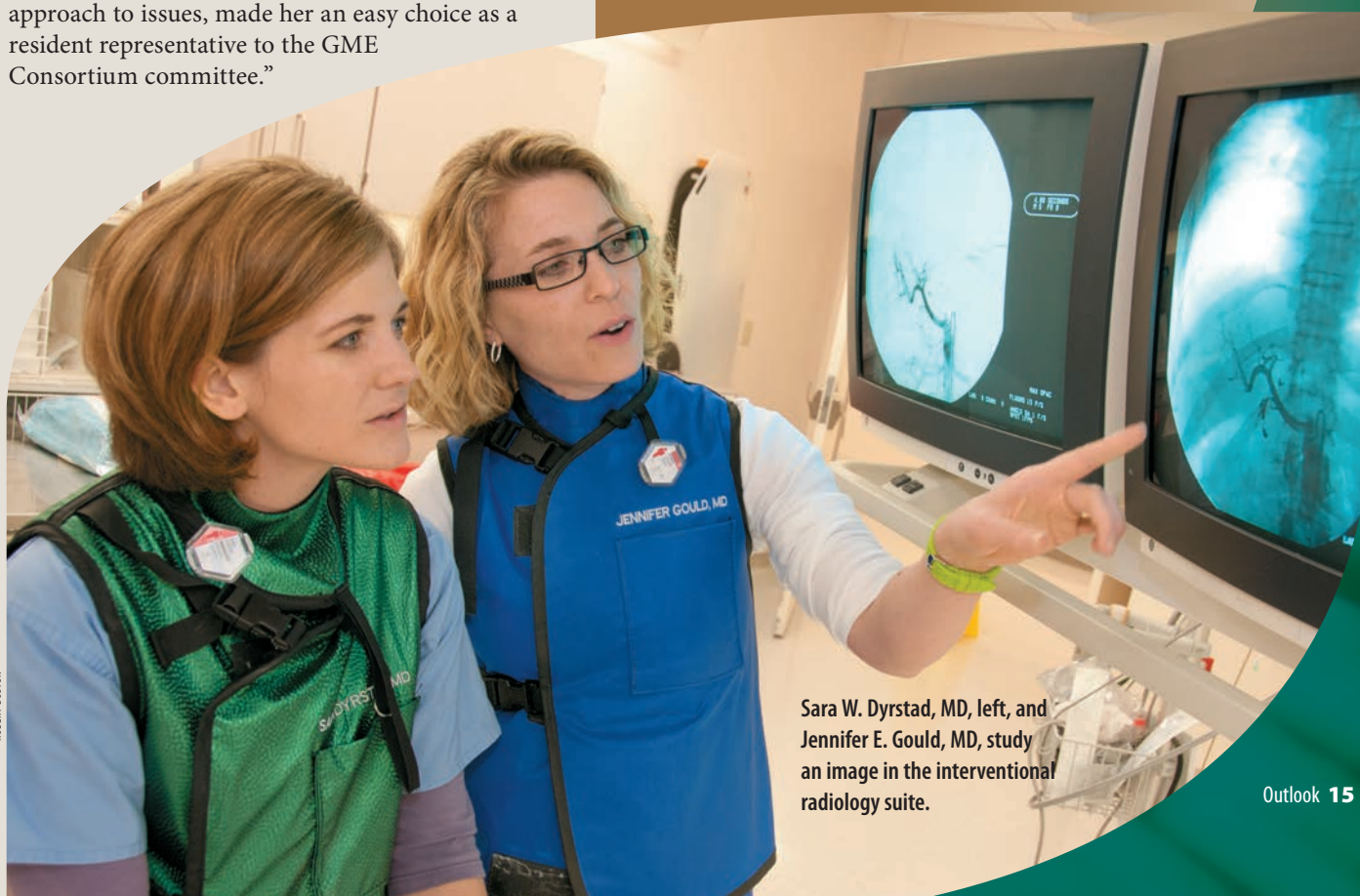
"Not only do we get to voice our concerns, we also gain insight into global issues that affect residency training, such as duty hour restrictions, and possible program changes."

"Sara has been a delight to have as a resident," says Gould. "She has matured over her four years of training to become a leader. Her 'can-do' attitude and willingness to jump in and work hard make her a pleasure to have on service." □

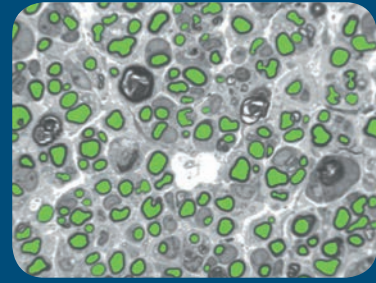
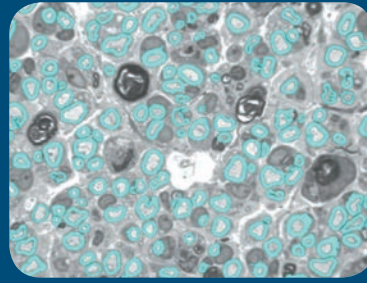
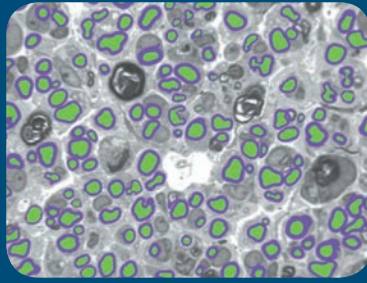
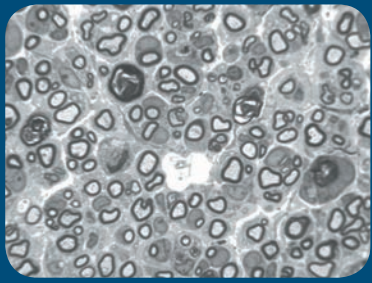
"As contributing GMEC members, we get to voice our concerns."

— Sara W. Dyrstad, MD

Different every day



Sara W. Dyrstad, MD, left, and Jennifer E. Gould, MD, study an image in the interventional radiology suite.



The Cutting Edge

Behind-the-scenes
lab work points
toward beneficial
treatments for
otherwise devastating
nerve injuries.

BY JULIA EVANGELOU
STRAIT

THE PAST 30 YEARS has seen a revolution in the treatment of injuries to peripheral nerves. Arms and legs, hands and feet rely on peripheral nerves to function and feel, and a few surgical specialists across the country have devoted their careers to fixing these delicate white fibers when they are damaged or broken. And behind the scenes, informing all of this surgical work, is the laboratory.

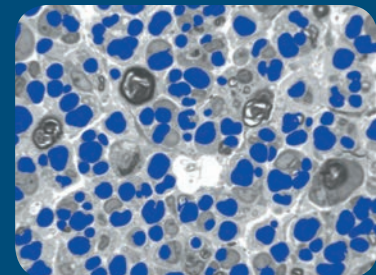
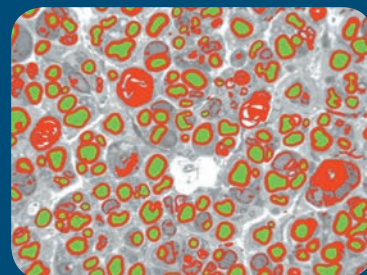
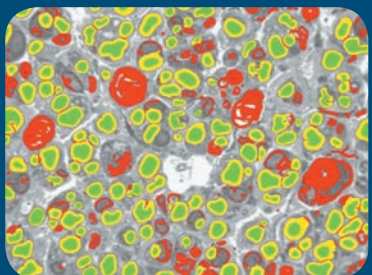
"Every question that comes up in the clinic, we have looked at in the laboratory," says Susan E. Mackinnon, MD, the Shoenberg Professor and chief of the Division of Plastic and Reconstructive Surgery. "We bring the answers we discover in the lab back to the clinic and the operating room."

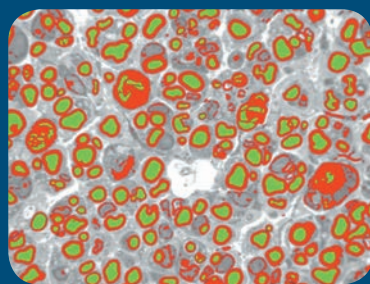
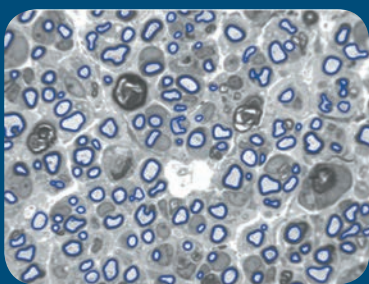
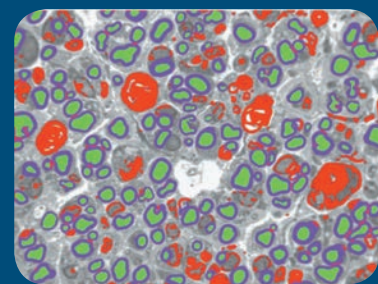
Over three decades, this flow of information between laboratory, clinic and OR has led to huge shifts in the understanding of nerve injury and regeneration. Limbs that might once have been amputated can be saved: A patient's own healthy nerves can be rerouted into a damaged limb, and nerves from a cadaver can be transplanted while minimizing risk of rejection.

