

# ENGINEERING News

SPRING 2005

School of Engineering & Applied Science  
at Washington University in St. Louis



## New BME-based center targets cardiac arrhythmias

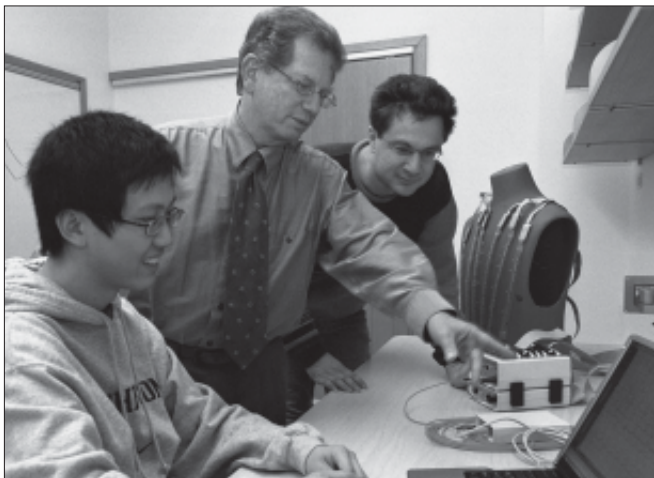
Cardiac arrhythmias—erratic heart rhythms—annually claim about 400,000 lives in the U.S. alone and 7 million worldwide. Many other persons are left disabled or with compromised

quality of life.

Anchored in the Department of Biomedical Engineering (BME), a new University center—the Cardiac Bioelectricity and Arrhythmia Center (CBAC)—is waging war on cardiac arrhythmias.

The CBAC's director is Yoram Rudy, the Fred Saigh Distinguished Professor of Engineering (see article on page 2). Besides being a professor of biomedical engineering, Rudy also has appointments in cell biology and physiology, medicine, radiology and pediatrics at the School of Medicine.

Rudy and two other BME faculty members, Igor R. Efimov, associate professor on the Lucy and Stanley Lopata Endowment (see article on page 4); and Jiamin Cui, associate professor on the Spencer T. Olin Endowment, as well as lab and support



Yoram Rudy, center, with doctoral student Yong Wang, left, and postdoctoral fellow Leonid Livshitz, discuss cardiac data.

See CENTER, page 8 ↓

## 3 faculty members receive endowed professorships in fall

Three faculty members of the School of Engineering & Applied Science were honored with endowed professorships in fall 2004.

On November 22, **Yoram Rudy** became the inaugural Fred Saigh Distinguished Professor of Engineering.

On December 13, **Joseph A. O'Sullivan** became the Samuel C. Sachs Professor of Electrical Engineering.

On December 14, **Alberto Isidori** became the inaugural Edwin H. Murty Professor of Engineering.

See pages 2 and 3 ↓

## Method cleans up pollutant

### Nanostructured titanium dioxide helps render MTBE harmless

Pratim Biswas, director of the Environmental Engineering Science Program and the Stifel and Quinette Jens Professor of Environmental Engineering, has discovered an effective way to remove a troubling new pollutant from our nation's water sources.

Biswas found a method for removing the toxin MTBE (methyl tertiary butyl ether) from water. A gasoline additive used to reduce engine knocking, MTBE has been detected at low levels in municipal water sources around the nation and in several cases has made its way into tap water.

Biswas discovered that a nanostructured form

of a compound called titanium dioxide causes MTBE to react with dissolved oxygen so that it yields the harmless gas carbon dioxide. This reaction proceeds via oxidation of MTBE on the surface of the titanium dioxide to produce a harmless end product. Biswas then designed nanostructure configurations of this catalyst to optimally degrade the pollutant.

"These photocatalysts can be powered by an artificial light source or can be designed to run on solar power," said Biswas.

See MTBE, page 8 ↓



Pratim Biswas



Torrential January rain, a rare occurrence in St. Louis, turned into fluffy snowflakes that quickly transformed the Hilltop Campus into a winter fairyland. The scene is facing east from Sever Archway.

## Nanotechnology minor to make debut

University undergraduates soon will be able to delve more deeply into the emerging field of nanotechnology, thanks to a new minor by the same name. The faculty assembly approved a nanotechnology minor at its December meeting.

"Everything should be in place by fall 2005," said Ramesh Agarwal, the William Palm Professor of Engineering and chair of a committee that investigated the nanotechnology minor's feasibility. Agarwal added that details concerning the new minor are currently being refined.

Agarwal said some classes in the nanotechnology minor will be team taught. He said professors also hope to bring in experts from industry as guest lecturers.

Agarwal said nanotechnology has "a vast number of applications" and that the engineering school already has strengths in various areas of nanotechnology, for example, nanoparticles (environmental engineering science), nanocomposites (chemical engineering) and nanofluids (mechanical and aerospace engineering).

QDQ•R•WHFK•QRO•R•J \ WKH  
EUDQFK RI HQJLQHHULQJ  
WKDW GHDOV ZLWK WKLQJV  
VPDOOHU WKDQ QDQR  
PHWHUV HVSHFLDOO\ ZLWK  
WKH PDQLSXODWLRQ RI LQGL  
YLGXDO PROHFHOHV ¥1DQRµ  
PHDQV RQH ELOOLRQWK

Source: WordNet Dictionary

## Thanks are in order

Totals are in for the recently concluded Campaign for Washington University. See pages 6 & 7 for more information.

# The School of Engineering salutes its newest endowed professors...

## ...YORAM RUDY

Yoram Rudy was born in Tel-Aviv, Israel, on February 12, 1946. Growing up in a young country with an ancient history, Rudy had strong interest in history and archaeology which, over the course of time, shifted toward the physical sciences. In 1966, he entered the Department of Physics at the Technion-Israel Institute of Technology, where he earned a B.Sc. degree in 1970. He continued his studies at the Technion, conducting research in quantum mechanics (tunnelling phenomena in superconductors), for which he received the M.Sc. degree in 1973.

During his graduate studies, Rudy developed an interest in the life sciences and, in particular, in the physics of living systems. He decided to pursue this interest and in the fall of 1973 joined the Ph.D. program in biomedical engineering at Case Western Reserve University, where he conducted research in bioelectric phenomena under the guidance of Dr. Robert Plonsey, a pioneer in the field. Rudy received his Ph.D. degree from Case Western Reserve University in 1978, where he also attended the first two years of medical school.

In 1980, Rudy joined the faculty of Case Western Reserve University as an assistant professor of biomedical engineering. He later became the M. Frank and Margaret C. Rudy Professor of Cardiac Bioelectricity, with

academic appointments in the departments of Biomedical Engineering, Physiology & Biophysics, and Medicine. In 1994, he established the interdisciplinary Cardiac Bioelectricity Research and Training Center and became its director. The center included 32 faculty members from various departments in engineering, science and medicine.

Rudy joined Washington University in fall 2004 as a professor of biomedical engineering with joint appointments in the departments of Cell Biology & Physiology, Medicine, Radiology and Pediatrics. He is director of a new interdisciplinary center, the Cardiac Bioelectricity and Arrhythmia Center, through which he is continuing his research on the mechanics of cardiac arrhythmias and how they lead to sudden death.

Rudy has used a computational biology approach to study arrhythmias at various levels of the cardiac system, and his laboratory also has developed detailed computer models of the workings of cardiac cells. In addition, he has developed a novel, noninvasive imaging modality for cardiac electrophysiology and arrhythmias. The new method, electrocardiographic imaging, adds a much needed clinical tool for the diagnosis and treatment of cardiac arrhythmias; it also



*Yoram Rudy, The Fred Saigh Distinguished Professor of Engineering*

provides a noninvasive method for mechanistic studies of cardiac arrhythmias in humans.

Rudy has published over 200 technical papers and graduated 18 doctoral and 20 master students, who continue to pursue careers in academic research and academic medicine as well as in industry. For his contributions in the fields of cardiac electrophysiology and electrocardiology, Rudy has received numerous awards. He is a member of the National Academy of Engineering, a fellow of the Institute of Electrical and Electronics Engineers, a fellow of the American Institute of Medical and Biological Engineering, and a fellow of the American Physiological Society. He is the recipient of a Merit Award from the National Institutes of Health, the Biomedical Engineering Society Distinguished Lectureship Award, the Gordon K. Moe Professorship Award, and the Ueda Memorial Award (Japanese Society of Electrocardiology and College of Cardiology). He also was named The Rijlant Distinguished Lecturer (International Congress on Electrocardiology).

Rudy and his wife, Hadas, live in the Central West End of St. Louis; they share a passion for music and the arts and hope to become actively involved in the musical life of the city. **EN**

## ...JOSEPH A. O'SULLIVAN

Joseph A. O'Sullivan was born in St. Louis, MO, on January 7, 1960. He studied electrical engineering at the University of Notre Dame, receiving a Bachelor of Science degree in 1982, a Master of Science degree in 1984 and a Ph.D. in 1986.

In 1986, O'Sullivan joined the faculty of Washington University's Department of Electrical Engineering (now the Department of Electrical and Systems Engineering). He has joint appointments in the departments of Radiology and Biomedical Engineering.

O'Sullivan's research interests include information theory, information-theoretic imaging, recognition theory and systems, X-ray CT imaging, information hiding, data storage systems and hyperspectral imaging. He is director of the Electronic Systems and Signals Research Laboratory and associate director of the Center for Security Technologies.

O'Sullivan and his research team are developing an information-theoretic foundation for the design and analysis of imaging systems. This research forms the basis for his efforts in recognition systems, medical imaging in the presence of known objects, radar systems and image processing. O'Sullivan's research in a class of optimization techniques referred to as alternating minimization algorithms has provided an information-theoretic basis for several commonly used algorithms and has led to the development of new algorithms, both in imaging

systems and in communication systems.

As a member of the Center for Imaging Science (sponsored by the Army Research Office), O'Sullivan developed fundamental bounds on the performance of target orientation estimation and target recognition systems. With support from the Office of Naval Research, he is developing new algorithms for recognition of targets from radar and optical data.

In medical imaging, O'Sullivan and Senior Professor Donald L. Snyder are working with Electronic Radiology Laboratory researchers to develop image reconstruction algorithms and a software testbed for spiral CT imaging systems. These efforts support several research projects, including imaging in the presence of radiation brachytherapy applicators.

O'Sullivan works with Professors Ronald Indeck and Marcel Muller on the design and analysis of magnetic and optical data storage systems. He is particularly interested in coding and advanced signal processing techniques for increasing the capacity of magnetic recording systems.

