

FIGHTING A HARMFUL RESULT OF CHEMOTHERAPY

What role can a dentist play in helping a child continue chemotherapy treatments for cancer?

Maybe a key one if research now underway confirms a theory posed by Dr. Brian Hodgson, assistant professor of pediatric dentistry in the Marquette School of Dentistry, and co-investigators at the Medical College of Wisconsin and the University of Alabama-Birmingham.

Chemotherapy drugs can cause painful sores to form in a patient's mouth that provide an open window for infection to enter the body at a time when a child's immune system is already weakened. "To prevent the

spread of infection," Hodgson says, "a doctor will stop chemotherapy or radiation therapy to allow the oral tissue time to heal." But that interruption in treatment can be harmful.

Hodgson believes light therapy applied directly to the oral cavity may offer a way to inhibit the development and reduce the severity of mouth sores so that treatment can continue.

Hodgson's friend, Dr. Harry Whelan of the Medical College of Wisconsin, was using photodynamic therapy in the treatment of brain cancers. He told Hodgson that the light therapy seemed to help wounds heal faster.

"The same day I had seen a 4-year-old patient who was scheduled for a bone marrow transplant for leukemia," Hodgson says. "We had extracted three teeth that were so decayed. I knew the heightened risk of infection. I wondered whether light therapy would work on a tooth-extraction site. There was no research published on this subject, but several papers were found on the treatment of mucositis with light therapy. Our first two pilot studies appeared to reduce the mucositis."

Hodgson and his co-investigators used a hand-held device developed by Quantum Devices of Barneveld, Wis., that is about the size of the wand used by airport personnel to scan passengers as they pass through the security checkpoint. When held to a child's cheek, the light-emitting diodes inside transmit a light that penetrates the oral tissues. It doesn't hurt, doesn't get hot and causes no thermal effect. A treatment takes 84 seconds.

"We believe the light is being absorbed by the mitochondria in the cells. The light allows the mitochondria to create more ATP or energy in a cell. Our objective is to help a cell heal itself rather than die," Hodgson explains.

NASA used this type of light in plant growth experiments in space and is interested in potential medical applications. NASA is funding the current placebo-controlled double-blind study spearheaded by Hodgson of 80 adult and child patients using these lights, including patients at Children's Hospital of Wisconsin, the University of Alabama-Birmingham and Children's Hospital of Alabama. Hodgson plans to publish the results in 2009.



A NEW APPROACH TO SENSORS

Sometimes great things come in tiny packages. That's the case of the microcantilever, a simple sensor device (whose dimensions range from microns down to nanometers) that could have applications from the field of medicine to the detection of biochemical warfare agents. With support from the National Science Foundation, Dr. Fabien Josse is studying this new approach in sensing technology.

Josse is a professor of electrical and computer engineering and director of Marquette's Microsensors Research Laboratory. An associate editor for *IEEE Sensors Journal*, he has served

as a visiting professor in Germany, Switzerland and France.

Josse compares a microcantilever to a miniaturized diving board that naturally vibrates at a specific frequency. By stretching out like a finger from a microchip, these extremely mass-sensitive or stress-measuring devices outperform conventional sensors by detecting changes in cantilever bending or vibrational frequency. In health care, microcantilevers could be used to monitor blood glucose and screen for diseases at the earliest possible stage. They could also be used by military personnel to detect chemical and biological warfare agents in the field.

But until now, these devices haven't worked well at detecting substances in liquids. Josse is trying to change that. Working with colleagues at Marquette and Georgia Tech, Josse hopes to create a more efficient and sensitive sensor by utilizing optimal cantilever geometries and more general and intelligent control of the excitation characteristics, which could drastically enhance performance. "The long-term goal is the development of portable, low-cost, microcantilever-based sensing devices that are capable of simultaneously detecting a broad spectrum of substances," he says.



COLD WAR PROPAGANDA LIVES ON

What does American culture look like through the prism of Soviet mass media? And how do those impressions shape the modern relationship between the United States and Russia? That's the research focus of history professor Dr. Alan Ball.