A major figure in this work is Daniel A. Hunter, senior scientist in Mackinnon's lab and an expert in the microscopic analysis of nerves. Mackinnon calls Hunter's work an integral part of her surgical practice.

"Dan has devoted his life to quantifying nerve regeneration and developed his own unique techniques to measure what we see under the microscope," Mackinnon says. "He can make the visual images of nerves — and they're beautiful images — into actual numerical results. So you can compare different strategies for treating nerve injury in a very scientific way."

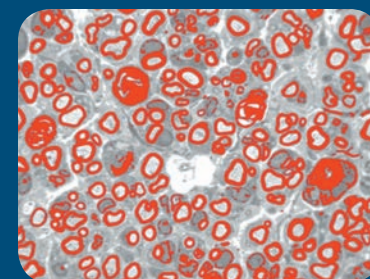
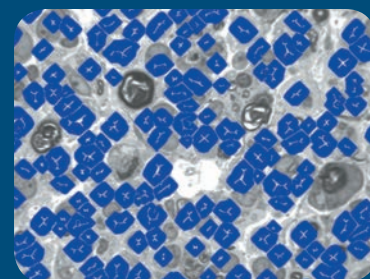
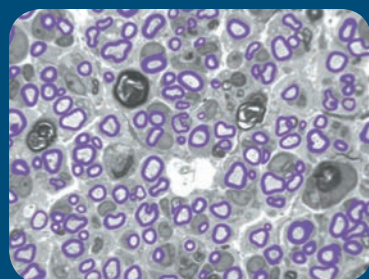
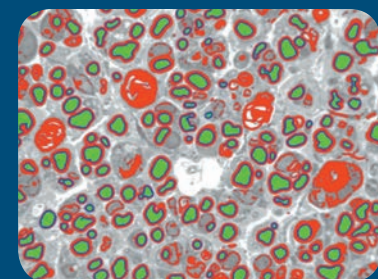
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Imaging techniques developed by Dan Hunter and colleagues in the peripheral nerve lab set a standard for quantitative analysis of regeneration. Hunter modified computer software to augment the painstaking application of his lifetime of research experience. Above and below: Examples show how raw images are progressively refined to yield valuable data.

ROBERT BOSTON



Peripheral VISIONS

Exacting peripheral nerve studies inform breakthrough surgical procedures

Neural pathways

The peripheral nervous system sends neural impulses to and from the brain, directing the body as it interacts with its environment. Injuries can impair or sever these vital links. But research shows that this system can be re-engineered to restore essential functions.

Whole nerves

40x
OPERATING
MICROSCOPE

120x
FLUORESCENT
MICROSCOPE

Neuromuscular connections

250x
CONFOCAL
MICROSCOPE

1,000x
LIGHT
MICROSCOPE

5,000x
ELECTRON MICROSCOPE

Myelinated fibers

If a human hair were this size...

A close shave

a slice of nerve cut with an ultramicrotome would be about this size (red line).

Slices float onto pool of water

Nerve encased in resin

Custom-made triangular glass knife, with water reservoir attached

Nerve sample prepared for microscopy

Seek and find

Assessing nerve regeneration experiments requires human and computer prowess in a painstaking, multistage effort that results in quantified data.

Processing to clarify the image

Applying false color to label each fiber and its myelin sheath

Separating the components for computer analysis

Neural fiber

1

Initially, information clutter

2

Viable nerve fibers mapped

3

Mathematical analyses of image data define the most promising treatments.

Applied in the OR

Ulnar nerve damaged in upper arm

Nerve surgically rerouted

The surgeon plugs a non-critical nerve into an injured nerve; at the microscopic level, new connectivity begins forming (elongated fibers, left). With therapy, the patient can regain elaborate neuromuscular functions such as crossing her fingers.



The Cutting Edge

On Hunter's first day working for Alan Hudson, MB ChB, who later became neurosurgeon-in-chief at St. Michael's Hospital in Toronto, the windowless basement lab had a rotary telephone, a typewriter, an old surgical microscope, and an ultramicrotome, a device used to slice impossibly thin sections of biological samples to look at under microscopes. It was 1973.

"Dr. Hudson handed me a box of rat nerves," Hunter recalls. "I asked what I should do with it, and he said, 'You figure it out; I'm going on vacation.' And he left. That was like baptism by fire. I think it was a test to see what I could do."

In 1978, as a plastic surgery resident at the University of Toronto with an interest in nerve injury, Mackinnon sought out the Hudson lab. There, she and Hunter used animal models to do the first studies of immune response and rejection in transplanted nerve, paving the way for the first human nerve transplant, performed by Mackinnon in 1988.



Surgeries use nerve regeneration techniques first verified by imaging studies in the peripheral nerve lab.

Today at Washington University, 38 years after his first days in the lab, Hunter still works in a windowless room. Rotary phones and typewriters have made way for computers and cell phones. But the ultramicrotome, transplanted from Toronto, remains.

Since this particular ultramicrotome is no longer manufactured, Hunter does any required maintenance himself. Perhaps reminiscent of the transplanted nerves he examines, he harvests replacement parts from his stash of secondhand ultramicrotomes of the same make and model.

Though modern ultramicrotomes use diamond knives, Hunter prefers the instruments and methods he perfected early in his career. "I'm old school," Hunter says with a laugh. "If I had to switch instruments, I think I would just leave."

The glass knives he makes himself are sharper than diamond, but more fragile. After only a handful of cuts, the edge dulls and the knife must be replaced. Neat rows of triangular glass knives sit on Hunter's bench top, waiting to be mounted in the ultramicrotome to slice cross sections of nerves embedded in a hard epoxy resin.

A microtome is termed "ultra" when it cuts samples even thinner than the already thin sections cut by regular microtomes. With his vintage ultramicrotome, Hunter can cut sections as thin as 60 nanometers. That's 1,000 times thinner than a human hair. Indeed, the sections are so thin they cannot be handled directly, but are collected on the surface of a tiny pool of water flush with the glass cutting edge. Floating on the water's surface, the sections appear in vibrant colors — tiny postage stamps of shimmering blues, greens, or

purples depending on their thickness. The same complex optical physics is at work in the rainbow of colors seen in thin films of oil floating on street puddles.

Hunter scoops these samples up with a platinum wire loop and mounts them on glass slides for light microscopy or on metal grids for the extreme close-up view provided by an electron microscope.

In the images of nerve cross sections, the average person sees wiggly lines, circles with thick borders, circles with thin borders, dots and splotches of all shapes and sizes. But to Hunter, each nerve section tells a story.

"This is a crush injury," he says, pointing to the small circles in one of the images.

When a nerve is crushed, the layer of insulation surrounding the nerve fibers, called myelin, gets thinner. But the axon, the "wire" that transmits electrical signals, stays the same. As the myelin sheath thins, the axon's electrical signals slow down.

"This axon here is dying," he explains. "It's being torn away from the myelin. Some scientists may not count these accurately because they can't distinguish between viable and nonviable axons."

Originally, Hunter counted axons and examined nerve sections entirely by hand. Seeking to speed up his process, he found help from an unlikely source: He co-opted an imaging system intended for examining metals — iron, steel, alloys and ores — and wrote his own programs to make the system analyze nerve cross sections instead.