O'Sullivan is a fellow of the Institute of

Electrical and Electronics Engineers (IEEE) and was awarded an IEEE Third Millennium Medal. He will be co-chair of the 2006 IEEE International Symposium on Information Theory. O'Sullivan has served as associate editor and publications editor for the *IEEE Transactions on Information Theory*.

O'Sullivan was chair of the faculty senate, chair of the faculty senate council, and faculty representative to the University's Board of Trustees from 2002 to 2004. He was secretary of the faculty senate and of the senate council from 1995 to 1998.

Washington University has been a major part of O'Sullivan's life since he was very young. He grew up on Wydown Boulevard with his seven brothers and sisters. His aunt and grandparents lived on the corner of Lindell and Skinker. He and his wife, Chris, are raising their five sons on Northmoor, a mile from his office. Three of his boys have attended Washington University preschool; Anthony is currently in the Big Bear class. Joseph,

Andrew, and George all attend Our Lady of Lourdes grade school. Michael is two years old. O'Sullivan enjoys family and sporting events, especially his boys' games. He plays basketball regularly. **EN**



*Joseph A. O'Sullivan, The Samuel C. Sachs Professor of Electrical Engineering*

## ...ALBERTO ISIDORI

Alberto Isidori was born in Rapallo, Italy. He graduated in electrical engineering from the University of Rome in 1965. In 1969 he obtained a degree equivalent to a doctorate in automatic control from the University of Rome.

Since 1975, Isidori has been professor of automatic control at the University of Rome, "La Sapienza." In 1989, he became a professor (part-time) in Washington University's Department of Systems Science and Mathematics (now part of the Department of Electrical and Systems Engineering). He has held visiting positions at several academic institutions, including the University of Illinois at Urbana-Champaign; the University of California, Berkeley; and the ETH, Zurich, Switzerland.

Isidori's research interests are primarily focused on mathematical control theory and control engineering.

In 1979, Isidori initiated a research program aimed at the extension of the so-called "geometric theory" of multivariable linear systems. Isidori's main intuition was to use differential geometric methods in the synthesis of feedback laws for nonlinear systems, more or less in the same way linear geometric methods were used in the synthesis of feedback laws for linear systems. The result of this seminal work was the development of systematic methods ad-

ressing outstanding design problems like feedback linearization, noninteracting control, disturbance decoupling and model matching.

From 1985 to 1990 Isidori's research concentrated on the development of the "nonlinear analogue" of the notion of "zero" of a transfer function. Remarkable examples of application of this theory consisted in the study and the solution of the nonlinear equivalent of the so-called "servomechanism problem" of linear system theory and in the characterization of the conditions for feedback equivalence to a nonlinear passive system.

Since the 1990s, Isidori has focused his research interests on problems of disturbance attenuation and robust stabilization of nonlinear systems.

Isidori is the author of eight books, more than 90 articles in archival journals, 16 book chapters, and over 90 papers on refereed conference proceedings. He is also editor or co-editor of 19 volumes of conference proceedings. He has received outstanding paper awards for papers published in *IEEE Transactions on Automatic*




Alberto Isidori, The Edwin H. Murty Professor of Engineering

*Control* (1981, 1990) and in *Automatica* (1991).

Isidori became a fellow of the Institute of Electrical and Electronics Engineers (IEEE) in 1987. In 1996, he received the International Federation of Automatic Control's (IFAC) George Quazza Medal, the highest technical award given by the IFAC. In 2001, he was awarded the Bode Lecture Prize from the Control Systems Society of the IEEE.

Isidori is listed in the Highly-Cited database (<http://isihighlycited.com>) among the top most-cited authors in engineering.

Isidori is a past president of the European Union Control Association (1995-97) and also served as a member of the IFAC Council (1993-96). He serves or has served on the boards of several leading journals in systems and control. He has been the organizer or co-organizer of several international conferences on feedback design for nonlinear systems.

Alberto and his wife, Maria Adelaide, met in 1960. They have four children: Gino, 36, on the faculty of the Italian National Research Institute for Nuclear Physics; Francesco, 33, an architect; Andrea, 30, an endocrinologist; and Aldo, 23, a graduate student in physics at the University of Rome. Alberto's and Maria's hobbies include sailing, listening to classical music, and—time permitting—gardening in their family country home near Rome. 

## ...and the donors who made the professorships possible

### FRED SAIGH

Fred Saigh (1905-1999) was born in Springfield, IL, the son of Lebanese immigrants who owned a chain of grocery stores. The oldest of five children, Saigh was brought up in Kewanee, IL, and attended Bradley University in Peoria. He loved sports and was an excellent student, graduating from the law school of Northwestern University in 1926, at the age of 21.

From an early age, Saigh believed in the virtues of hard work, determination and accepting responsibility.

Saigh's commitment to hard work and determination led to his rapid rise to success as a tax and corporate attorney. In 1946, after months of study and planning, Saigh became an investor in historic downtown St. Louis. He was able to purchase two architecturally notable office buildings: the Railway Exchange Building and the Syndicate Trust Building. The purchase of these buildings became national news and established Fred Saigh as a visionary in the St. Louis community.

It was in the late 1940s that Fred Saigh truly became part of St. Louis history, when he and Robert Hannegan, Postmaster General and Democratic party chairman, purchased the St. Louis Cardinals from Sam Breadon. Saigh became sole owner of the Cardinals in 1949, when Hannegan's health failed, and Saigh bought out his partner's share. Saigh knew little about the business of baseball, but he was a quick study and worked hard to learn as much as he could, as quickly as he could, about America's favorite pastime.

Saigh was considered a generous and fair owner by players as well as by fans. Early on, he gave many players—including rookie players—substantial salary raises, above and beyond major league salary guidelines. In one famous incident from the spring of 1952, Saigh put a blank con-

tract in front of Stan Musial and told him to fill in the amount he felt he deserved. Musial wrote in \$85,000. The figure was acceptable to both parties.

In 1953, Saigh sold the team to Anheuser-Busch for three-quarters of a million dollars less than he would have received from out-of-state interests. Saigh was adamant that the Cardinals stay in St. Louis, and his act ensured that the city kept its team.

In his later years, Saigh devoted himself to friends and family, and to assisting those less fortunate than himself. Saigh died at the age of 94 on December 29, 1999, after a brief illness.

The Saigh Foundation pays tribute to Fred Saigh by continuing to honor his contribution to our community and by extending his most important gifts to those in need.

### SAMUEL C. SACHS

Samuel C. Sachs (1902-1980) was a pioneer who gave a lifetime of service to St. Louis and Washington University. Evidence of his achievements can be seen in the many local landmarks in which he played a part. A testament to his generosity can also be found in the form of the Sachs Professorship in Electrical Engineering, established in 1972.

Sachs was born in Lithuania in 1902 and entered the United States with his parents in 1905. He became a naturalized citizen in 1911, at the age of nine. He was raised in Desloge, MO, the town in which he first pioneered the use of



Clockwise from top right photo, Fred Saigh, Samuel C. Sachs and Edwin H. Murty.



electricity. While still in high school, Sachs salvaged batteries from car systems and hooked them to lamps to provide light in the Sachs home prior to the installation of electricity in the town. During his teenage years, Sachs also wired houses and stores in the area, replaced the high school's light fixtures and formed his own business. With the money he earned as one of Desloge's first electricians, he put himself through Washington University, graduating with a degree in electrical engineering in 1924.

Following his graduation, Sachs worked briefly for Union Electric Company. Then, in 1925, he founded Sachs Electric, which eventually grew to become one of the United States' largest electri-

See DONORS, page 11 ↴

## BME researchers aim to improve defibrillators

When it comes to affairs of the heart, love taps are preferred over love jolts.

That's the result of a team of heart researchers, including Igor R. Efimov, associate professor of biomedical engineering on the Lucy and Stanley Lopata Endowment, trying to devise a better implantable heart defibrillator. Efimov and his colleagues have modeled a system in which an implantable heart defibrillator focuses on rogue electrical waves created during heart arrhythmia and breaks up the disturbance, dissipating it and preventing cardiac arrest.

The jolt is much milder than that produced by presently used implantable devices, in theory sparing the heart any damage from the trauma, lessening the shock to the patient and reducing the amount of energy required for the device to do its life-saving work.

The smaller energy requirement, from five to 10 times less than what is needed today, opens up the possibility of manufacturing even smaller devices that would last longer and be more comfortable to wear. This would free cardiac patients from the discomfort and danger of having to have a device replaced frequently.

The largest killer of Americans is heart disease, claiming 1 million annually. About 300,000 of these deaths are attributed to arrhythmia.

The first line of defense against arrhythmia is defibrillation, which requires that the patient be near a trained physician and a defibrillator, unless the person is one of 175,000 worldwide who wear an implantable defibrillator.

"Improvement in heart defibrillation devices can save hundreds of

thousands of lives," Efimov said. Efimov said that currently only 2 percent to 3 percent of Americans who suffer an arrhythmia survive.

"Under optimal conditions, the survival rate can be brought up to 50 percent to 60 percent."

Efimov and his colleagues, Valentin Krinsky and Alain Pumir of the Nonlinear Institute of Nice, France, published their results in a recent issue of *Physical Review Letters*.

Eighty percent of the population wearing defibrillators have had a previous infarction, which plays a role in how Efimov's model works. An implantable defibrillator functions like a computer, comprising mainly a battery and large capacitor, and senses electrical activity in the heart. An electrode extends through a vein inside of the heart and

**"Improvement in heart defibrillation devices can save hundreds of thousands of lives."**

**Igor R. Efimov,  
Associate Professor  
of Biomedical Engineering**

records an electrocardiogram (EKG) at all times.

When arrhythmia starts, it generates electrical wave vortices, like miniature tornadoes. These are what stops the heart's pumping.

Efimov and his collaborators knew that the vortices are naturally

attracted to scarred heart muscle. State-of-the-heart defibrillators target the entire heart with an electric current of 3–10 joules of energy to disrupt these vortices and shock the heart back to producing normal electrical activity.

A joule is a standard energy unit equal to one watt of power generated or dissipated for one second.

"We thought: Why don't we just affect the important part of the heart that sustains arrhythmia?" Efimov said. "Instead of shocking the whole heart, let's shock just the tornado activity around the scar. It's much gentler and requires less use of energy."