Ball is working on a follow-up to his 2003 book, *Imagining America: Influence and Images in 20th-Century Russia*. During the Cold War, "a big part of the propaganda battle was each side saying our way of life is better than your way of life," he explains. Because America's free market society and consumer culture appealed to many around the world, Soviet authorities directed intense criticism at "the American way of life." It appears that most of all, Ball adds, "they were concerned that their own people might be enticed."

Ball's new book will translate and analyze articles from Soviet mass-market periodicals, ranging from sports and women's magazines to a Communist-sponsored satirical magazine. Ball, who teaches courses in Russian and Soviet history and the Cold War, started the project after realizing that the primary sources he wanted for his students didn't exist in English.

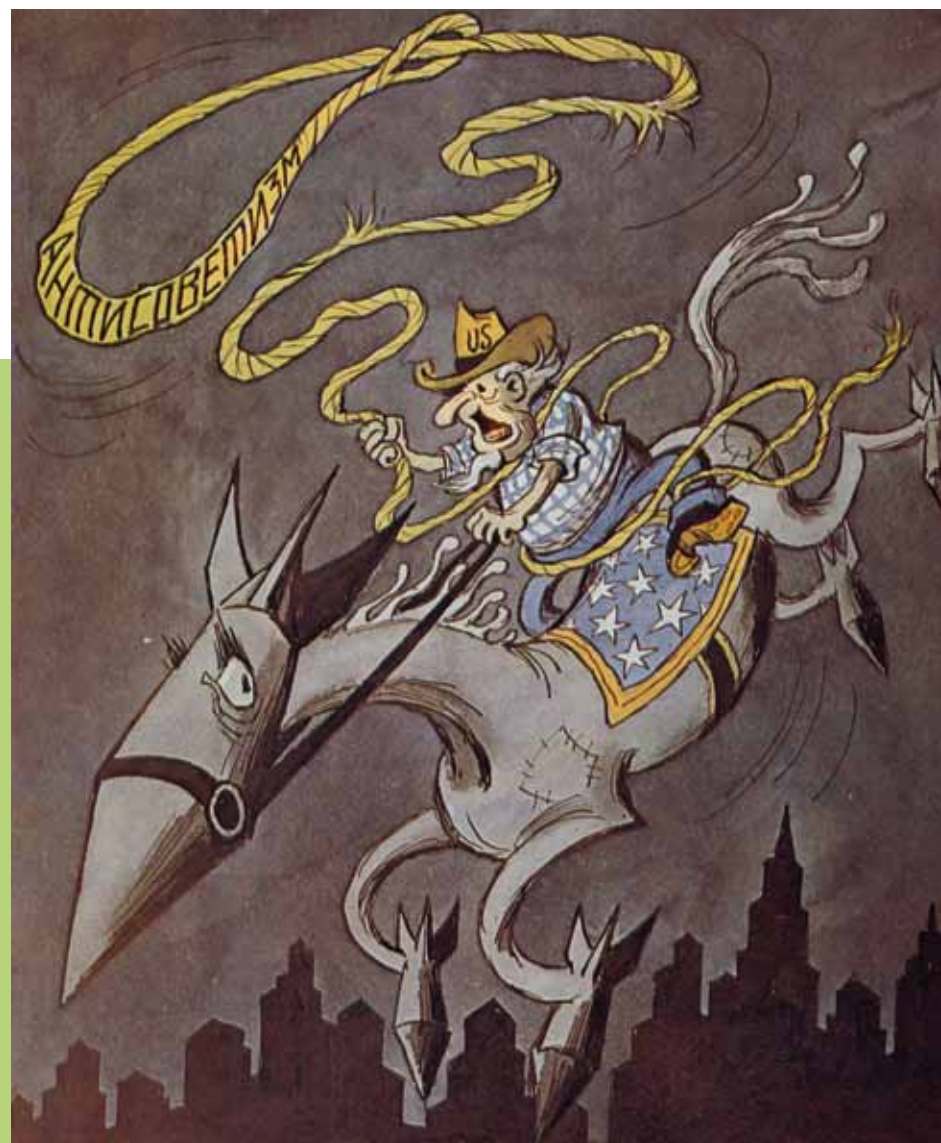
"It's unlike any book I've done before because it's mostly translation," says Ball, who has a contract with Oxford University Press. "Virtually nothing like this is translated and available for the Western reader."