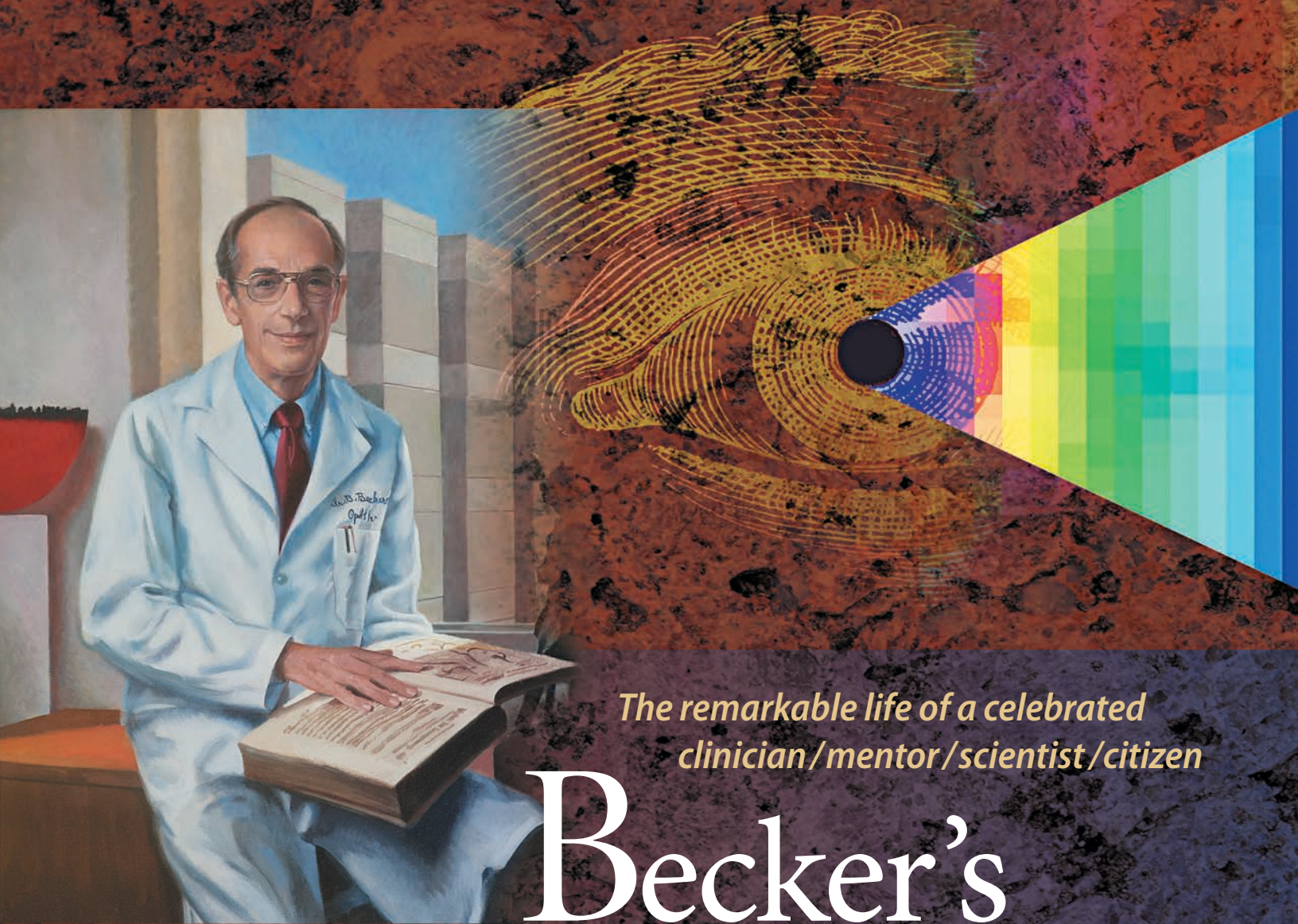
"I don't even know how he came up with that," says Mackinnon. "But for every new operation that I develop, Dan looks at the nerve regeneration in animal models first and tells me whether the new technique worked."

Hunter's methods have proven so comprehensive that researchers at other universities have purchased the metalurgy software platform to use with his custom peripheral nerve programs. Groups at the University of Pittsburgh, Massachusetts General Hospital, the University of Texas Southwestern Medical Center at Dallas, and Chang Gung Memorial Hospital in Taiwan are now using Hunter's system in their own nerve investigations.

"Dan has been doing this type of analysis on nerves his entire career," Mackinnon says. "He has really focused on that with tremendous intellect and passion and become extraordinarily expert in it."

Hunter calls these meticulous methods the gold standard in quantifying the state of a nerve, whether healthy, injured or regenerating.

"It gives us far more information than any other tool to assess nerve regeneration," he says. "Other groups might choose to only count axons. And I'm not saying that's right or wrong. We are just extremely comprehensive when we look at nerve injury and regeneration. That's one aspect of our lab that sets us apart." □



*The remarkable life of a celebrated
clinician/mentor/scientist/citizen*

Becker's (re)collection(s)

In this portrait, Bernard Becker, MD, holds the first comprehensive text on eye diseases and treatments, a rare 16th-century book from the extensive collection of ophthalmology texts that he donated to the School of Medicine's library, later named in his honor.

IN ONE WAY OR ANOTHER, nearly everyone at the School of Medicine has heard of Bernard Becker, MD. Many use the beautiful Bernard Becker Medical Library or consult rare eye books there from the well-known Becker collection. In the Department of Ophthalmology, which Becker chaired for more than 35 years, faculty members know well his landmark research on glaucoma. One member, David C. Beebe, PhD, is the Janet and Bernard Becker Professor of Ophthalmology and Visual Sciences. But Becker is much more than a portrait in the library.

BY CANDACE O'CONNOR



Looking back on the storied career of a clinical scientist, a “jack-of-all-trades” BERNARD BECKER, MD

ADAPTED FROM A PRESENTATION BY GEORGE M. BOHIGIAN, MD



Accepted leadership of ophthalmology department in 1953 at age 33, becoming the university’s youngest chairman; served for 35 years



Military service in World War II

His 500 publications contributed to the understanding of glaucoma

Authored influential ophthalmology textbook

Taught and inspired legions of students

At 91, Becker is still a vital force in the lives of his former colleagues and residents, some 18 of whom went on to head ophthalmology departments of their own. Though wheelchair-bound from hip and vertebrae fractures, he is still highly alert and active on the computer, reading journals and sending articles to colleagues around the world.

“It’s a compulsion of mine. When I read an article, the first thing that occurs to me is: ‘My gosh, this is something so-and-so needs to know about,’” says Becker.

According to Michael A. Kass, MD, the Bernard Becker Professor and current head of the Department of Ophthalmology and Visual Sciences, Becker’s greatest legacy is the people he trained and continues to influence. “He inspired us to pursue excellence, question dogma, and seek answers to important basic and clinical questions,” says Kass.

And Becker is still winning awards, though he modestly downplays them. The American Academy of Ophthalmology honored him with its prestigious Laureate Recognition Award in 2009. From the Association for Research in Vision and Ophthalmology (ARVO), an organization he was instrumental in founding, Becker has received the Proctor Medal, the Friedenwald Award and the Mildred Weisenfeld Award.

But another legacy, and one that Becker values equally, is the work that he and his wife, Janet, have done to further social justice. He still uses his contacts to raise money for causes such as combatting homelessness, feeding the hungry, housing ex-offenders and offering scholarships to students.

“My wife and I were brought up Jewish, and we both faced discrimination,” he says of his commitment. “I was also brought up to like people no matter what their religion.”

Childhood and Education

Growing up in Brooklyn, Becker was early, and excellent, at everything he attempted. As soon as he started school, he was promoted to third grade — and from then on was younger than everyone in his classes. After high school, he won a scholarship to Princeton University, where he was one of six Jewish students in a class of 400. He tutored wealthy young men to supplement his budget.

At Princeton, Becker became a chemistry major and worked with the head of the department, H.S. Taylor, PhD, in researching the structure of molecules, especially proteins and polypeptides. Taylor wanted him to continue on for a PhD in chemistry, but Becker felt that medical training would allow him to apply his research. So he went to Harvard Medical School on a scholarship and worked in the laboratory of A. Baird Hastings, PhD, head of biochemistry. With World War II under way, Becker finished medical school and his internship on a truncated schedule and served in the military.

Afterward, he might have stayed in biochemistry if not for a fortuitous meeting with Jonas S. Friedenwald, MD, a renowned histochemist at Johns Hopkins University. Friedenwald had a dazzling intellect, and when he invited Becker to Hopkins for his residency, Becker eagerly agreed. But he didn’t fully realize that ophthalmology was Friedenwald’s primary interest — and thus Becker began his migration toward eye research.

“That was an exciting time,” says Becker. “Friedenwald was a brilliant man, who even knew all about legal things — all about everything. When they needed advice on the

Founded Association
of University Professors
of Ophthalmology

Built Association for
Research in Vision and
Ophthalmology (ARVO)

Helped establish
National Eye Institute

Directed
American Board of
Ophthalmology

First editor of
*Investigative
Ophthalmology and
Visual Science*

With his wife, Janet,
championed the poor,
the homeless, the
disenfranchised

Remade School of
Medicine library,
donating his
600-volume collection
of rare eye texts



Attending Grand Rounds

U.S. Supreme Court, they called on him; in fact, Justice Felix Frankfurter used to come to the lab to visit with Friedenwald and talk about issues coming up before the Court.”