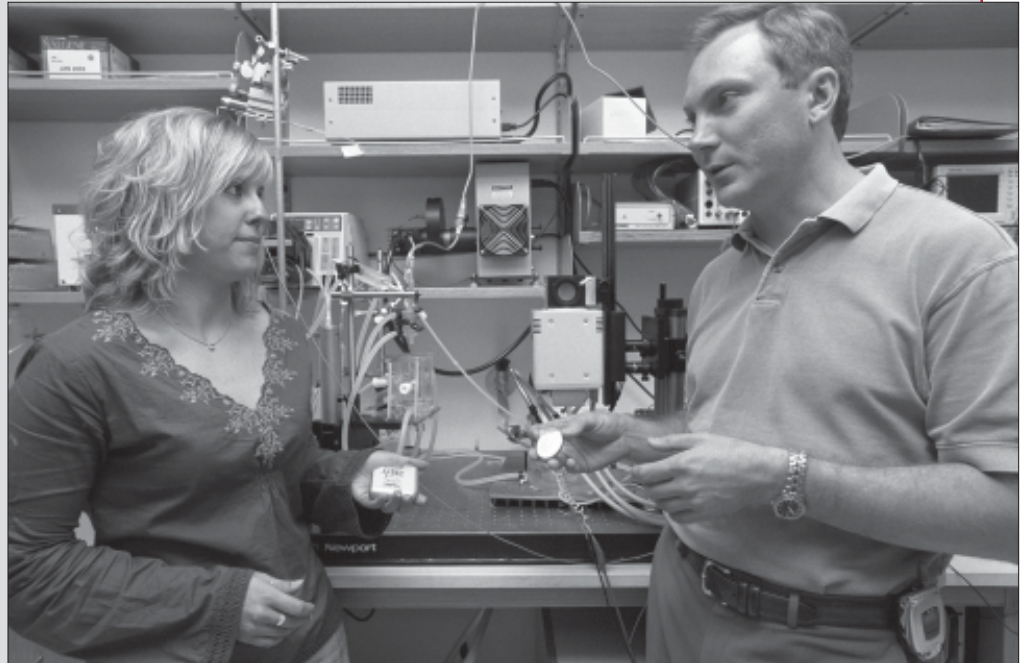
Efimov and his collaborators calculate the energy output from their mild shock would be a half joule. The shock dislodges and eliminates the electrical tornado,

displacing it from the scarred tissue and flinging it toward healthy muscle.

There it disappears or is eliminated by mild antitachycardia pacing, a therapy that uses small bursts of low-power electrical pacing pulses to return a racing heart to its normal rhythm.

Next for Efimov and fellow researchers Vladimir P. Nikolski, assistant professor of biomedical computing, and graduate student Crystal Ripplinger are in vitro studies of rabbit hearts undergoing arrhythmia, where the phenomenon will be photographed with sophisticated imaging techniques to see how the waves propagate.

If the in vitro studies prove successful, clinical trials in humans will be next. **EZ**



*Crystal Ripplinger, graduate student in biomedical engineering, and Igor R. Efimov, associate professor of biomedical engineering, discuss their work on implantable defibrillation. Ripplinger holds the actual model defibrillator tested in the laboratory; Efimov's smaller model is the size they want the new product to be. Behind them is the equipment they use to test devices.*

## Engineers' Scholarship Program marks 31st anniversary

The School of Engineering & Applied Science celebrated the 31st year of the Engineers' Scholarship Program with a Nov. 4 dinner and program at St. Louis's Marriott West Hotel.

The annual banquet serves as a thank you to scholarship sponsors and gives them a chance to enjoy dinner with the recipients of their scholarships. To commemorate the occasion, photos are taken of sponsors with their scholarship students.

Not only are scholarship students encouraged to attend the dinner, but they also play an important role in the evening's program: One student serves as emcee, and another delivers a short talk.

This year's emcee was Joseph Blasi, a civil engineering senior from Columbia, MD, and the Terry and Carol Fuldner Scholar; the student speaker was Laura Seger, a biomedical engineer-

ing senior from Leawood, KS, and the Luisa D. Mendez Endowed Scholar.

Other speakers for the 2004

scholarship dinner included Stanley I. Proctor, EN57, SI62, SI72, sponsor of the Stanley and Carol Proctor and the Proctor/Kroeger

Scholarships, and chair of the Engineers' Scholarship Committee; Christopher I. Byrnes, engineering school dean and the Edward H. and

Florence G. Skinner Professor of Systems Science and Mathematics; and Matthew M. Thomas, EN85, TI88, SI89, sponsor of the Beers/Thomas Scholarship.

The Engineers' Scholarship Program was inaugurated in 1974 by James M. McKelvey, SI47, SI50, former engineering school dean and currently a senior professor, and William K.Y. Tao, SI50.

During the current academic year, 381 students are receiving scholarship support; 194 have endowed scholarships, and 187 have annual scholarships. **EZ**



*Seniors Laura Seger and Joseph Blasi, scholarship dinner student speaker and emcee, respectively, pause from the festivities for a photo with Christopher I. Byrnes, engineering school dean and the Edward H. and Florence G. Skinner Professor of Systems Science and Mathematics.*

# Department of Computer Science & Engineering to help host ICSE in downtown St. Louis May 15–21

For the last three years, Gruia-Catalin Roman has felt as if he has had two full-time jobs.

In effect, he has.

Roman, chair of the Department of Computer Science and Engineering and the Harold B. and Adelaide G. Welge Professor of Computer Science, also is general chair of the 27th International Conference on Software Engineering (ICSE). ICSE 2005 will be held May 15–21 at the Adams Mark Hotel in downtown St. Louis.

The premier software engineering conference, ICSE provides a forum for researchers, practitioners and educators to present and discuss the most recent innovations, trends, experiences and concerns in the field of software engineering.

Generally, ICSE alternates each year between a location in the United States and one abroad. This is the first time in the conference's 27-year history that it has been held in the Midwest.

"I'd been asked to organize the conference, so I really thought it was an opportunity to bring it to St. Louis," Roman said.

The local community rallied around him in his bid to bring ICSE 2005 to St. Louis, Roman said, adding that his proposal contained letters of support from the governor

of Missouri, the mayor of St. Louis and other area leaders.

"We put an impressive package



together," Roman said.

After St. Louis was designated the site of ICSE 2005, Roman said he and others—part of a coalition from industry, government and academia who are spearheading a local information technology (IT) initiative—set about trying to make the most of the opportunity to showcase St. Louis as a welcoming place for IT.

St. Louis-based corporations and Washington University contributed \$160,000 of the \$200,000 raised to support the

conference organization. Roman said the contributions will help ensure that the conference will have a long-lasting impact on participants as well as the host region.

With computers increasingly permeating the fabric of society, Roman said projections are that job openings in computer-related fields will skyrocket. His hope is that ICSE 2005 will be a catalyst for IT expansion in the St. Louis area.

"Software is an engine for growth," Roman said. "We want to

See ICSE, page 8 ↓

For more information about ICSE 2005, go to <http://www.cs.wustl.edu/icse05>

## Faculty News

### Biomedical Engineering

**Yoram Rudy**, the Fred Saigh Distinguished Professor of Engineering, is president-elect of the Cardiac Electrophysiology Society and will assume his post in 2006.

**Dr. Frank C-P Yin**, chair and the Stephen F. and Camilla T. Brauer Professor of Biomedical Engineering, is president-elect of the Biomedical Engineering Society (BMES); he will assume the office in October. In 2008, St. Louis will host the annual meeting of the BMES and Yin will be the meeting chairperson.

### Civil Engineering

**Shirley J. Dyke**, the Edward C. Dicke Professor of Engineering, gave a plenary talk at the U.S.–Korea Workshop on Smart Structures Technologies, held in September in Seoul, Korea. Dyke also organized and hosted the 2004 International Conference on Motion and Vibration Control (MOVIC04), which was held in St. Louis and attended by 132 international participants.

### Computer Science & Engineering

**Cindy Grimm**, assistant professor, has received a two-year, \$154,000 grant from the National Science Foundation for research titled "Surface Construction and Comparison Using Manifolds."

**Mark A. Franklin**, the Hugo F. and Ina Champ Urbauer Professor of Engineering; **James H. Buckley**, associate professor of physics; **Jeremy D. Buhler** and **Patrick Crowley**, assistant professors; and **Roger D. Chamberlain**, associate professor, have received a four-year,

\$750,000 ITR grant from the National Science Foundation for research titled "Storage Based Supercomputing for Scientific Applications."

**Chenyang Lu**, assistant professor, has received a five-year, \$400,000 National Science Foundation CAREER Award for research titled "Adaptive Quality of Service Control in Distributed Real-Time Embedded Systems."

**Lihao Xu**, assistant professor, has received a three-year, \$300,000 grant from the National Science Foundation for research titled "Design and Implementation of Hydra: A Platform for Survivable and Secure Storage Systems."

### Electrical & Systems Engineering

**Barry E. Spielman**, professor, has organized two special sessions for the IEEE Microwave Symposium, to be held in June in Long Beach, CA. One session is on distributed RF sensors/communications systems and the other is on left-handed materials. The left-handed materials research that Spielman and his

students perform creates new effects such as left-handed wave propagation (instead of the traditional right-handed wave propagation); negative permittivity and negative-permeability-like behavior; and negative refractive index effects.

### Mechanical & Aerospace Engineering

**Stefan R. Falke**, research assistant professor in the Environmental Engineering Science Program, and **Rudolf B. Husar**, professor, have received a five-year, \$1.5 million grant from the National Aeronautics and Space Administration for research titled "Application of ESE Data and Tools to Particulate Air Quality Management."

**Guy M. Genin**, assistant professor, and School of Medicine colleagues Dr. Eric Leuthardt and Dr. Dennis Rivet, have received \$30,000 from Washington University's Bear Cub fund for the construction of a head restraint device.

**Mark J. Jakiela**, the Lee Hunter Professor of Mechanical Design, has received a \$25,000 grant from the law school's new Center for

Research on Innovation and Entrepreneurship for a study titled "Users as Product Developers: A Model for Communal Innovation and Entrepreneurship." Jakiela's project will examine how to facilitate end-user disclosure of ideas for improvement of products or production of after-market products. The new center is being funded by a gift from the Ewing Marion Kauffman Foundation.

**Michael A. Swartwout**, assistant professor, has received a \$110,000 grant from the Air Force Office of Scientific Research to continue research on small satellites and a slot in the next "nanosat" competition in 2007 (see photo on page 10).

### AIChE multiphase reaction sessions named for ChE chair

Milorad P. Dudukovic, chair of the Department of Chemical Engineering and the Laura and William Jens Professor of Environmental Engineering, received an unexpected 60th birthday present in November.

Three sessions at the American Institute of Chemical Engineering (AIChE) annual meeting in Austin, TX, were named in his honor.