Ball's book will focus on several themes in Soviet coverage of the United States: American politics, capitalism, racism, crime, culture, sports and religion. He found that

ideology colored even a topic as innocuous as sports: Soviet publications tended to portray American sports as violent and exploitative, representative of American culture at large.

While Soviet propaganda appeared to die along with the Cold War, Ball noticed some of the same messages reemerging recently in the Russian media, as tensions increased between Russia and America.

"My hypothesis is that you couldn't expose people, including Vladimir Putin, to four decades of propaganda and have it disappear in 1991 without a trace," Ball explains. "As Russians have become disillusioned with America again, they did not have to invent critical images of the United States as, say, an imperialist bully. The images had been there all along during the Soviet period, and there was neither the need to create them from scratch nor to explain them to most citizens."



Upper left: This Cold War-era cartoon from a Soviet satirical magazine depicts the United States casting a grim imperialistic shadow. Lower left: Another Cold-era cartoon paints America as an imperialistic cowboy. Images courtesy of Dr. Alan Ball.

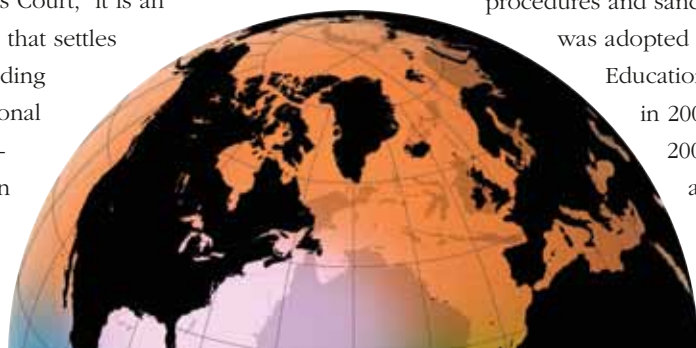
SPORTS LAW ON THE GLOBAL STAGE

Foreign players in the NBA. An NFL game in London. Major League Baseball offices in China. As the world of sports becomes globalized, one professor is at the heart of understanding how the law applies to an increasingly complex industry.

Matt Mitten, director of the National Sports Law Institute at Marquette University Law School, is an internationally recognized expert in sports law who is now turning his attention to the intricacies of governance in sports on a world playing field. Mitten lectures at international conferences and law schools on the cutting-edge issues — including doping and athlete eligibility disputes — facing sports in all corners of the globe.

Mitten is a member of the Court of Arbitration for Sport.

Known as the “World’s Sports Court,” it is an international arbitral tribunal that settles sports-related disputes, including those arising out of international and Olympic sports competition and events. He is also an author of a leading sports law textbook; faculty adviser to the *Marquette Sports Law Review*, the



oldest sports law review in the nation; and a frequent contributor to both national and international academic publications, including most recently Korea’s *The Journal of Comparative Law*.

Outside its obvious application to industry participants such as athletes and team owners, why does sports law matter? Mitten notes that legal rules developed to resolve sports-related issues have tentacles into general case law. “Important antitrust, intellectual property and labor law principles arose out of sports cases,” he explains.

Another good example of the growth of sports law is the 2003 adoption of the World Anti-doping Code by international sports governing bodies to harmonize doping rules, testing procedures and sanctions for Olympic sports. The code was adopted as a treaty by the United Nations Education, Social and Cultural Organization in 2006 and ratified by the United States in 2008. “The successful development and adoption of this treaty may teach us lessons we can apply to agreements on broader global issues ranging from the environment to trade policy,” Mitten says.

ENHANCING ATHLETIC PERFORMANCE — THE NATURAL WAY

Dr. William Ebben became fascinated with the science of sports when he worked as a strength and conditioning coach for the Green Bay Packers, U.S. Olympic Education Center, Marquette University and others. Now an assistant professor of exercise science, he’s driven to helping athletes become stronger, faster and safer.

“If we can find ways to enhance performance without chemicals, steroids and even dubious supplements, then the research is useful,” he says.