During the five years that he spent at Hopkins, Becker developed methods for diagnosing glaucoma and measuring aqueous humor, directed the residency program, did non-stop research and served as chief resident. At age 30, he celebrated one of his happiest accomplishments: marrying his wife, Janet, a Philadelphia-born Sarah Lawrence graduate deeply committed to civil rights.

The Washington University Years

Before his marriage, Becker roomed with fellow ophthalmology resident Lawrence Post Jr., MD, son of the part-time ophthalmology chairman at Washington University, Lawrence Post Sr., MD. Word got back to the School of Medicine about Becker, and at the end of his third residency year, Dean Robert A. Moore, MD, recruited him to head the Department of Ophthalmology, but Becker refused. When Moore tried again two years later, Becker accepted. At age 33, he was the university’s youngest department chairman.

Arriving in St. Louis in 1953, Becker faced some immediate challenges, among them building up the residency program, creating a strong research focus, hiring new faculty and forging a solid relationship with community physicians. At the same time, he took on important national roles: founding ARVO, serving as first editor-in-chief of *Investigative Ophthalmology & Visual Science*, and traveling



The Becker Collection of books, manuscripts and graphics, housed in the Becker Library’s Archives and Rare Books, includes many rare items chronicling the parallel evolution of ophthalmology and scientific optics.

the country to convince medical schools they should establish full-time ophthalmology departments with NIH funds.

Horrified by the segregation that he found in McMillan Hospital, he adamantly insisted that it be integrated, and he also appointed African Americans to the staff, among them Howard P. Venable, MD. At the same time, Janet Becker was working in the community, forming organizations such as Beyond Housing.

“In those days, every floor in the hospital had cigarette machines — and this was the institution that had established the link between smoking and lung cancer!” says Becker. “I was a rebel, and I insisted they take the machines off the floors. The only one who would support me was Carl Moyer, head of surgery, because there was so much money to be made from them.”

He also managed to continue his own research, amassing some 500 publications and writing a well-known textbook, *Diagnosis and Therapy of the Glaucomas*, still in use today. Altogether he served for 35 years as department chair, stepping down in 1988. Next he took on the project of remaking the inadequate library, later named for him in recognition of his work. For years he had been buying precious eye texts, and he donated the entire 600-volume collection to the archives.

Among his and Janet’s five living children, one is also an ophthalmologist — William L. Becker, MD 87 — while the other four sons include a teacher, artist, musician and craftsman. The couple also has 10 grandchildren. But Becker has other “children,” too, he says. “Teaching people to do research and take care of patients spreads your ability to do good. And that carries over.” □

Medicine GONE WRONG

Exhibit shows how a cloak of spurious health claims once hid a deadly agenda

IMAGINE BEING A CHILD IN 1930s GERMANY, called into a room where a man in a white coat holds up charts next to your face to look at your eye color and uses tools to measure the bridge of your nose, width of your forehead and circumference of your head.

Hundreds of thousands of children and adults were measured this way by physicians, who also

recorded family genealogies to trace hereditary traits. The practice was part of a broad effort using German physicians and others to racially “cleanse” European society of people seen as biologically inferior and those perceived as racial enemies of the German people.

This practice of the “science” of eugenics, or racial hygiene, as it was known in Germany, is featured in “Deadly Medicine: Creating the Master Race,” a traveling exhibition from the United States Holocaust

Memorial Museum recently on display at the School of Medicine’s Bernard Becker Medical Library. The exhibit highlights the role of science and medicine in the Holocaust.



Sign of the times: A British poster from the early 1930s promotes the surgical sterilization of genetic “inferiors.”



“Our starting point is not the individual, and we do not subscribe to the view that one should feed the hungry, give drink to the thirsty, or clothe the naked. . . . Our objectives are entirely different: We must have a healthy people in order to prevail in the world.”

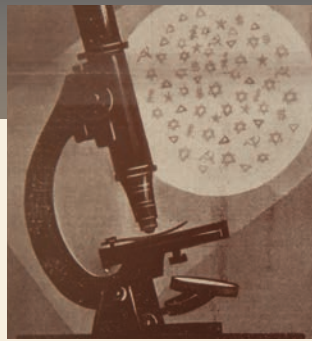
— Joseph Goebbels,
German Minister of Propaganda, 1938

In the 1930s, the National Socialist (Nazi) party enacted a law preventing “genetically diseased offspring” by a mass sterilization program. This emulated sterilization laws enacted decades earlier in the United States and the Scandinavian countries. More than 400,000 German citizens were sterilized over the next 13 years for hereditary conditions including schizophrenia, manic-depressive disorder, genetic epilepsy, genetic blindness or deafness, and severe physical deformity, among others.

Midwives and physicians were enlisted to register all children born with severe birth defects and, during World War II, the program was expanded to include children and adults deemed “incurable.” They were sent to specialized hospital centers, where they were then gassed or starved to death. The Nazis justified these as “mercy deaths,” using asylum directors, physicians and nurses to end “lives unworthy of life” for the good of the Fatherland.

In 1942, the “euthanasia” program and its medical personnel were moved to German-occupied Poland. There, in camps specially constructed as killing centers, gas chambers were used to murder millions. It was to these death camps that 6 million Jews and hundreds of thousands of Romany were transported from throughout Europe and killed in a policy of total extermination (“the final solution”).

Nazi killing centers where millions perished: Jews, Gypsies, non-Jewish Poles, and Soviet prisoners of war



Jews as “microbes” and Bolsheviks as “germs,” from Nazi journal *Der Stürmer* (The Attacker), 1943

“‘Deadly Medicine’ helps us understand how our contemporary world came to be and the human stakes involved in trying to improve the human race,” says Stephen S. Lefrak, MD, professor of medicine and assistant dean of the Humanities Program in Medicine. “If history teaches us anything, it is that what has happened, can in fact happen. It certainly behooves an engaged citizen to comprehend that National Socialist Germany was a biological state that sought humankind’s perfection through racial and biological selection. Therefore, for medicine in the age of genomics, *in vitro* fertilization and the search for wonder cures, the exhibit is a striking billboard warning us to be wary of the promise of biological utopian fantasies.”

Robert W. Sussman, PhD, professor of anthropology in Arts & Sciences, says the exhibit presents many historical events and ideas that aren’t commonly known.

“In many cases, people don’t realize how medicine and science can be used in such a very bad way,” Sussman says. “People have forgotten how horrible those things that occurred during World War II were.



Hartheim “euthanasia” center staff enjoying leisure time, circa 1940–42

The ‘Deadly Medicine’ exhibit shows very well the connection between medical scientists and anthropologists and how the American eugenics movement influenced the Nazis.”

Sussman says many of the ideas presented in the exhibit about different races are still an undercurrent in the United States today.

“This exhibit really shows how people can think so differently, how the behaviors we think are atrocious can be really part of their culture.” □



“Don’t Go Blindly Into Marriage!” In 1926, officials in Berlin opened the first eugenics bureau that certified fitness for marriage.

Choosing a Mate (excerpts)

Remember that you are a German. Everything you are is not of your own merit but through your nation.

If you are hereditarily healthy, you should not remain unmarried.

As a German choose only a spouse of the same or Nordic blood. The mixing of races that do not match each other ... frequently leads to degeneration and downfall in the life of people and nations.

Seek a companion in marriage and not a playmate.

The purpose of marriage is having children and raising descendants. Only among mentally, physically and racially homogenous people can this ultimate goal be achieved.

“Ten Commandments for Choosing a Mate,” created by the Reich Committee for Public Health. From the pamphlet *May I Marry My Cousin?* [1935]

Based on an exhibit that opened at the U.S. Holocaust Memorial Museum in Washington, D.C., in April 2004.

Visit ushmm.org/deadlymedicine

Mission forward

Alumni endowed professorships support full range of faculty efforts

For clinician Alan C. Braverman, MD, having an endowed professorship is a tremendous honor.

“I am very grateful to the alumni for this professorship,” says Braverman, the Alumni Endowed Professor of Cardiovascular Diseases. “Washington University is an incredible research facility, and we also want to be known for providing excellent clinical care. When we give these professorships to clinicians, it highlights the mission of the medical school in research and clinical care.”