"Multiphase Reaction Engineering: In Honor of Mike Dudukovic I, II, and III" paid tribute to Dudukovic's contributions to the discipline.

According to Joseph Cramer, AIChE director of technical programming, "The naming of sessions in honor of outstanding chemical engineers happens from time to time." Cramer said the organization's rules limit named sessions to 10 per annual meeting and that it has been only recently that living people were allowed to have sessions named after them.

### Yablonsky mentee wins best paper award

Elizabeth Maroon, a high school junior who attends Mary Institute and Saint Louis Country Day School, was the winner of the best engineering paper award in the 2004 Pfizer-Solutia Students and Teachers as Research Scientists (STARS) Program.

The annual summer program pairs academically talented high school juniors and seniors with research mentors from three St. Louis area universities: Washing-

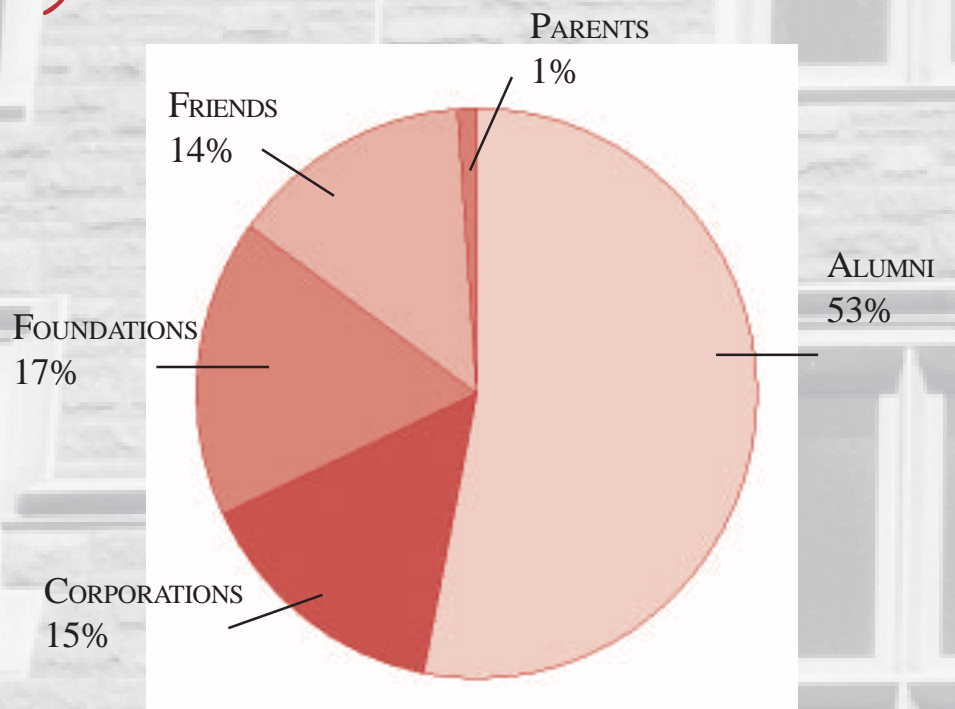
ton University, Saint Louis University and the University of Missouri–St. Louis.

Gregory Yablonsky, research professor of chemical engineering, was Elizabeth's mentor. Her winning paper was titled "A Bell Curve in Heterogeneous Catalysis: Is It Valid or Not?"

The award is the second time in the STARS Program's 15-year history that a Yablonsky mentee has won a best paper award.

*thank you, thank you!*

The School of Engineering & Applied Science offers a sincere thank you to all who participated in the recently concluded *Campaign for Washington University*. The engineering school's *Campaign* total came to \$133 million.



CAMPAIGN GIVING DISTRIBUTION

Words seem inadequate to express the gratitude that I and others in the School of Engineering & Applied Science feel to our *Campaign* donors. Nevertheless, we must try.

Thank you very much from the bottom of our hearts.

The engineering school raised \$133 million for the *Campaign*, a considerable part of the overall Washington University total of \$1.55 billion.

Thousands made the decision to invest in engineering education during the *Campaign*. The nine years of the fundraising effort saw a total of 38,411 donations to the engineering school, with an annual average of 4,268 donations.

The School received 22 new endowed professorships in the *Campaign* years, reflecting a current market value of \$37.7 million.

Many donors chose to help deserving students receive a quality engineering

education by financing scholarships. The School of Engineering received 107 endowed and 286 annual scholarships during the *Campaign*, for a total of almost \$21 million.

The Annual Fund realized donations of \$13.2 million during the *Campaign* period. The unrestricted support offered through the Annual Fund allows the engineering school to maximize its day-to-day advancement and to address unanticipated opportunities.

Engineering school investments made possible by Campaign contributions include:

- 48 new faculty hires
- \$24 million in start-up funds for technology transfer
- \$8 million for the renovation of labs and the educational infrastructure
- \$42 million for the construction of Uncas A. Whitaker Hall for Biomedical Engineering.

The engineering school's William

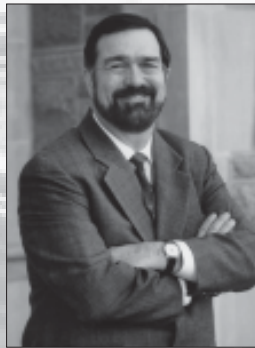
Greenleaf Eliot Society saw an 85 percent increase in membership in the *Campaign* period; membership in the Century Club grew by 26 percent. Membership in these groups provides generous, flexible support to the School.

As the above chart shows, the School of Engineering's Campaign donors are recognized under various categories: alumni, friends, parents, foundations and corporations.

The generosity of donors to the Campaign for Washington University, however, defies categorization. The engineering school's donors are alike in their desire to advance the School's mission "to serve society as a center for learning in engineering, science and technology..." and "to provide an environment that nurtures critical thinking and the education of innovators and leaders for the future."

Again, I offer my thanks, and please let me add my sincere wishes to you and your loved ones for a future that's radiant.

—Dean Christopher I. Byrnes



Dean Byrnes

## ENHANCING LEARNING, TEACHING & RESEARCH

Donors gave generously to the *Campaign*, thus furthering the School's academic mission

868

new Eliot Society members

\$13.2M

donated to the Annual Fund

107

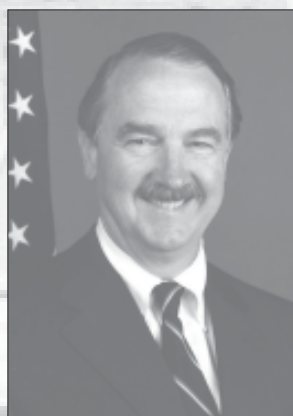
new endowed scholarships

*THE SCHOOL OF ENGINEERING & APPLIED SCIENCE EXPRESSES ITS  
SINCERE THANKS TO NATIONAL COUNCIL MEMBERS FOR THEIR  
GUIDANCE AND LEADERSHIP BEFORE, DURING AND AFTER  
THE CAMPAIGN FOR WASHINGTON UNIVERSITY.*

**NATIONAL COUNCIL CHAIRS**



*George Pake  
Xerox Institute for  
Research on Learning  
1987-1993*



*Stephen Brauer  
Hunter Engineering  
1994-1998  
2005-*



*William Tao  
William Tao &  
Associates  
1998-2001*

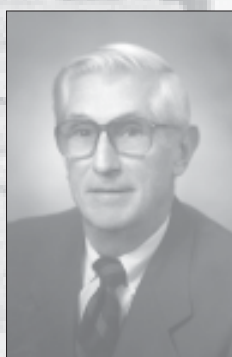


*William Patient  
Polyone Corporation  
2001-2004*

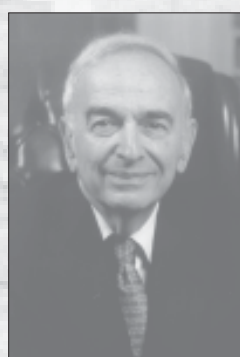
**NATIONAL COUNCIL MEMBERS**



*Allen Atkins  
The Boeing  
Company*



*Jack Bodine  
Bodine Aluminum  
-retired*



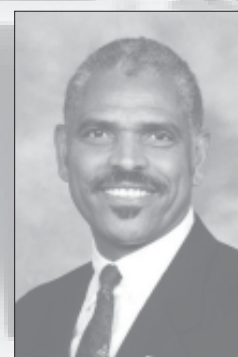
*Jerome Brasch  
Brasch  
Manufacturing Co.*



*Charles Buescher  
Senior Professor*



*Carl Deutsch  
Standard Machine  
and Manufacturing  
Co.*



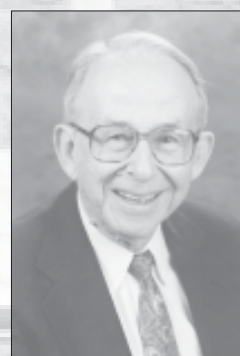
*Arnold Donald  
Merisant Company*



*Harold Faught  
Emerson Electric -  
retired*



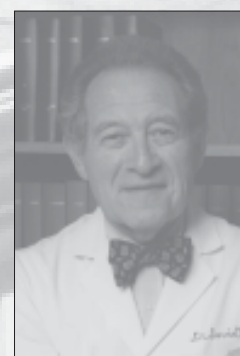
*Norman Foster  
-retired*



*Rudolph Freedman  
SEMCOR -retired*



*Dennis Kessler  
Kessler  
Management  
Consultants*



*David Kipnis  
WU School of  
Medicine*



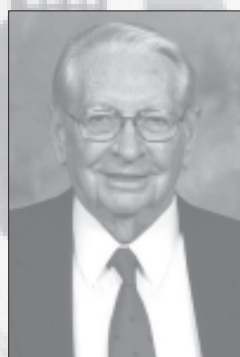
*Harold Law  
Chinese American  
Forum*



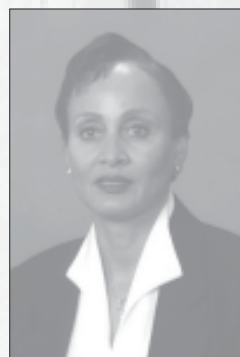
*Charles Lebens  
Lebens Associates  
Inc.*



*Ellen Lee  
Lee Inc.*



*Joseph Moyer  
Charles S. Lewis &  
Co. -retired*



*Brenda Newberry  
The Newberry  
Group*



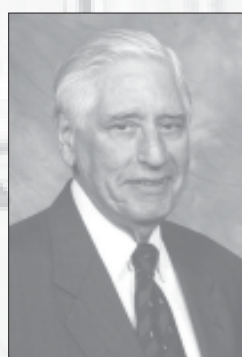
*Rick Oertli  
Guarantee  
Electrical*



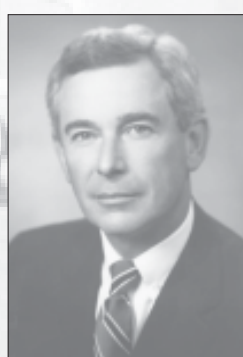
*Stanley Proctor  
Proctor Consulting  
Services*



*Richard Roloff  
Washington  
University*



*Donald Ross  
Ross & Baruzzini*



*Henry Schwartz  
Senior Professor*



*Greg Sullivan  
Entrepreneur and  
civic volunteer*



*Susan Welsh  
Shering-Plough  
Research Institute*

## MTBE, from page 1

Biswas presented his research at the American Chemical Society's annual meeting, held last August in Philadelphia.