Ebben is a national leader in the field of strength and conditioning and a highly productive researcher — he published 12 articles last year and has another 10 in review or in press. His research recently earned him national awards from the American Society of Exercise Physiologists and the National Strength and Conditioning Association.

His lab focuses on several areas,

including evaluating plyometrics (explosive exercises such as jumping), lower-body muscle activation during resistance training, speed development, and strength- and power-training methods. In almost all of his studies, he explores gender differences.

“I think that’s important because historically women have been underrepresented in exercise science research,” he says. “It’s important to find similarities or differences, and in some cases, I’m hopeful there are similarities so that we can decrease the gender gap or the perception that there are differences.”

Understanding gender differences can protect athletes. For example, because women are six times more likely to suffer ACL injuries, Ebben studied how men and women activate the hamstrings and quadriceps. He found that women don’t activate their hamstrings as well as men — key because the hamstring acts as a

helper for the ACL — while they activate their quadriceps more, which pulls on the ACL. The problem might be reduced by adjusting training methods, he says.

He also studies the brain connection between upper-body muscle activation and lower-body reflexes. He found that by clenching a jaw or fist, athletes could enhance the power of a lower-body movement. Since Ebben introduced the concept to sports literature, he has heard anecdotal stories of professional athletes using the technique.

He is also intrigued by speed development, which he views as under-researched. “As a strength coach, you can take an athlete and in some cases make them twice as strong. But you can’t make someone run twice as fast,” he says. “You’re shooting for gains of 2 to 5 percent. And yet speed is probably the most important physical factor in many sports such as soccer, baseball and football.”

UNDERSTANDING SMOOTH MUSCLES

Heart disease, irritable bowel syndrome, asthma, infertility — it’s possible that malfunctioning smooth muscles could cause these and a host of other illnesses. But while smooth muscle cells — which surround all hollow organs — are clearly critical, we are just beginning to understand how they function. Dr. Thomas Eddinger is working to enhance that understanding.

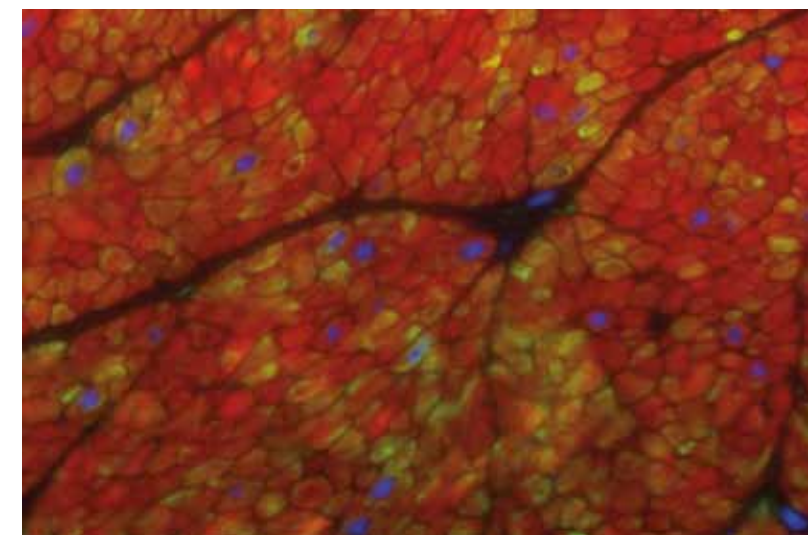
Eddinger, a professor of biological sciences, is well known as a pioneer in the field of smooth muscle research. For more than 20 years he has studied these workhorse cells, which are responsible for maintaining blood pressure, propelling food through the digestive system and excreting urine from our body. He is best known for helping identify four different myosin protein isoforms found in the cells of smooth muscles. Since that pivotal discovery, Eddinger has continued his work to better understand how the subunit proteins combine to form different molecules that regulate the muscle cell’s ability to function and recover from injury.

After helping to identify the myosin isoforms, Eddinger’s lab adapted techniques routinely used at the tissue level to study single cells, which showed that single cell function can be related to the expression of the myosin isoforms. But Eddinger wants to look beyond single cells.