In addition to his clinical practice, which covers all aspects of noninvasive cardiology, Braverman is a nationally known authority on genetically triggered aortic diseases such as Marfan syndrome and thoracic aortic aneurysms and dissections.

Braverman’s professorship helps him conduct clinical research projects on aortic dissections and aneurysms that would not have been possible otherwise. It also provides support for the Washington University Marfan Syndrome and Genetically Triggered Thoracic Aortic Aneurysm Clinic.

Alan C. Braverman, MD,
with cardiology patient
Thomas Stobbs.





Through the work of faculty such as Braverman and Jeanne M. Nerbonne, PhD, Alumni Endowed Professor of Molecular Biology and Pharmacology, left, new knowledge is created and the next generation of physicians and scientists is trained.

Endowed professorships help to attract and retain exceptional faculty like Braverman, and these professorships are among the highest honors that a university can bestow on its researchers, clinicians and teachers.

In 1978, the Alumni Endowed Professorship program was established with the goal of creating one professorship in each department of the School of Medicine. The professorships are funded by unrestricted gifts of \$1,000 and greater from medical alumni and former house staff.

To date, the program has funded nine professorships. The first Alumni Endowed Professorship at the School of Medicine, established in 1982, was held by Philip Needleman, PhD, in the Department of Pharmacology.

The first endowed professorships, supported by private philanthropy, were established at the School of Medicine in 1910. To date, 159 professorships, including alumni endowed, have been created. These professorships have helped propel the medical school into the world-renowned institution it has become.

With endowed professorships, the income from permanently invested funds provides salary, benefits and research support. Endowed professorships guarantee a stream of funding that helps to offset the vagaries of external research funding, which often enables researchers to pursue projects at the frontiers of current knowledge and understanding.

An endowed professorship continues as long as the university endures, representing a commitment to support and sustain the advancement of the medical school.

It was an incredible honor to receive the Alumni Endowed Professorship in Molecular Biology and Pharmacology in 2001, says Jeanne M. Nerbonne, PhD. She admits, however, that at the time she had little idea of what that honor would mean in practical terms.

“Over the years, the impact of the salary support provided by the professorship has moved my laboratory’s research in new directions and has allowed us to pursue new initiatives as opportunities presented themselves, rapidly broadening the scope and impact of our work,” she says.

She adds that a clear case in point is the recent establishment of the Translational Cardiovascular Tissue Core at Washington University, a multi-investigator, collaborative effort that Nerbonne is leading with additional seed funding from the Institute for Clinical and Translation Sciences (ICTS) and the Children’s Discovery Institute.

Such initiatives are what keep Washington University School of Medicine at the forefront of medical science and patient care. Alumni Endowed Professorship are just one of many ways to show support for the school’s mission. □

Alumni Endowed Professorships

Dora E. Angelaki, PhD

Anatomy and Neurobiology

Douglas E. Berg, PhD

Molecular Microbiology

Alan C. Braverman, MD

Cardiovascular Diseases

Elliot L. Elson, PhD

Biochemistry and Molecular Biophysics

Robert P. Mecham, PhD

Cell Biology and Physiology

Jeanne M. Nerbonne, PhD

Molecular Biology and Pharmacology

David M. Ornitz, MD, PhD

Molecular Biology and Pharmacology

Robert D. Schreiber, PhD

Pathology and Immunology

History of medicine useful in guiding the future



George M. Bohigian, MD

George M. Bohigian, MD, professor of clinical ophthalmology and visual sciences, knows the importance of connecting with others.

He began his career as a high school science teacher after earning an undergraduate degree (LA 61, zoology) and a teaching certificate from Washington University. He soon realized he wanted to make an even bigger difference, which brought him to medical school and then Washington University School of Medicine for his residency.

During his residency, Bohigian was inspired by the chairman of the Department of Ophthalmology and Visual Sciences, Bernard Becker, MD.

"Dr. Becker is one of the most brilliant people I have ever met," says Bohigian. "He taught me how to think critically and encouraged the residents to do good research."

Becker also had an impact on Bohigian's future interests. It was Becker who first urged him to present a paper at the Cogan Ophthalmic History Society; today, Bohigian serves as its president.

The study of history not only gives him an appreciation of the past and present, but also serves as a guide to the future, says Bohigian. He finds this knowledge helpful when treating his patients.

Bohigian describes one of his life's purposes — teaching — as

"being able to share your light and knowledge with those around you."

Bohigian's connection to the university continues to shine.

He and his wife, Chris, have recently established the Bohigian Lectureship in Ophthalmic History and Visual Sciences.

They know that philanthropy strengthens both the university and the St. Louis community.

"We are pleased to support Washington University School of Medicine and to emphasize the importance of history," says George Bohigian. "The newly formed Center for History of Medicine at the medical center should be a valuable addition to this endeavor."

Support to train audiologists and therapists



James W. Seeser, PhD, and his wife, Judy

Growing up with deaf parents put James W. Seeser, PhD, in an unusual role.

As the oldest child in his family, Seeser served as an interpreter for his parents, landing him squarely in the adult world. He remembers negotiating a car purchase with his father when he was just 6 years old.

Still, he never truly felt he could bridge the gap. "Being deaf in a hearing world, my parents lived in a parallel universe," says Seeser. "Being unable to fully communicate is a huge barrier."

Those early lessons taught him self-reliance and left him determined to figure things out for himself, a trait he carried into his chosen field of science.

From his parents, Seeser gained strong ethics and morals. He also learned about giving back and has used that knowledge to become

personally involved in helping other families that are affected by hearing issues.

Realizing that educating future audiologists and therapists is crucial to helping hearing-impaired children, Seeser donates annually to support scholarships established in Washington University School of Medicine's Program in Audiology and Communication Sciences (PACS).

"Jim Seeser has been an important friend and supporter for the PACS programs for a number of years," says William W. Clark, PhD, professor of otolaryngology and director of PACS. "His passion and motivation stem from his personal experience as the child of deaf parents; his experience as a fellow academician and research scientist make him a valuable colleague and consultant to our programs."

Seeser credits Jerome R. "Jerry" Cox Jr., ScD, senior professor in computer science, with his involvement in the PACS program at Washington University. Through Cox and Clark, he has learned the importance of data gathering and sharing information with parents as they make decisions for their hearing-impaired children.

Early diagnosis and the use of hearing technologies such as cochlear implants and digital hearing aids provide the opportunity for hearing-impaired children to maximize their ability to function in the hearing world.

"Jim Seeser's vision, business experience and entrepreneurship are valuable resources, and his financial support helps us achieve the goals we share," says Clark. "We want to attract and train the most highly qualified leaders in the field."

2nd Century awardees honored at annual banquet

The 2011 2nd Century Awards were presented at a dinner held at the Ritz-Carlton Hotel in Clayton on September 16. The awards recognize those whose long-term commitment and participation have truly made a difference and whose ongoing support allows the School of Medicine to move forward in its second century with strength and confidence.

Robert G. Clark is the chairman and CEO of Clayco, a firm specializing in real estate development, engineering, architecture and construction in industrial, corporate, institutional and residential markets. Clark and his late wife, Ellen, dedicated their time and resources to a broad range of critical issues. The Clark family recently made a gift to Washington University School of Medicine to build and dedicate the Ellen S. Clark Hope Plaza to the school.

Timothy J. Ley, MD, the Lewis T. and Rosalind B. Apple Professor of Medicine, is a hematologist, oncologist and cancer biologist. He is an internationally known expert in the pathogenesis of acute myeloid leukemia (AML) and other blood-related disorders. Ley, with other researchers,



MARK BEAVEN

2011 2nd Century Award recipients, from left:

Robert G. Clark, Morton E. Smith, MD, and Timothy J. Ley, MD

was the first to use the reference sequence of the human genome to systematically identify the mutations responsible for the initiation and progression of cancer, focusing primarily on AML. In addition, his laboratory was the first to develop an accurate mouse model of AML and the first to sequence a mouse cancer genome.

Morton E. Smith, MD, professor emeritus of ophthalmology and visual sciences and associate dean emeritus for post-graduate education, began teaching students at the School of Medicine in 1967. Now in his fifth decade with the university, he continues as a lecturer in ophthalmology and pathology.