One of the researcher's innovations was developing a special micro-lamp (corona) that emits a glow after a current is run through it. But that's not all: This system also can be tailored to produce ozone, which speeds up the oxidation of MTBE to carbon dioxide.

Biswas felt it was important to find a way to remove this pollutant because "(it) is a toxin and has been implicated as a carcinogen," he said.

Even more immediately obvious, the chemical's presence in water produces an offensive taste and a slight odor.

MTBE has been used in American fuels since 1979—even more so in recent years in California—as an alternative to octane-enhancing lead additives because it helps fuel to be completely combusted. Thus, MTBE

decreases the environmentally harmful byproducts of incomplete burning without containing the toxic element lead.

The one drawback is that MTBE can be harmful to human health, too, through exposure via groundwater sources.

"One doesn't know why, but underground gas tanks consistently leak, and this problem should really be taken care of," said Biswas.

Unfortunately, when gasoline leaks out, the MTBE is very soluble in water, and even localized leaks can allow MTBE to spread widely in a relatively short amount of time.

Biswas set out to design a compact unit for MTBE removal—and he succeeded. The original device was only 18 by six inches and held three to four gallons of water. The reactor removed all of the MTBE within a couple hours. Companies such as Salt Lake City-based Ceramtec have collaborated with him on scaling up the purifying unit, a process that he anticipates to be

rather straightforward.

Biswas is optimistic that his technology can be used to remove MTBE from water.

MTBE levels in gasoline started to increase after the Clean Air Act of 1990, which mandated lower levels of harmful emissions in car exhaust. MTBE seemed like the perfect alternative, and it wasn't until high levels were detected in a Santa Monica well in California in 1996 that people began to take notice of the pollutant.


The U.S. Environmental Protection Agency (EPA) has said that levels of the pollutant below 20 to 40 parts per billion (ppb) are considered nontoxic, but water with considerably lower levels of the toxin can be foul tasting.

Biswas discovered that titanium dioxide catalyzes the oxidation of MTBE, as a follow-up on his work related to removing pollutants like mercury from coal combustion exhausts. He said that titanium dioxide is proving to be an exciting

compound because it also oxidizes dirt and scum, and is already the active constituent in products like self-cleaning bathroom tiles. He calls it a "wonder chemical" with a variety of applications in environmental technologies.

Nanoparticles are also an active area of research, and Biswas is excited to be working in this field. These particles have many potentially beneficial applications, for example, drug delivery via aerosol spray, and production of novel materials — work that is being conducted through the auspices of the Washington University Center for Materials Innovation.

There is some concern about the health risks of these nanoparticles.

"One needs to address the problem at the beginning, rather than discover the problems years later," said Biswas. "Our take is that (nanoparticles) could be made safe. They can be engineered to be safe. But it is important to be careful from the start, and we are doing so." 

## Geographic information systems software is symposium focus

Lopata Hall was the venue for a Nov. 19 symposium titled "You Can Get There From Here: Mapping the Future of Geospatial Information Science at Washington University."

The objective of the symposium was to raise awareness of geographic information systems (GIS) and technology on campus and to help attendees understand how GIS software might help them with teaching and research activities.

The University recently acquired a campus-wide license for GIS software, ArcGIS, from the California-based ESRI company. The School of Engineering & Applied Science, Arts & Sciences and the University Libraries collaborated to obtain the software and are developing a model for use of GIS.

GIS software allows processing, analyzing and visualizing spatial data. ArcGIS allows data to be displayed graphically as layers applied to familiar tools such as maps and globes; it includes tools to examine

spatial relationships among data.

For example, ArcGIS can be used to track such critical information as storm surge patterns or to display up-to-the-minute election results while analyzing their demographic distributions.

Stefan R. Falke, research assistant professor in the Environmental Engineering Science Program and Center for Air Pollution Impact, Trends and Analysis (CAPITA), is a member of the campus-wide GIS advisory committee and helped plan the GIS symposium, attended by over 100 students, faculty and staff.

According to Falke, "While GIS has been around for well over 30 years, more recent advances in information science and technology have made it more practical, allowing researchers who are not necessarily GIS gurus to apply it in their work."

For more information about GIS and ArcGIS, go online to <http://www.gis.wustl.edu>.



Stefan Falke, center, research assistant professor in the Environmental Engineering Science Program, discusses a poster with electrical engineering junior Mrunal Parikh and the poster's author, chemical engineering junior Erin Robinson, at a Nov. 19 symposium titled "You Can Get There From Here: Mapping the Future of Geospatial Information Science at Washington University." Falke was an organizer of the symposium, which focused on geographic information system (GIS) software. GIS software helps users to manage, analyze and display geographic information. Organizers said the meeting's objective was to raise awareness of geospatial information science and technology on campus and to begin coordinating geospatial activities among various disciplines. Events were held in Lopata Hall.

## CENTER, from page 1

personnel, relocated from Case Western Reserve University last fall to establish the CBAC.

The new center is emphasizing and facilitating interdisciplinary approaches to the study of cardiac arrhythmias and the development of new strategies for diagnosis and therapy. In addition to BME faculty, Washington University faculty members from the departments of Electrical and Systems Engineering, Mechanical and Aerospace Engineering, Cell Biology and Physiology, Pathology, Molecular Biology and Pharmacology, Medicine, Surgery, Pediatrics and Radiology are performing CBAC-related research.

"The complexity of arrhythmia mechanisms requires such a multidisciplinary approach and is within the spirit of the BioMed 21

initiative," Rudy commented.

BioMed 21 is a Washington University initiative to catalyze and support emerging forms of bioresearch and convert knowledge of the genetic blueprint into effective, individualized treatments.

Rudy said the center's research spans the entire spectrum from the molecular basis of cardiac excitation and arrhythmias to clinical diagnosis and treatment.

The CBAC director added that the Department of Biomedical Engineering is a perfect "home" for the new center.


"Because the CBAC is anchored in biomedical engineering," Rudy said, "the research will emphasize quantitative approaches in the description of arrhythmia mechanisms and the development of new technologies for diagnosis and treatment."

To help center members maintain

a sense of their common mission, the CBAC is hosting a seminar series for its members from both campuses and plans to have research retreats. Members located on the Hilltop campus also regularly attend cardiovascular seminars at the School of Medicine.

The educational events are part of Rudy's plan to foster strong interactions and collaborations between scientists on the Hilltop campus and scientists and clinicians in the medical school.

Rudy calls the efforts "building a bridge across Forest Park," in reference to the large urban park that separates the University's Hilltop campus from the School of Medicine campus.


The CBAC Web site <http://cbac.wustl.edu> will be ready soon. In the meantime, see <http://rudylab.wustl.edu>. 

## ICSE, from page 5

educate the public and make business more receptive to early software adoption."

The ICSE program includes 44 research papers selected from among 313 submissions; 14 experience reports selected from among 72 submissions; 22 position talks on education and training; eight formal and eight informal research demonstrations; 12 invited talks; 19 workshops; and 16 tutorials.

The three conference days will be devoted to three major themes (state of the art, extending the discipline and state of the practice) that will be reflected in the keynote and invited talks being presented that day.

ICSE 2005 also will offer social events, highlighted by an opening reception at a modern engineering feat, the Gateway Arch. 



## October CREL meeting draws University and industry participants

The 29th annual meeting of the Chemical Reaction Engineering Laboratory (CREL) drew about 100 persons to the University's Charles F. Knight Center on Oct. 28.

Washington University participants comprised about a third of the attendees; the rest were from various corporations and national laboratories. In addition to U.S. participants, attendees came from France, England, Italy, Norway, South Africa, India and China; 17 of CREL's industrial sponsors were represented.

CREL's director is Milorad P. Dudukovic, chair of the Department of Chemical Engineering and the Laura and William Jens Professor of Environmental Engineering; its associate director is Muthanna Al-Dahhan, associate professor of chemical engineering.

According to Dudukovic, "CREL's overall mission is the development of a rational basis for scale-up of multiphase, reactive systems. Experimental techniques unique to CREL, for quantification of flow and mixing in such opaque multiphase systems, are essential for model validation and of great interest to numerous sponsors."



*Bia Henriques, senior in chemical engineering, discusses her research with Robyn Bartosch of Monsanto EnviroChem, a subsidiary of Monsanto Co., at a poster session during the 29th annual meeting of the Chemical Reaction Engineering Laboratory.*

## In Memoriam

### Gene K. Beare

Gene Kerwin Beare died Feb. 15, 2005, at his home in St. Louis of complications from an infection. He was 89.

Beare provided funds for the Gene K. Beare Professorship in Biomedical Engineering. BME's Whitaker Hall bears the Gene Kerwin Beare family name in four areas. Beare received an Alumni Achievement Award in 1981 and the Dean's Award in 2001.

Beare received a Bachelor of Science in mechanical engineering from Washington University in 1937 and a master's degree from the Harvard Graduate School of Business Administration in 1939. He served in the Navy during World War II.

In a career that spanned more than 50 years as a business executive, Beare led and directed a score of companies.

At Automatic Electric Company, Beare progressed quickly through a succession of executive positions at affiliated and parent companies, including presidencies of Automatic Electric, its sister company Sylvania Electric Products and its parent, General Telephone and Electronics. In all, he was president of six companies. His career culminated in General Dynamics' invitation to become executive vice president, a post he held for five years.

In retirement, Beare was active in countless community activities as a corporate director and trustee of various companies.

He is survived by his wife, Lena; two daughters; a stepdaughter; a



*Gene K. Beare*

stepson; and a stepgranddaughter.

Memorials may be made to the School of Engineering, One Brookings Dr., Campus Box 1163, St. Louis, MO 63130; St. Peter's Episcopal Church, 110 N. Warson Rd., St. Louis, MO 63124; or Harvard Graduate School of Business, Soldiers Field, Boston, MA 02163.