Much of the research in this field relies on individual cells grown in cultures. However, Eddinger’s lab has shown that cultured cell behavior is different from cell behavior in actual tissue, so it studies cells in freshly isolated or intact smooth muscle tissues. In order to really understand how smooth muscles function it is vital, Eddinger argues, to study the cells in their natural state.

“If I want to understand how a person functions in the real world, I’m not going to throw them into a freezing lake,” he says. “How that person reacts would say nothing of how they typically function. I’m using that same concept in my lab. If we want to understand how smooth muscles function at the cellular level in our bodies, we need to study the tissue, not just a single isolated cell.”

While many questions still need to be answered, Eddinger is confident that his lab’s work will help explain how smooth muscles work and carry out vital functions in our bodies. And once that happens, he says, “Treatments and therapies will follow that allow people to lead longer and healthier lives.”



Smooth muscle cells in stomach showing distribution of non-muscle myosin (green), actin (red) and nuclei (blue). Reprinted with permission from the *American Journal of Physiology – Cell Physiology*.

CREATING STRONG NURSE LEADERS

As one of 20 nurses nationally accepted for a three-year Robert Wood Johnson Executive Nurse Fellowship, Dr. Janet Krejci hopes to improve Wisconsin health care by developing strong nurse leaders.

“The health care system is broken,” says Krejci, associate professor of nursing. “We need strong nurse leaders to create a better future for vulnerable humans. Providers are trained to be fabulous clinicians, but they don’t always get the leadership development needed to negotiate today’s complex health care environment of advancing technologies, multiple providers and rapid movement of patients through the health care system.”

The RWJ fellowship came on the heels of a fellowship with the American Council of Education, which Krejci used to research interdisciplinary teaching and scholarship and innovations in education delivery for health professionals.

“Sentinel events in health care often happen because of communication issues,” says Krejci. “Presently we educate health professionals in silos — physicians in one, nurses in another, social workers in another, and then put them in health care settings and say ‘OK, now talk to each other.’ If these groups don’t understand each other, patients suffer.”

Krejci plans to incorporate her findings from the ACE fellowship into the RWJ project. She hopes to transform Marquette’s health care systems leadership graduate program into a hybrid format (combining online with face-to-face education); collaborate with the Wisconsin Center for Nursing to build a statewide leadership academy; and increase access to leadership development and mentoring for nurses from rural areas and underrepresented groups.

SURVIVING KATRINA — AND THE MEDIA

What caused some Hurricane Katrina survivors to rebound and lead successful lives while others were left feeling powerless, voiceless and angry?

The answer could lie in how local media portrayed the survivors in their new environments, according to Dr. Sumana Chattopadhyay, assistant professor of broadcast and electronic communication.

Chattopadhyay started studying survivors of the 2005 disaster after reading about disparities between displaced hurricane survivors in Atlanta and Houston. The Atlanta group adapted quickly to its new surroundings while the new Houston residents suffered from joblessness and a sense of despair. In 2008, about 100,000 evacuees were still living in Houston, while another 80,000 lived in Atlanta.

Chattopadhyay, who researches how media shapes identity, combed through articles in the local media to determine how many portrayed the survivors as victims versus intruders. “Are the displaced people perceived as victims deserving of empathy and help?” Chattopadhyay asks. “Or are they perceived more as refugees now part of the community but who are not always welcomed with open arms?”

In the Houston media, Katrina survivors were depicted as victims just as often as they were portrayed as intruders. In Atlanta, survivors were portrayed as victims three times more often than as intruders. Chattopadhyay found that in Atlanta most of the intruder mentions came from government officials, while in Houston reporters used the intruder terminology most often. In addition, she found that while coverage of evacuees in Atlanta gradually decreased over time, coverage in Houston stayed consistently high from 2005 through 2007. One journalist Chattopadhyay interviewed confided that the media might have been “a little harsh.”

The hurricane’s impact continues — long after the Gulf waters have receded and the news cycle has moved its attention elsewhere — so Chattopadhyay continues her research on the long-term adjustments in Katrina survivor communities. Next, she hopes to study whether survivors believe they can influence the political process, which helps determine how engaged they are in their community and the political domain.