Michael Crowder, MD/PhD 89

Kevin T. Baumgartner



Bradley A. Evanoff, MD 86, HS 89

Justin D. Kroge



Naomi Y. Jiang

Laura J. Bierut, MD 87, HS 91



Stanley M. Wald, MD 46

Austin J. Wesevich

2011–12 Distinguished Alumni Scholarship Program Honorees and Scholars

The Distinguished Alumni Scholarship Program awards four-year, full-tuition scholarships named in honor of esteemed alumni of the School of Medicine. Honorees are selected based on outstanding citizenship and leadership, and scholars are chosen for their exceptional academic record and character. In addition to these four students, there are 86 others that receive funding in part through unrestricted gifts to the Annual Fund.



Scientific spirit soars

“Bo” Koster’s love of science inspires contributions of others

One person can make a difference in the world. Some people accomplish this through their work, some through their personal relationships, and some through their commitment to the community. Joseph C. “Bo” Koster, PhD, managed to make a difference in each of those aspects through his life’s work advancing medicine.

A St. Louis native, avid runner and bird watcher, Koster began working in the Department of Cell Biology and Physiology at Washington University School of Medicine as a graduate student. He turned down postdoctoral opportunities on the West Coast in order to stay within the department and work with Colin G. Nichols, PhD, the Carl F. Cori Professor.

Koster loved everything about science and being in the lab; his work set a high standard. In his later research, he discovered one of the fundamental causes of neonatal diabetes, a discovery that led to a revolution in therapy, allowing many patients to switch their therapy from insulin shots to pills.

His findings made a difference in the lives of many.

Sadly, he passed away in February, 2010. His important research findings remain alive in the work of his research partner Nichols as he continues their groundbreaking work.

“Bo was an important member of our departmental community,” says Philip D. Stahl, PhD, professor emeritus and former head of the Department of Cell Biology and Physiology. “He was deeply and passionately engaged in his research and made the lab his second home. He is missed.”

Koster’s life pursuit was medical research; his devotion to this field led his uncle, Col. Charles R. Stribling III and his wife, Winnie Runge-Stribling, to establish an endowed fund in their nephew’s name. The Joseph C. Koster Memorial Fund has become a lasting tribute to him, and it inspires other researchers to make their own life-changing contributions to medical research.

Koster’s important work continues to be a focus for Nichols’ lab. His family, brother R. Stribling Koster and sister Ann Antoniou, hope that the medical discoveries initiated by their brother will lead to better treatments for patients. Although Joseph C. “Bo” Koster is no longer with us, he continues to make a difference in the lives around us.



The Joseph C. Koster Memorial Fund has helped support activities associated with an annual Koster Memorial Lecture, presented by the Center for the Investigation of Membrane Excitability Diseases (CIMED) and the Department of Cell Biology and Physiology. The lecture series showcases the significant contributions to the understanding of membrane excitability and associated diseases. The 2011 lecture featured Harvard Medical School neurobiologist Gary Yellen, PhD, who led a seminar titled “Reverse Engineering Epilepsy Therapy: Exploring Metabolism and Excitability.” The first two lectures were met with great success, an indicator that future lectures will be highly anticipated.



David C. and Betty Farrell

David C. and Betty Farrell are close friends of Washington University School of Medicine and have shown their confidence and trust in the university in myriad ways. Shortly after moving to St. Louis in 1975 as president of May Department Stores Co., Farrell and his wife spent time immersing themselves in their local community. Through (then-Chancellor) William H. Danforth, MD, David Farrell became involved with Washington University, eventually becoming a university trustee. Since then, he has watched the university's extraordinary growth and excellence in research for nearly four decades.

The Farrells' trust and personal belief in the university were made known early on when they endorsed the decision of both of their sons — Mark, LW 86, and David, LW 90 — to attend the School of Law. As the years progressed, their passion for the School of Medicine led them to give remarkable gifts. When Farrell retired as chairman and chief executive officer of May Co., the couple, along with his former employer, established the David C. and Betty Farrell Distinguished Professorship in Medicine. In 2005, through a lead naming gift, the Farrells helped open the doors to the Farrell Learning and Teaching Center (FLTC). The outstanding educational facility for medical students and faculty has become a model for other institutions.

"With the opening of the Farrell Learning and Teaching Center, the university took an exciting

Ongoing support

Farrell Family Research Fund to focus on Alzheimer's disease and dementia

step forward in providing world-class medical education," says Larry J. Shapiro, MD, executive vice chancellor for medical affairs and dean of the School of Medicine. Today, the FLTC is the heart and hub of the medical center, training and educating the best and brightest students in the world.

The Farrells' support of the university hasn't slowed. Most recently, they have contributed to the growth of the School of Medicine through a \$1 million gift to establish and endow the Farrell Family Research Fund in the Department of Neurology.

Not only will this endowed fund support much-needed research in neurological disorders, specifically Alzheimer's disease and dementia, it also will allow the School of Medicine to receive an equal amount from the Danforth Foundation for the Donald Danforth, Jr. Advanced Research in Neurological Disorders Endowment Fund, through the Danforth Foundation Challenge for Neurological Disorders.

The Danforth Foundation Challenge was established with a gift from the Danforth Foundation to support innovative research at the internationally known Hope Center for Neurological Disorders.

Gifts like the Farrells' that are received or committed by December 31, 2013 — up to a total of \$10 million — will secure an equal amount of endowment support from the Danforth Foundation to support the Hope Center.

The Farrells felt it was important that they contribute now. "Alzheimer's disease has affected my family, so I have a special interest in it," says David Farrell. "I've gotten to know Dr. John Morris and his work in the field. The medical school is without peers, and its partner, BJC HealthCare, is an outstanding institution."

The School of Medicine is honored to have the dedicated support of two of St. Louis' most respected leaders, philanthropists and volunteers, David C. and Betty Farrell.

Gifts like the Farrells' that are received or committed by December 31, 2013 — up to a total of \$10 million — will secure an equal amount of endowment support from the Danforth Foundation to support the Hope Center.

Leading the way



Kyle G. Jacobsen, Class of 2014, center, with Ronnie and Jay A. Kaiser, MD 72

Physicians committed to helping medical students finance their education

As co-chairs of the scholarship initiative committee and major donors to Washington University School of Medicine, Jay A. Kaiser, MD 72, and Gordon W. Philpott, MD 61, are as serious about attracting the best and brightest talent to the school as they are about helping medical students fulfill their dreams without the burden of enormous debt.

The two physicians, who both serve on the school's National Council, share a commitment to today's medical students and their chosen profession.

**Scholarships make education
more accessible to all students.**



Jay A. Kaiser, MD 72: A need to give back

Kaiser founded and is president of California Advanced Imaging Medical Associates located in the San Francisco Bay area.

But Kaiser, who remembers being a student fresh out of college who needed a leg up, came from much humbler beginnings.

"My father was a coal miner. I had no money," he recalls. "To attend a medical school the quality of Washington University School of Medicine wouldn't have been possible without scholarships and loans."

Kaiser credits his professional success not only to his medical education, but also to the culture of excellence and constant learning that he internalized during his training in St. Louis.

"Everything I've achieved is due to the education I received at Washington University," he says.

Because of that, Kaiser and his wife, Ronnie, began donating to the university when he entered private practice. They have a named endowed scholarship and contribute to the Class of 1972 scholarship fund.

"It's important that people from all economic levels of our society have the opportunity to attend medical school," he says. "Who better to understand that than physicians?"

Gordon W. Philpott, MD 61: The fun of giving

Philpott, emeritus professor of surgery, has always felt the need to give back to the school where he received his education.

Shortly after becoming a faculty member, he convinced his mother to set up a scholarship fund for students. Since then, he's set up an endowed scholarship, donated to annual scholarships and, with Kaiser, is leading the effort to bring in more money for medical students.

But there was one aspect of giving that Philpott never anticipated: how much enjoyment he would derive from getting to know the medical students.

"Creating and participating in these scholarships is not only a good thing to do, it's actually fun," he says. "It keeps us connected with the students and the school."

He and his wife, Susie, stay in touch with their scholars, both past and present. Current Philpott scholar Marshall C. Strother, a second-year medical student, calls the couple "wonderful" and says he enjoys spending time with them.

The feeling is mutual.

"The students are so good; they're bright and hard-working," says Philpott. "We are proud to be part of the school's ongoing scholarship efforts."

Debt can limit career choices for physicians

Kaiser and Philpott view scholarships as a way to help young physicians avoid crushing debt, freeing them to make career choices based on their unique interests.

"The students ought to always be able to make a decision (about specialty) based on their heart," Kaiser says. "If you want to train physicians to go into the less highly paid specialties, you have to support them."

Philpott, who spent his career as a faculty member, worries that excessive debt load may prevent some talented individuals from pursuing careers in academic medicine, robbing the future of great teachers and investigators.