### Andrew L. Hargrove

Andrew L. Hargrove, a longtime engineering school staff member, died on Jan. 3, 2005, of a heart attack. He was 62 and lived in University City, MO.

A Louisiana native, Hargrove retired from Washington University in May 2004. He had worked 36 years as an engineering school technician.

Hargrove spent most of his career working for the Department of Chemical Engineering and the Department of Mechanical and Aerospace Engineering. He spent the two years prior to his retirement working in the engineering school's machine shop.

Hargrove helped faculty as well as students with instrumentation for

research projects. He provided many other services to the engineering school, including driving a van for student field trips.

He is survived by two daughters, a son and three grandsons, who all live in the St. Louis area, and a sister, who lives in his hometown of Bastrop, LA.

### H. Boulter Kelsey, Jr.

H. Boulter Kelsey, Jr., former assistant dean of engineering and former adjunct professor of mechanical engineering, died Aug. 24, 2004, at his residence in University City, MO. He was 63.

A native of St. Louis, Kelsey studied mechanical engineering at Washington University, receiving a Bachelor of Science degree in 1966 and a Master of Science degree in 1968.

From 1973 until 1980, Kelsey was assistant dean for engineering admissions. He also served as an adjunct professor of mechanical engineering until 1994.

In 1981, Kelsey helped form the forensic engineering firm of Senne, Kelsey & Associates. He served as president and senior engineer of the firm until his death.

Kelsey became nationally recognized in his field. He was a board-certified diplomate in forensic engineering by the National Acad-

emy of Forensic Engineers, where he also served as senior vice president. He appeared through the years as a qualified expert witness in mechanical engineering for both plaintiffs and defendants in court trials.

He is survived by two daughters, his partner, a brother, a sister and a grandchild.

Memorial contributions may be made to Christ Church Cathedral, 1210 Locust St., St. Louis, MO 63103; or Shaare Emeth's Michael Matlof Homebound Fund, 11645 Ladue Road, St. Louis, MO 63141.

### Walter R. Knox

Walter R. Knox, an affiliate professor of chemical engineering since 2000, died of brain cancer Dec. 7, 2004, in St. Louis. He was 78.

Knox is credited with helping Johnson & Johnson develop Splenda, a non-calorie sweetener. Prior to working at Johnson & Johnson, Knox spent 33 years at Monsanto. He took early retirement from Monsanto in 1985.

Knox held more than 150 patents and was active in the Department of Chemical Engineering's Chemical Reaction Engineering Laboratory.

He is survived by his wife, two daughters, a son, four stepsons, four grandchildren, five step-grandchildren and two step-great-grandchildren.

### *The University received these alumni death notices through February 15, 2005.*

Harold W. Wiese, EN30, 1/25/05  
Reuben E. Lapin, EN35, 11/22/04  
Gene K. Beare, EN37, 2/15/05  
Theodorick M. Knobel, EN37, 11/26/04  
Louis E. Sauer, EN37, 10/30/04  
John A. Logan, EN40, 11/29/04  
Markley S. Binzel, EN41, SI53, 12/28/04

Henry F. Niedringhaus III, EN44, 12/31/04  
Ivan Chorlins, EN47, 12/6/04  
Gilbert C. Pauls, EN47, 9/10/04  
Ralph E. Bishop, Jr., EN49, 10/27/04  
Harold L. Turnbough, EN49, 11/20/04  
Leonard H. Elliott, EN53, 12/16/04  
George R. Vogel, EN57, 11/6/04

Donald Baganoff, EN60, 12/17/04  
Gene J. Carron, SI60, SI63, 1/14/05  
John B. Hallquist III, EN60, 10/29/04  
Tomás F. Milch-Hallin, EN66, 11/8/04  
John C. Thompson, TI70, 10/27/04  
Richard Harry Hefter, Jr., SI77, 10/21/04  
Paul Jude McBryan, SI79, 11/7/04  
Lee M. Kary, EN83, 10/10/04

# Student News

## EnWeek: Entertaining and Enlightening

Engineering students took time out from their studies to celebrate 2005 Engineers' Week, held the last week of February.

Among the week's events were a doughnut giveaway, an academic bowl, speaking events and an egg drop competition.

Several evening events, including a Super Smash Brothers tournament, a Simpsons marathon and "s'mores on the swamp,"



*A flock of plastic flamingos, including these two perched on the engineering school directory, announced the start of EnWeek.*

gave students a break from classwork.

The week culminated in an "Enformal," held Saturday, Feb. 26, in Holmes Lounge.



*Left photo, Rachel Lee helps herself to a doughnut, courtesy of fellow engineering freshman Justin Char. Right photo, engineering freshman Lara Bennett gets set for EnWeek's duct tape competition. A&S freshman Ryan Hacala, left, helped do the taping.*

## Of note

Biomedical engineering senior **John Woock**, of Louisville, KY, has been named to the 2004 First-Team Academic All-America College Division Football Team, as selected for *ESPN The Magazine* (the sports network's e-zine) by the College Sports Information Directors of America. A team captain as a senior, the defensive back led the Bears' defensive unit with 85 tackles, 15 pass breakups and five interceptions. Woock, who has a 4.0 grade point average, was one of 15 football players chosen to college football's 2004 National Scholar Athlete Class by the National Football Foundation. He will receive an \$18,000 post-graduate scholarship.

**Rahul Magan**, doctoral candidate in chemical engineering, received the outstanding poster award at the 228th American Chemical Society Colloids and Surface Chemistry Division National Meeting (August '04, Philadelphia) and the third-best

poster prize at the 2004 American Institute of Chemical Engineers Nanoscale Science and Engineering Forum (November '04, Austin, TX). The awards were for his poster "Morphology of Nanostructured Interfaces Synthesized by Electrodeposition," coauthored with Radhakrishna Sureshkumar, associate professor of chemical engineering.

**Hasan Nuzhet Atay**, graduate student in computer science and engineering, won third place in the 42nd-annual Design Automation Conference (DAC) /International Solid-State Circuits Conference Student Design Contest in the conceptual category. Atay's entry was titled "Collision Detection System Using an FPGA Implemented on the FPX Platform." He will receive his award at the June DAC in Anaheim, CA. Atay's faculty advisors on the project were Burchan Bayazit and John Lockwood, assistant professors.



*Seniors Brandon Wiese, left, and Brian McDaniels install propulsion tubing into the prototype of the University's 2-kilogram Bandit inspector spacecraft. The students were helping with preparations for a January NASA/Air Force student design contest for small satellites. The Washington University team received second place in the competition. The Air Force Office of Scientific Research recently awarded Bandit project participants a slot in the Nanosat-4 as well as a \$110,000 research grant.*

## In engineering design classes, hands-on learning is key

The end of the semester meant hands-on tests of learning for students in engineering design classes.

Freshman students in ME 141D, Introduction to Engineering Design Project, for example, tested their knowledge of mechanical engineering concepts at semester's end by designing and building a ball-tossing machine from a kit of parts. The students then played a game of par-3 golf with a tee area and several "greens."

A senior design project fair gave students in ME 404P, Mechanical Engineering Design Project, an opportunity to discuss and display research projects that synthesized four years of engineering education.

Senior design projects, also known as capstone experiences, are a critical part of every undergraduate degree program in the

School of Engineering & Applied Science. The projects bring together a variety of abilities, such as applying knowledge of mathematics, science and engineering; designing and conducting experiments; designing a system or process to meet desired needs; working on a team; and using modern engineering techniques, skills and tools. **EZ**



*Left photo, freshman Brittney Taylor watches as a ping-pong ball, tossed from a machine she built from a kit of parts, lands on a green. Right photo, seniors Andrew Bugg, left, and Asa Young explain their senior design project, the "Smart Wet Wipes Box," which automatically warms baby wipes. The students were participating in end-of-the-semester projects in their design classes.*

# Class Notes

## 1930s

**Francis B. Klein, EN35**, writes that he is “still around” and physically active, with several construction projects around his home in progress. He wishes his engineering school classmates good health and invites them to send their news to 4056 Schuykill Dr., Calabasas, CA 91302.

**John D. Rosebrough, EN37**, writes that he is now living at the Gatesworth and that he is as well as can be expected as he approaches his 90th year. John invites friends’ news: 1 McKnight Pl., Apt. 372, St. Louis, MO 63124-1972.

## 1940s

**William O. McConnell, EN40**, writes, “As an 86-year-old engineering graduate, I have accumulated four children (three girls and one boy—all local), eight grandchildren and three great-grandchildren (last three in Vermont).” William adds that he is very active and that he and his wife just celebrated their 62nd wedding anniversary. Contact him at 431 California Ave., Webster Groves, MO 63119.

**Robert (Bob) Hemm, EN42, SI53**, is retired from the U.S. Air Force as a colonel and from the National Academy of Science staff. He occasionally is a substitute teacher at Thomas Jefferson High School of Science and Engineering and is very active in Lions International.

**Donald F. Essen, EN43**, suggests to fellow alums that they visit Whitaker Hall, new home of the Department of Biomedical Engineering. He also wants to spread the word that Bruce Schwartz, BU43, a friend of many engineering ROTC students, will be 85 on July 15, 2005. Contact Don at 525 Kehrs Mill Rd., Ballwin, MO 63011 or [dfessen@sbcglobal.net](mailto:dfessen@sbcglobal.net).

**Leland (Lee) Wallace, EN43**, recently received nine medals and ribbons, including a Bronze Star and Purple Star, for his role in World War II’s Battle of the Bulge. Lee spent 10 weeks fighting in Germany’s “last stand.” He received belated recognition through the efforts of outgoing Illinois Sen. Peter Fitzgerald.

**Stephen M. Hoyt, EN49**, has been retired from Ameren for 10 years after a “fabulous” career. Contact him

at [steve537@nothnbut.net](mailto:steve537@nothnbut.net). **William R. Stebbins, Jr., EN49**, is retired but keeps active by participating in his church choir and a symphonic chorale and by serving as a docent at the restored Fort Concho. The fort is owned and operated by the City of San Angelo, TX. Send correspondence to 6241 Indian Path, San Angelo, TX 76901.

## 1950s

**Dr. Eric E. Ungar, EN51**, received a Lifetime Achievement Award at the 75th-annual Shock and Vibration Symposium, held in October in Virginia Beach, VA. He also recently was named the Distinguished Noise Control Engineer by the Institute of Noise Control Engineering. Eric is a life fellow of the American Society of Mechanical Engineers and a fellow of the Acoustical Society of America, serving as that society’s president in 1992–93 and honored with its Trent-Crede silver medal. He held several technical and management positions at Bolt Beranek and Newman in Cambridge, MA, from 1956 until he retired in 1996. Since then he has been chief engineering scientist at Acentech Incorporated, Cambridge. Send Eric your news at [eungar@acentech.com](mailto:eungar@acentech.com) or 15 Considine Road, Newton, MA, 02459.