HOW LATINO YOUTH SUCCEED

Dr. Lisa Edwards is well aware of studies that paint grim portraits for inner-city adolescents.

She’s driven to change that picture.

Edwards, an assistant professor of counseling and educational psychology, researches how Latino youth have overcome discrimination, poverty and pervasive low expectations. She found that the common attributes of the most successful youth included strong family bonds, valuing religion and possessing a bold, almost defiantly positive attitude.

“All we hear about is the negative,” she says. “There are real concerns, but I’m also interested in finding out the factors and strengths that help people be successful.”

She started spreading word of her interest, contacting a local middle school and offering to help families. Edwards helped to coordinate an event where mothers and sons discussed how they could rely on each other as the students faced the stress of entering high school.

“One need our families face is the transition from middle to high school,” says Melodie Hessling, principal of Nativity Jesuit Middle School in Milwaukee.

“When Lisa came to Nativity, I was impressed by how she linked her experience with the needs of our families.”

This wasn’t the only time Edwards has taken her research to where it really counts. Along with her graduate students, she presented at an event with two local

groups of young women, Hermanas and Sistas, about how ethnic identity and other cultural strengths can help deal with discrimination and racism.

The daughter of a Colombian mother and European-American father, Edwards feels both professional and personal satisfaction in sharing her knowledge with others who can benefit. She believes that she’s helping fulfill Marquette’s social justice mission.

“I really try to focus on the positive cultural strengths and factors that help youth succeed,” Edwards says. “I want to make sure the research gets out there and improves people’s lives.”

THIN BODIES, THIN WALLETS?

What’s the connection between fat and finances? The question intrigued Dr. Olga Yakusheva, an assistant professor of economics who specializes in health and labor economics. After analyzing a national dataset of more than 10,000 American adults, she discovered a relationship between income and obesity that is the opposite for men and women. Her paper “Thin bodies, thin wallets?” is under review by the *Journal of Health Economics*.

“What we found was actually very interesting because it very much depends on the gender,” Yakusheva explains. High-income men are more likely to be overweight or obese than low-income men, whereas low-income women are more likely to be overweight or obese than high-income women. “The trend is a lot more noticeable among women. That’s where poor women are really, really overweight and rich women are really, really skinny,” she says. That pattern held true for Caucasian and African-American women. The correlation between weight and income was least strong among Hispanic women.

Because low-income adults are generally at risk for negative health outcomes, Yakusheva was surprised by the difference between genders.

“For men, we’re thinking it may be occupation,” she says. “Men who have lower incomes tend to be in more physically demanding occupations, and higher-income men are more likely to be in white-collar jobs. They sit all day and then maybe have dinner with friends and pour a couple of drinks, and there’s just not a lot of physical work that goes into their daily life.”

For Caucasian women, body weight often stayed consistent from age 25 to 45 or older. One possible explanation could be the “stickiness” of poverty, Yakusheva says.



“It could be that women who are relatively better off also grew up in families that were better off, and that’s why they may have come through childhood and adolescence healthier than women who grew up in poorer households,” she says.

A second hypothesis involves a woman’s choice of spouse. Thinner women might be more likely to marry financially successful men who then carry them into comfortable middle-age and retirement, Yakusheva says.

Her latest study examines the role of the environment in weight gain among college freshmen.

“When you come to campus as a freshman, for the most part you are

placed with a random roommate in a random dormitory,” she explains.

“So I’m going to look at whether living with a more overweight person makes you more overweight or whether there are dramatic differences in how much weight kids gain between dormitories, and what is it that makes some dormitory environments more conducive to being fit or some more conducive to putting on weight.”

MARQUETTE BOOKSHELF

Looking for new reading material? Check out some of the latest works written and edited by Marquette University faculty.