"Keeping people in the teaching and academic world is one of my personal aims," says Philpott.



"If students are in debt, they feel compelled to pick a field, such as the clinical option, that is more financially rewarding. I'm worried that teachers are going to be hard to find."

Because cost has become such a critical factor in how students choose a medical school, scholarships help attract the very best students.

"Every student who is considering enrolling at Washington University School of Medicine has already shown a commitment to excellence and a desire to keep learning," says Kaiser. "To continue to attract that high quality of student into the program, we need to support them."

▶ for more information, please visit scholarshipinitiative.wustl.edu

Susie and Gordon W. Philpott, MD, with their students, from lower left: Salil H. Desai (Class of 2012), Douglas J. Dearth Jr. (Class of 2013), S. Hassan Akbari (Class of 2012), and Marshall C. Strother (Class of 2014)

1940s

Charles Fullenwider, MD 43

Fullenwider is a retired ophthalmologist. He has traveled to Egypt, West Africa and Turkey in the past five years. He also enjoys reading, gardening and being a member of the Rotary Club.

Elliot D. Luby, MD 49

Luby is professor emeritus of psychiatry and law at Wayne State University and past president of the Michigan Psychiatric Society. The Elliot D. Luby, MD Endowed Professorship at Wayne State University is currently held by Manuel Tancer, MD. Luby's daughter, Joan L. Luby, MD, is a professor of child psychiatry at Washington University School of Medicine.

1950s

James Cunningham, MD 51

Cunningham served in Afghanistan and Africa as a visiting orthopedic surgeon with a humanitarian organization.

James Cutter, MD 51

Cutter has been an avid hiker, backpacker and photographer throughout many state and national parks in California. He has one son who is an anesthesiologist and one daughter and three granddaughters who are registered nurses.

Brent Parker, MD 52

Parker and his wife, Molly, took a driving trip to Glacier National Park. They sing in their church choir and attend all of the symphony concerts. He likes to hike in the mountains, lead nature walks in the Garden of the Gods, and play tennis. Parker is hopeful that he will be able to attend his 60th reunion in 2012.

1960s

John S. Douglas Jr., MD 67

Douglas is professor of medicine and director of interventional cardiology and the cardiac catheterization laboratory at Emory University Hospital in Atlanta GA. He enjoys work, golf, gardening and his four grandsons.

1970s

Robert M. Galatzer-Levy, MD 71

Galatzer-Levy, a child and adolescent psychoanalyst, is on the faculty of the Chicago Institute for Psychoanalysis and the University of Chicago. His latest interests include chaos theory and false confessions. The second edition of his book, *The Scientific Basis of Child Custody Decisions*, was published in 2009.

Mark Stitham, MD 75

Stitham continues to be active in his avocation of acting, appearing in two episodes of the television show "Lost."

1980s

Ralph Glasser, MD 81

Glasser is a partner at Associated Anesthesiologists of Springfield IL, a clinical professor at Southern Illinois University in Springfield, and the immediate past-president of the Illinois Society of Anesthesiologists. He has flown for seven years as the #5 wingman and lead acrobatics pilot with the Trojan Horsemen Airshow Team. Other pastimes include family travel, scuba diving with his daughter, and collecting Alfa Romeo Spider roadsters.

1990s

Maral Kibarian Skelsey, MD 91, HS 95

Skelsey is director of dermatologic surgery at Georgetown University Medical Center in Washington DC, and has been appointed a consultant to the Food and Drug Administration (FDA) Committee for (Medical) Devices and Radiological Health. She also serves as assistant clinical professor of dermatology at Georgetown University School of Medicine and conducts ongoing research related to skin cancer. Skelsey also directs the Dermatologic Surgery Center of Washington in Chevy Chase MD, an outpatient surgical center and diagnostic laboratory that specializes in Mohs micrographic surgery.

2000s

Scott Lovitch, MD 07

Lovitch recently completed his residency in pathology and fellowship in hematopathology, and he is signing out six weeks per year on the hematopathology service at Brigham. He is also doing postdoctoral research in immunology in Arlene Sharpe's (MD, PhD) lab and teaching at Harvard Medical School. He and his fiancée are planning a July 2012 wedding.

Anjali Gopalan, MD 08

Gopalan has been selected as a 2012 Robert Wood Johnson Foundation (RWJF) Clinical Scholar. She will begin her fellowship in the fall of 2012 at the University of Pennsylvania and the Veterans Affairs Medical Center.

Sushant Punjaram Kale, MD, MPH, HS 09

Kale recently joined the faculty at Southern Illinois University School of Medicine as an assistant professor of neurology. He also is a member of SIU HealthCare, the medical school's practice group, and director of St. John's Hospital Stroke Center. He is married to Shubhangi Peche, has one child, and has been published in several professional journals.

IN MEMORY

Ruth Jensen, NU 37

Jensen died on June 28, 2011. She was the wife of St. Louis physician J.E. Jensen Sr., MD. She was active in Girl Scouts, the Missouri Baptist Auxiliary, and Third Baptist Church. She is survived by three children, six grandchildren and four great-grandchildren.

Dorothy M. Kraft, NU 40, NU 42

Kraft, 92, died on May 17, 2011. She donated her body to Washington University School of Medicine.

Walter J. Kennedy Jr., MD 43

Kennedy, 92, died on March 20, 2011. After earning his medical degree, he served in the U.S. Army for two years in Omaha NE and at Shick General Hospital in Clinton IA. He was honored by the Yakima County Medical Society, receiving a Fifty Year

Service Award, and at 80 years of age he tested for and received special certification in pediatric neonatology. Kennedy was a Diplomate of the American Board of Pediatrics and served numerous other organizations throughout his career.

Henry Uhlemeyer III, LA 39, MD 43, HS

Uhlemeyer died on August 29, 2011. He attended Washington University for his undergraduate and medical educations and then stayed with the university for medical residency training.

William H. Weiss, MD 46

Weiss died on June 27, 2011. After earning his medical degree, he did a residency at the Cleveland Clinic where he trained to become an ear, nose and throat physician. He was most proud of "never losing a postsurgical patient or being named in a lawsuit."

Ann Fee, NU 47

Fee, 86, died on June 20, 2011. While in nursing school, she met her future husband, **Wesley S. Fee, MD 44, HS 51**. After raising their children, they retired, sold their cattle ranch on the banks of the Tanque Verde, reluctantly surrendered their season tickets to Wildcat games, and volunteered with the Indian Health Service in Alaska for 13 years. Retirement allowed them to pursue their love of traveling, hunting, scuba diving and fishing. Fee was a civic leader and volunteer, supporting numerous community organizations.

Herluf G. Lund Sr., MD 49

Lund, 94, died on August 30, 2011. He earned both his undergraduate and medical degrees at Washington University and later served in the U.S. Army Medical Corps at Fort Gordon GA. He worked on the medical staffs of many area hospitals, including St. Anthony's Hospital and Lutheran Hospital, where he also served as president of the medical staff. The Missouri State Medical Association recognized him with the 50 Year Membership Award. He was an avid golfer and a longtime member of the Old Warson Country Club.

Albert Peterman, MD 52

Peterman, 85, died on May 30, 2011. Following U.S. Army service during World War II, he became committed to having a career that focused on saving lives. After

earning his medical degree, he was a resident at Philadelphia General Hospital where he met his wife, Nancy DeWitt, the chief nurse in the emergency room. During training, he discovered a passion for neurology, and he later became chief of the department and a clinical instructor in neurology at Stanford University School of Medicine. After practicing for more than four decades, he retired in 2001. This first retirement did not last long once he realized that golf, travel and the occasional Monopoly tournament did not satisfy his needs. He entered the workforce again, evaluating disability claims submitted to the Social Security Administration, a job he held until his final retirement in 2010.

Kurt D. Burns, DE 53

Burns, 83, died on July 24, 2011. Following graduation, the Naval Reserve called him to active duty, where he served as a lieutenant stationed at Camp Pendleton in San Diego CA.

Elden H. Mecham, DE 60

Mecham, 82, died on May 20, 2011. He practiced for 32 years in Salt Lake City UT. He loved reading, history, drawing, model airplanes, classical music, ice cream and his wife's famous pie. He and his wife, Mary, celebrated 55 years of marriage.

Wallace M. Kameoka, DE 61

Kameoka, 79, of Mililani HI, died on April 30, 2011. He was a U.S. Army veteran and was retired from practice.