**Frank S. Thomas III, EN52**, writes, “I’m semi-retired but still practicing financial planning, following early retirement from McDonnell-Douglas 20 years ago.” Contact Frank at 573 Amber Jack Dr., Ballwin, MO 63021 or [franktren@sbcglobal.net](mailto:franktren@sbcglobal.net).

## 1960s

Annette Steinberg Milch, widow of **Tomás Milch, EN66**, who died Nov. 8, invites Tomás’s classmates to contact her with their memories about her husband: [tmilchh@aol.com](mailto:tmilchh@aol.com).

**Dale H. Hagen, SI66**, writes, “I retired several years ago and I am living on my farm near Brussels, IL (Calhoun County, 40 miles northwest of St. Louis ‘between the rivers’). I had a tremendous career starting in engineering and ending up as vice president, engineering, with stops in marketing and operations as a project

engineer, product line manager and plant manager. I was associated with great firms like Magnavox, Mallinckrodt, McDonnell Aircraft and International Telephone and Telegraph. I worked with great people and traveled the world after receiving great educations at the University of Illinois (BSME) and Washington University (MS).” Dale invites correspondence: HC82, Box 90, Brussels, IL 62013.

**Jack Stein, EN67, SI69**, has been elected a diplomate of the American Academy of Environmental Engineers.

## 1970s

**Neil B. Marks, EN71**, sends news that his one-act play, *Cassandra’s Journey*, was performed at the Fitton Center for the Creative Arts, Hamilton, OH, April 16–18, 2004. E-mail: [marksnb@muohio.edu](mailto:marksnb@muohio.edu).

## 1980s

**Kenneth V. Harris, EN82**, is now a senior project manager for Perdue Farms Inc. and is living in Salisbury, MD. According to Ken, “Living on the Eastern shore is great.” Contact him at 30935 Cariocia Road, Delmar, MD 21875, or [KenKVH@aol.com](mailto:KenKVH@aol.com). **Massoud Amin, SI86, SI90**, merited the cover story in a recent issue of *Minnesota*, the alumni magazine of the University of Minnesota. Amin’s research to improve the reliability and security of North America’s power grid was featured. Massoud is the director of the University of Minnesota’s Center for the Development of Technological Leadership and holds the H. W. Sweatt Chair in Technological Leadership. Find the article at [http://www.alumni.umn.edu/January-February\\_2005.html](http://www.alumni.umn.edu/January-February_2005.html). **Norman Umberger, EN88**, recently served on the National Council of Examiners for Engineering and Surveying committee that scored the new environmental engineering P.E. exam. Norm also has joined Spartech, a Clayton, MO-based plastics processor, as regional environmental, health and safety manager based at Spartech’s facility in Salisbury, MD. E-mail: [numberger@juno.com](mailto:numberger@juno.com).

## 1990s

**Steven Baynham, SI94**, would like to hear from engineering school friends. Contact him at [Baynham@Kirkwoodfurniture.com](mailto:Baynham@Kirkwoodfurniture.com) or 46 Longfellow, Kirkwood, MO 63123.

**Anna Lindeberg, EN94**, and her husband, Eric, announce the birth of twins, Jessica and Melanie, born Sept. 2. They join big brother Luke (4). Anna works for Pfizer in Chesterfield, MO, and would like to hear from classmates: [alesstenar@aol.com](mailto:alesstenar@aol.com).

**Danielle Forget Shield, P.E., EN94**, was named a 2004 Houston Woman of Excellence; she also recently was named director of engineering and environmental compliance for WCA Waste Corporation. Contact Danielle at [dforget@wcamerica.com](mailto:dforget@wcamerica.com).

**Karin (Boyse) Imhoff, EN97**, writes, “We are blessed to announce the birth of our first child, Nathaniel Bryan Imhoff. He was born on November 30, 2004, at 6:27 a.m. His father, Bryan, and I are so grateful for our beautiful, healthy new addition.” **Will Eatherton, SI99**, has been named a Distinguished Engineer by Cisco Systems, Inc. Widely recognized as a technical expert in IP forwarding, classification and memory technology, Will joined Cisco in 2000 with the company’s acquisition of Growth Networks. He was one of the founding engineers of the SEAS startup company, which designed and developed semiconductor devices for routing and switching infrastructures.

## 2000s

**Brian J. Berman, J.D., EN01**, wants to inform engineering classmates of his new address: 7707 Wisconsin Ave., #1005, Bethesda, MD, 20814. **Kelly J. King-Ellison, EN00, LA00**, is excited to announce her engagement to Christopher J. Brown. Kelly is an engineer for the cardiac rhythm management division of Guidant Corporation and is pursuing her MBA part time at the University of St. Thomas. Chris is director of business risk management at UnitedHealthcare. Their wedding is planned for fall 2005. E-mail: [kelly\\_kingellison@yahoo.com](mailto:kelly_kingellison@yahoo.com).

## DONORS, from page 3

cal contractors. Even through the Depression, Sachs Electric never had a losing year, although according to Sachs, they “broke even” in 1934. The company performed electrical contracting for such St. Louis institutions as the Gateway Arch, Busch Memorial Stadium, Clarion Hotel, Marriott Pavilion Hotel, St. Louis Children’s Hospital and major buildings in the Barnes-Jewish Hospital complex. In addition, his company provided electrical contracting for the Chrysler and General Motor plants, the Union Station redevelopment and several power plants in the area. Sachs was an active member

of numerous professional, local and University societies.

## EDWIN H. MURTY

Ed Murty (1913–2002) was curious, creative and fascinated by engineering. He loved to tinker and figure out how things worked, why they worked and how they could work better. Experiencing new developments—like riding in a battery-powered automobile provided by the School of Engineering & Applied Science’s Department of Mechanical and Aerospace Engineering—excited him. In 1990, Murty was thrilled to have the Murty Electronic Imaging Laboratory in the Department of Electrical Engineering (now the Department of Electrical and

Systems Engineering) named in his honor because of his contributions.

Born in Ferguson, MO, on June 30, 1913, Murty graduated from high school in 1932 and attended Washington University briefly in 1942. In 1966, he married Margaret Katherine Club in Herman, MO. They had no children. After Margaret’s death in 1986, Murty endowed a scholarship in engineering in their names.

Murty’s career included a variety of positions with companies such as Radio Research Co. in Washington, D.C., Bendix Radio, Continental Radio and Curtis Wright in St. Louis. For a time, Murty also worked for the Federal Communications Commission in Portland, OR, and during World

War II, he was a radio engineer at the Puget Sound Navy Yard in Bremerton, WA, where he tuned radar equipment on Navy ships. Even in his later years, Murty would enjoy recalling the precision that was used, in less than perfect conditions, for tuning the equipment. After the war, Murty became a sales engineer and representative for Sprague Electric Company. He was later a representative for Continental Carbon Inc., Lavole Labs and Kay Sales Co.

Murty retired in the 1970s to manage his investments. A long-term investor, he observed, “I never thought I’d make more from my investments than from selling electronics equipment.” E7

## SEAS Calendar

- **April 6** Alumni Achievement Awards dinner and awards ceremony, Fox Theatre, St. Louis. Call Charla Bruce, (314) 935-4894 for details.
- **May 20** Commencement.
- **May 20 and 21** Reunion Weekend. May 20, Dean's Reception, 5–6:45 p.m., Whitaker Atrium; May 21, Connection Series Speaker Event, Dan Moran, assistant professor of biomedical engineering, "Brain Computer Interfaces: Reading Movement Intentions from our Brain," 9:15 a.m. continental breakfast, 9:45 a.m. program, Whitaker Hall. Call Midge Bailey, (314) 935-5419 for details.
- **June 11** Connection Series Family Event, Lewis and Clark Museum, Hartford, IL. Watch for more information about this opportunity for a family outing featuring a picnic and children's activities.

## Engineering School Directory

All numbers are area code 314.

### Academic Departments and Programs

Biomedical Engineering .....	935-6164
Chemical Engineering .....	935-6082
Civil Engineering .....	935-6350
Computer Science and Engineering .....	935-6160
Electrical and Systems Engineering .....	935-5565
Environmental Engineering Science .....	935-5548
Mechanical and Aerospace Engineering .....	935-6047
Professional Degree Programs .....	935-5484

### Administrative Departments

Dean's Office .....	935-6166
Alumni and Development .....	935-5419
Business Office .....	935-6111
Career Services .....	935-6130
Cooperative Education .....	935-4354
Dual Degree .....	935-6130
Engineering Communications .....	935-4856
Graduate Recruiting .....	935-7974
Registrar .....	935-6100
Research Office .....	935-5997
Technical Writing Center .....	935-5494
Undergraduate Admissions .....	935-6130

## ENGINEERING News

### Associate Dean for Engineering Communications

Rose Brower  
**Assistant Dean  
for Engineering  
Communications**  
Barbara Carrow

### Contributing writers

Tony Fitzpatrick  
Doug Main  
**Contributing  
photographers**  
Thomas Bever  
David Kilper

### Alumni address changes:

Development Services  
Washington University  
7425 Forsyth, Campus Box 1082  
St. Louis, MO 63105-2103

addresschange@aismail.wustledu

### Non-alumni address changes and Class Notes information:

Engineering News  
Washington University  
Campus Box 1165  
One Brookings Drive  
St. Louis, MO 63130-4899

bcarrow@seas.wustledu  
Telephone: (314) 935-4856  
Fax: (314) 935-4434

SEAS Web site: [www.seas.wustledu](http://www.seas.wustledu)

# Dean's List for Fall 2004

To qualify for the Dean's List, undergraduates must attain a grade point average of at least 3.6 on a 4.0 scale.