Spain is (Still) Different: Tourism and Discourse in Spanish Identity
By Eugenia Afinoguénova, assistant professor of Spanish, and Jaume Martí-Olivella (Lexington Books, 2008)



International Handbook of Urban Education
Edited by William Pink, professor of education, and George Noblit (Springer, 2008)



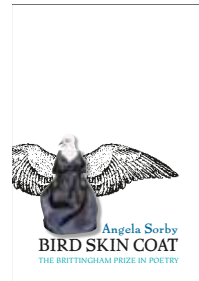
Federal Criminal Restitution
By Jay Grenig, professor of law, Nathan Fishbach and Catharine Goodwin (Thompson West, 2008)



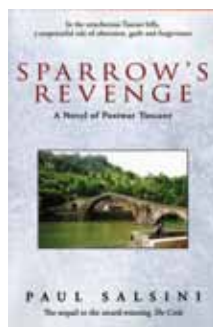
The Myth of an Irish Cinema
By Michael Patrick Gillespie, professor of English (Syracuse University Press, 2008)



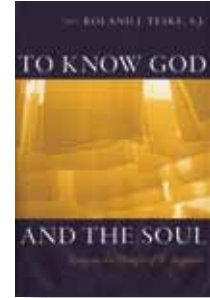
Human Fertility: Where Faith and Science Meet
Edited by Richard Fehring, professor of nursing, and Theresa Notare (Marquette University Press, 2008)



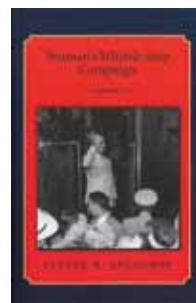
Bird Skin Coat (Winner of the Brittingham Prize in Poetry)
By Angela Sorby, associate professor of English (University of Wisconsin Press, 2009)



Sparrow's Revenge: A Novel of Postwar Tuscany
By Paul Salsini, adjunct professor of journalism (iUniverse, 2008)



To Know God and the Soul: Essays on the Thought of St. Augustine
By Rev. Roland J. Teske, S.J., professor emeritus of philosophy (Catholic University of America Press, 2008)



Truman's Whistle-stop Campaign
By Steven Goldzwig, professor of communication studies (Texas A&M University Press, 2008)



Grand Opportunity: The Gaelic Revival and Irish Society, 1893-1910
By Timothy McMahon, assistant professor of history (Syracuse University Press, 2008)



Justice and Mercy Will Kiss: The Vocation of Peacemaking in a World of Many Faiths
By Michael Duffey, associate professor of theology (Marquette University Press, 2008)



Chaos and Complexity in Psychology: The Theory of Nonlinear Dynamical Systems
Edited by Stephen J. Guastello, professor of psychology, Matthijs Koopmans and David Pincus (Cambridge University Press, 2008)



RESEARCH AND SCHOLARSHIP AT MARQUETTE

- More Marquette faculty applied for federal grants during fiscal year 2008, and externally funded research requests exceeded \$28 million for the first time.
- Foundation research dollars nearly doubled from fiscal year 2007, and corporate research dollars also increased, with the largest award supporting work on renewable energy.
- Marquette faculty have formed strong partnerships with the Clinical and Translational Science Institute, Medical College of Wisconsin, University of Wisconsin system and others.
- Promentis Pharmaceuticals, a company launched by Marquette professors, recently licensed technology developed by Marquette and the University of Wisconsin-Milwaukee that could lead to a novel treatment for schizophrenia and other central nervous system conditions. It is the third example of commercial applications springing from Marquette research.
- The university supports research through several programs: three-year Way Klingler fellowships, fourth-year sabbaticals for junior faculty and the Lawrence G. Haggerty Faculty Award for Research Excellence.
- Marquette faculty edit a number of scholarly journals, from the *Journal of Orthopaedic and Sports Physical Therapy* to the *International Journal of Systematic Theology*.
- The Department of Special Collections and University Archives houses more than 17,000 cubic feet of archival material and 11,000 volumes, including approximately 7,000 titles within the rare book collection. The J.R.R. Tolkien Collection features many of the author's original manuscripts, including *The Hobbit* and *The Lord of the Rings*.
- Marquette has more than 20 academic centers and institutes that foster research in the areas of end-of-life care, ethics, neuroscience, rehabilitation engineering, transnational justice, water quality, sports law and other areas.

For more, go to marquette.edu/research.