FACULTY

Harold R. Schreiber, LA 40, DE 47

Schreiber died on Feb. 10, 2011. He completed his undergraduate studies at Washington University, then served in the U.S. Army. After completing his tour, he graduated from Washington University School of Dental Medicine and became a Diplomate of the American Board of Periodontology. He continued to serve his country as a periodontal consultant to the U.S. Fifth Army, Scott Air Force Base and the Veterans Administration. He held several positions at Washington University School of Dental Medicine. Most recently, he served as a clinical professor in the

Graduate Periodontics Department at the Saint Louis University Center for Advanced Dental Education. He was recognized in 2000 with the Gold Medal Award by the Greater St. Louis Dental Society and, in 2001, was awarded the Lifetime Achievement Award from the American College of Dentists.

J. Neal Middelkamp, MD 48

Middelkamp, professor emeritus of pediatrics, died on Nov. 2, 2011. He was 86. He spent his entire career at Washington University Medical Center, from residency at St. Louis Children's Hospital to joining the faculty in the medical school's Department of Pediatrics. He served as director of the department's Division of Infectious Diseases and the Division of Ambulatory Pediatrics, and he was the pediatric clerkship course master for 40 years. He also served on the Residency Review Committee for pediatrics and was active in the Office of Graduate Medical Education. He was a member of the American Board of Pediatrics, including the group's board of directors, and in 1988 he served as the board's chairman. In 1958, Middelkamp was a fellow of the National Foundation/March of Dimes and began to study viral diseases affecting children. He received the School of Medicine's Alumni Award in 1988 and its Distinguished Alumni Scholarship in 1993. He received St. Louis Children's Hospital's Distinguished Physician Award in 1997. Middelkamp and his wife, Lois, also established the J. Neal and Lois Middelkamp Visiting Professorship in Pediatrics to support a pediatric lectureship in infectious diseases and advances in pediatric education for medical students, residents and pediatricians. He is survived by his wife; four children: Sharon Belcher, Steven Middelkamp, Susan Crean and Scott Middelkamp; a sister; nine grandchildren and two great-grandchildren.

If you wish to make a tribute in honor of any of the above alumni or faculty, please contact: Pamela Buell, Washington University Medical Alumni and Development, Campus Box 1247, 7425 Forsyth Blvd., St. Louis MO 63105, (314) 935-9691.

Opening Doors to the Future



The Scholarship Initiative for Washington University School of Medicine

In order to remain affordable for our students and to continue to compete with the nation's strongest medical schools, the School of Medicine has placed even greater emphasis on philanthropic support of scholarships. For more than eight decades, alumni and friends have carried on a tradition of scholarship support.

The cost of a medical education results in an unfair debt load for our students, and we are compelled to alleviate this burden. Scholarships are the key to allowing future generations of students to pursue a career path based on passion, not on potential income.

Scholarships ensure that deserving students do not miss the opportunity for a premier education.

You may name your scholarship in memory of a loved one, in tribute to a friend, or in honor of yourself, your family, or your company. In the fall, a student will be selected to receive your scholarship and you will be notified with information about the student. You also will receive an invitation to the annual scholarship dinner.

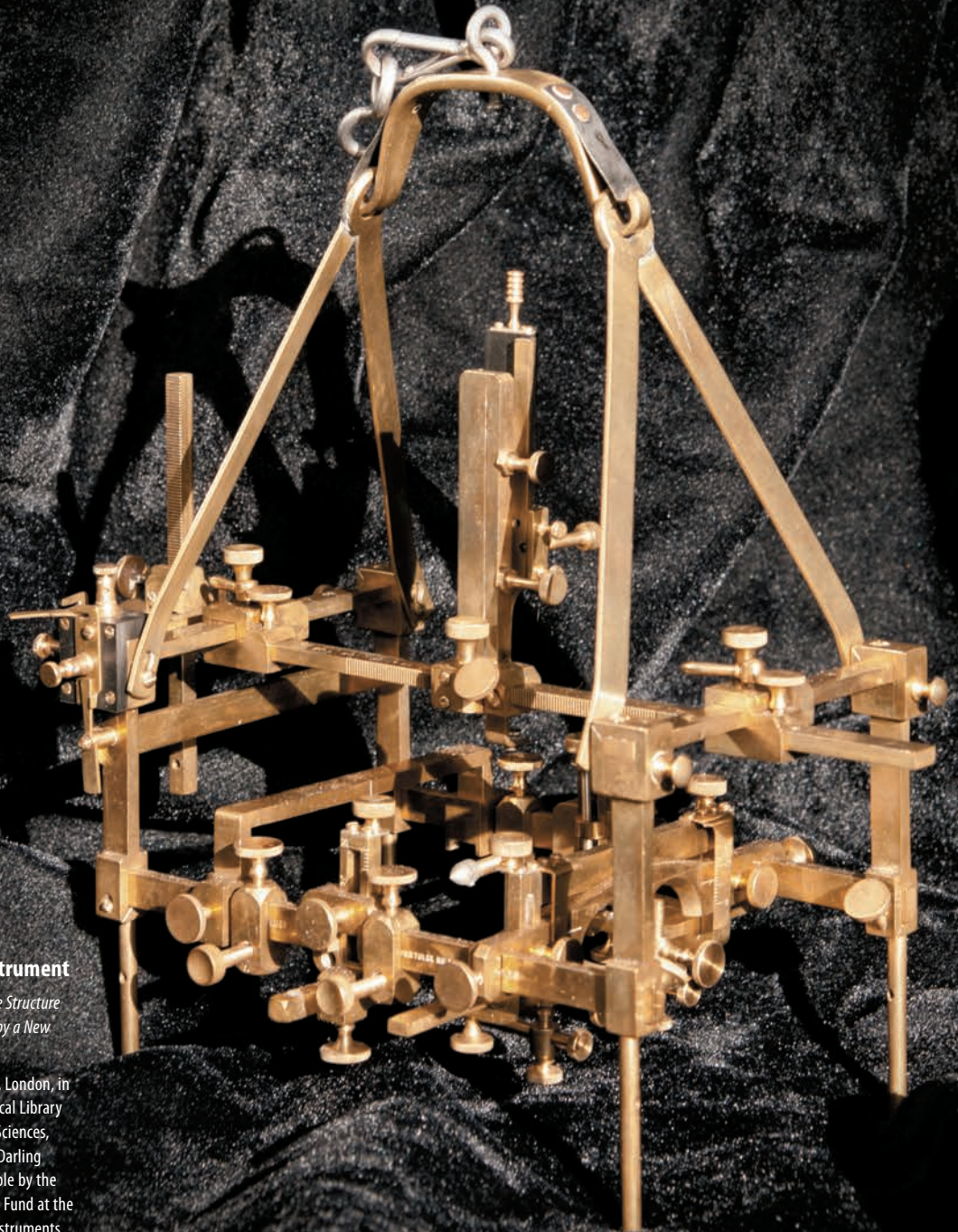
PHONE (314) 935-9691 EMAIL meddev@wustl.edu WEB scholarshipinitiative.wustl.edu



Washington University School of Medicine in St. Louis

Surveying the brain

One hundred years ago the three-dimensional brain remained an undiscovered territory. Mapping that territory required precision, and a device that showed great promise was described by Sir Victor Horsley, a pioneer in neurosurgery, in a 1908 journal article. That year, a London-based instrument company made the second such device for Ernest Sachs, MD, a young doctor who was studying with Horsley. In 1910, the School of Medicine's Department of Surgery recruited Sachs to St. Louis to develop a neurosurgery program. The Department of Neurological Surgery — which celebrated the 100th anniversary of neurosurgery at the School of Medicine in September — is internationally known for its leadership in groundbreaking basic and clinical research, dedication to patient care, and training of outstanding residents and fellows. For more information, please visit neurosurgery.wustl.edu.



Horsley-Clarke Stereotaxic Instrument

First cited in Horsley, V. and Clarke R.H. *The Structure and Functions of the Cerebellum Examined by a New Method*. Brain, v. 31, 1908, pp. 45–124.

The device, made by Palmer and Company, London, in 1908, was recently on loan to Becker Medical Library from History & Special Collections for the Sciences, Library Special Collections, UCLA Louis M. Darling Biomedical Library. Exhibition made possible by the Barbara and Leon Rootenberg Endowment Fund at the UCLA Library. Restoration by David Kopf Instruments.

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Washington University in St. Louis
SCHOOL OF MEDICINE

Touchdown With the onset of cooler weather comes the southward migration of the Monarch butterfly. On its way to warmer climes, this insect stopped to rest atop flora blooming in the plaza of the medical center’s newest research facility, the BJC Institute of Health at Washington University School of Medicine.

ROBERT EUSTON