## CLASS OF 2008

Nikhil Aggarwal  
John Harvey Baird  
Matthew Scott Bensley  
Francis Xavier Bergh  
Jordan Andrew Bletscher  
Brian Philip Blosser  
Charles William Bond  
Kathleen Margaret Booth  
Christopher Benjamin Bunn  
Andrew Frank Burkett  
Robert Nicholas Carlson  
Joshua Kai Chan  
Justin Daniel Char  
Anthony Gee Chen  
Robin Michael Chisnell  
Dennis Yi-Lun Chuang  
Jessica M. Codr  
Daniel Evan Cohen  
Michael James Connor  
Samuel C. Crawford  
Mark Edgar Davenport  
Austin Stanley Davies  
Dale Ding  
William Cannon Fargo  
Alexander Vernon Fisher  
Matthew Charles Fulgo  
Mark Richard Gatheman  
Jonathan Ary Gerstenhaber  
Jeffrey Alan Gole  
Adam Lawrence Greenstein  
Brittany Lynn Hagedorn  
Yoonsung Han  
Matthew Allen Hemphill  
Pehr Lorand Hovey  
Timothy Hwei-Chung Hsiau  
Jonathan Chyi-En Huang  
Patrick Ryan Hunt  
Joseph Herman Izraelevitz  
Tyler James Jensen  
Neil Kamal Kathuria  
Benjamin Paul Kay  
Christopher Ray Kelley  
Laura Beth Keys  
Kenneth Riley Kline  
Jonathan David Klusmeier  
Annie Ko  
Thomas John Krall  
Elizabeth Alison Kramer  
Kristine Lynn Kramer  
Abigail Anne Kressner  
Bradley Matthew Kukurza  
Adam Joel Lamore  
Justin Martin Lawler  
Eric C. Lee  
Rachel Elizabeth Lee  
David Ashley Lewis  
Xihui Lin  
Jason Andrew Logan  
Kyle Christopher Mairose  
David Gregory Marks  
Michael Amos Meng  
Kevin Michael Mercurio  
Thomas William Morris  
Kate Elizabeth Nevin  
Ann Siu-Lon Ng  
Richard Shropshire Ockers  
John Paul Pasinski  
Jason Joseph Phillips  
Allison Laurene Pitt  
David Mitchell Raber  
Zachary Picker Radwine  
Brian Cosmos Reale  
Marc Christian Reese  
Christopher Spengl Rhodes  
David Allan Rickard  
Aaron David Robinson  
Forrest Rogers-Marcovitz  
Troy Jonathan Ruths

Nina Lynn Sass  
Anne Rachel Schneider  
Matthew Casey Sculnick  
Sareen Swapan Shah  
Steven Louis Shalwitz  
Jonathon Aaron Shapiro  
Brian Gregory Sinn  
G Ralph Spence  
Jonathan Samuel Steer  
Stephen Daniel Sylwestrak  
Craig Andrew Szczeniul  
Lizhi Tan  
Kristi Marie Tanouye  
Austin John Thompson  
Stephen Mankata Tourjee  
Edward Tsai  
Rebecca Lynne Veto  
Amy Jean Vukovich  
Edward Kang-Hua Wang  
Emily Lynn Webelhuth  
Xuancong Wen  
Scott Chia-Hung Wu  
Ziyuan Yang  
Matthew William Zackoff  
Michael Dylan Zeller

## CLASS OF 2007

Saurabh Anand  
Ryon Scott Buchman  
Joshua Adam Cohn  
Victoria Lee Coppard  
Daniel James Delitto  
Eric Michael Diamond  
Ivan Dimitrov  
Kathleen Whitty Disanto  
Derek Petrick Dohler  
Kristen Ann Erickson  
Marina Fooks  
Andrew John Frank  
Stacey G. Galvez  
Joseph Hirsh Goodman  
David Reynolds Hall  
Philip Jacob Halley  
Melissa Beth Harris  
Jason Skye Hawks  
Julie Elizabeth Higgins  
Avi J. Hoffman  
Kathryn A. Hueser  
Wendy Elizabeth Jenkins  
David Xu Jin  
Karan Deepak Kanwar  
John Peter Klacsmann  
Adam M. Kost  
Joshua F. Kuperman  
Xinyu Li  
Lauren E. Linderman  
Kathleen T. Malinowski  
Kyle David Manley  
Katherine T. Maschmeyer  
Eisha Akiko Matsubara  
Patrick Thomas McCarthy  
Robert F. McCarthy  
Paul Vincent Mocerri  
Jessica Lynn Mohatt  
Bridget Rose Mollner  
Thomas Jerry Moore  
Brandon Evan Morgan  
Joshua Adam Mule'  
Ronald Nguyen  
Colleen Elizabeth O'Hare  
Evelyn Ostrovsky  
Jae Woo Park  
Stanley R. Parker  
Zachary Kyle Patterson  
Brian C. Pierce  
Allison Nicole Rader  
Brent Douglas Ramerth  
Luke Asher Rinard  
Brendon Theodore Rippe

Gregory David Ruppel  
Peter Allen Shaw  
Min-Sun Son  
Brian Craig Stowe  
Kelsey Erin Suddard  
Sangita Sudharshan  
Joseph Andrew Swisher  
Raymond Howard Thomas  
Anjan Tibrewala  
Jonathan Chang-Shan To  
Matthew James Tyler  
Brian James Vacek  
Steven Richard Vogl  
Simon Alexander Waters

## CLASS OF 2006

Onaolapo Wali Akande  
Mark Albrecht  
Safwan Ali  
Moshe Adiel Barach  
Benjamin E. Birnbaum  
Timothy M. Blakely  
Damien Douglas Brewer  
James W. Brockman  
Justin T. Brown  
Pamela A. Buzzetta  
Edward Peiyang Cheng  
Rachel C. Cousart  
Christopher Jon Degroot  
Claudiu Iulian Diaconu  
Azuka C. Dike  
David Y. Ding  
Michael P. Dougherty  
James Robert Eckstein  
Ghideon Z. Ezaz  
Tracy E. Fixel  
Daniel Tobias Fishbone  
James Morgan Flaherty  
Cara Michelle Freling  
Gretchen Elizabeth Garbe  
Brent Benjamin Goldman  
Jason Thomas Hall  
Benjamin D. Hamlington  
Steven Anthony Handy  
Adam M. Hansen  
Mark A. Hendel  
Joshua Robert Henry  
Robert Mansell Humble  
James Joseph Jost  
Rahal Kahanda  
Ashish Hareesh Khatri  
Erich L. Kiehl  
Thomas T. Klumpner  
Wesley Ryan Legant  
Dennis J. Li  
Joseph M. Lieb  
Conor Lucas-Roberts  
Leah Jane Martens  
Thomas G. Martin  
Emily Lauren Martis  
Megan Laura McCain  
Michelle E. McCully  
Nathaniel Sutton McVicar  
Neil Jitendra Mehta  
Robert Joseph Murphy  
Sumona Nag  
Adam Clark Nathan  
Jennifer Joy Pangborn  
Andre Daniel Pennington  
Amber M. Petersen  
Leah Gabrielle Pike  
Shuddhadeb Ray  
Steven H. Reis  
Ryan Alexander Scheurer  
Craig Wademan Schiller  
Nainesh Jashvant Shah  
Amin Mounir Shazly  
Megan L. Sheridan

Jonathan Rubin Silverman  
Cheryl Lynn Simon  
Aliza Skolnik  
Michael Erik Sorensen  
Ashley Michelle Starwalt  
Fei Sun  
Kai Sun  
Graham Seaborn Walker  
Jared Anthony Weis  
Stephanie Lynn Werner  
Natalie Anne Zaczek  
Jiening Zhan

## CLASS OF 2005

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Carolyn J. Aler  
Mark Christopher Ambrosi  
Scott Edward Armul  
Stefan Mark Atay  
Ellen Hunter Bailey  
Florence Trinity Baluyot  
Warren C. Bergquist  
Benjamin Thomas Bocher  
Thomas Edward Bryan  
Kevin T. Carlberg  
Douglas Ford Caruthers  
Timothy Ryan Cassilly  
Ariel Brier Chatman  
Anthony Brett Clyde  
Shane Jay Cochran  
Christopher Jon Degroot  
Scott Lawrence Crick  
Denise Dajles  
Bryan Danforth  
Joel Hunter Davis  
Ryan J. DePuit  
Paul Thomas Donnelly  
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Kathleen Diane Fitterling  
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Steven R. Floyd  
Amy Michelle Freestone  
Margaret Mary Frericks  
Annabel S. Fu  
Saurabh Gayen  
Craig J. Goergen  
Danna Gurari  
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Bradley D. Hartmann  
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Christopher Laurenc Hines  
Matthew D. Hoelle  
Christopher M. Holman  
Richard R. Hough  
Christopher Casey Houston  
Jessica I-Tien Hsieh  
Barbara Kwok Wing Huen  
Rumana Sultana Hussain  
Caleb Sisson Hyde  
Mila H. Ju  
Scott Kaminski  
David F. Karandish  
Anuk Dyan Karunaratne  
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Peter Ben Kornmeier  
Aaron T. Kozuki  
Daniel Benjamin Larremore  
Brandon Larson  
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Daniel James Livengood  
Jonathan D. Lowe  
Gina Marie Macchiaroli  
Brett Dashner Macdonald  
Herbert William Markwort  
Kevin M. McCarthy

William J. McClellan  
Matthew Melchiori  
Adam David Meranda  
Christopher Moffatt  
Sean Mueller  
Erin O'Shea  
Kelly Colleen O'Shea  
Mrunal Rajendra Parikh  
Amanda K. Patton  
Rachel C. Pedersen  
Nathan S. Reller  
Andrew Christia Retzinger  
Stuart P. Rosenberg  
Stephen Matthe Schleicher  
Laura M. Seger  
Scott G. Siebers  
Thomas Simpson  
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Paul Aaron Spiegel  
Paul Edward Stanis  
Taylan Terzioglu  
Andrew Craige Thomas  
Sean Michael Thomas  
Mary Katharine Tomlinson  
Elizabeth Lien Tran  
Rachel Dain Vazzi  
Darius Daniel Viet  
Vaibhav Vohra  
Thomas Walker  
David M. Weingeist  
Kristina J. Williams  
John Patrick Woock  
Se Young Yoon  
Suan Zhu  
Lucas Andrew Zulauf

## CLASS OF 2004

Joseph Blasi  
Alexa K. Horvath  
Haruka Kakimoto  
Boris Klaydman  
Frederick W. Steiling  
Timothy N. Terlaje  
Jonathan D. Wetherbee  
Brandon R. Wiese

## PROFESSIONAL DEGREE PROGRAMS

Sabiha Abbas  
Jason Barnett  
Kelly E. Bernard  
Damon Braggs  
Gregory F. Camden  
Su Deng  
Douglas L. Dick  
Katherine Diekemper  
Gabiella Farkas  
Jason B. Going  
Berhanu H. Haile  
Denis W. Hartley  
Andre C. Jones  
Kelly Sue Kaiping  
Peter Gachobe Karaya  
Myung Jin Kim  
William A. Kleeschulte  
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Xia Li  
David J. Rhyne  
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