

ENSURING THE RELIABILITY OF TRANSPORTATION INFRASTRUCTURE

The research interests of Dr. Christopher Foley have very practical implications. Foley, a Marquette professor of civil engineering, focuses on the performance of civil infrastructure systems and components, such as bridges and highway signs.

“Structural systems have a finite life span and can be subject to fatigue-induced damage resulting from traffic or wind-induced vibrations,” he explains. “We develop field-monitoring solutions and analytical modeling approaches that help agencies such as the Wisconsin Department of Transportation determine guidelines and frequency of inspections.” The U.S. Department of Transportation estimates that there are nearly 74,000 structurally deficient bridges in the United States — 1,335 in Wisconsin alone.

Foley, who teaches structural engineering, is a member the American Institute of Steel Construction Specification Task Committee on Connections and its Committee on Research. He serves on the Technical Oversight Committee for WisDOT Structures and also served on the WisDOT committee that oversaw monitoring of Wisconsin’s deck-truss bridges after the 2007 collapse of the Interstate Highway 35 bridge in the Twin Cities.

As part of the Federal Highway Administration’s Innovative Bridge Research and Deployment Program, Foley and colleague Dr. Baolin Wan, associate professor of civil and

environmental engineering, examine the efficacy of fiber-reinforced polymer components as an alternative to traditional steel reinforcement and formwork of bridges. A noncorrosive, FRP is typically more expensive but may have a longer life cycle. Studying new bridges with FRP reinforcement compared with traditionally constructed bridges in Waupun and Fond du Lac, Wis., involved visual inspections and on-site load testing. Foley, Wan and their team, including students, designed and fabricated low-cost, strain-measuring sensors that can be temporarily bolted onto bridges to conduct load testing.

A significant auxiliary to the nation’s transportation system is the signage used for traffic direction and information. The Wisconsin Highway Research Program funded Foley’s investigation and analysis of full-span overhead and high-mast luminaire support structures after several incidents of unsatisfactory performance. That study is now being followed by research involving mast-arm-pole support structures adjacent to highways. “This project is the first comprehensive, reliability-based analysis of sign support structures,” Foley says. “That’s important for understanding performance and risk of fatigue-induced fracture

and establishing appropriate inspection intervals.”

The three-phase study, concluding by fall 2011, first involved gathering and synthesizing fatigue testing data for connections in sign support structures, enabling researchers to develop the first comprehensive set of statistical models for fatigue life of such connections. Undergraduate researchers compiled 10 years of contiguous hourly wind speed and direction data from the National Climatic Data Center for eight Wisconsin cities. This data was used to develop probability models for wind speed and direction. The second phase involves additional fatigue testing to further enhance the statistical models used to predict fatigue life. Foley’s team also will conduct field monitoring at a Milwaukee site. In phase three, researchers will develop a handbook of effective retrofit measures and recommend inspection cycle frequencies for typical mast-arm support structures.



EXAMINING GLOBAL CONSUMER CULTURE

In a partnership that spans two decades, Drs. Steven Lysonski and Srinivas Durvasula have researched consumer behavior across continents. These Marquette professors of marketing recognize that economies are global and brands are international.

What they want to know now is the extent to which consumer behavior is converging worldwide.

Global consumer acculturation, Lysonski explains, reflects the process that transforms consumers into people who have similar tastes and preferences for products and services. To examine this convergence more closely, he and Durvasula compared consumers in Nigeria and the United States.

“Among the African countries, Nigeria has become relatively wealthy because of oil. This wealth has attracted foreign companies to market their products there,” Durvasula says. “Our key question was to find out whether Nigerians have become exemplars of the global consumer culture in comparison to Americans who represent the ‘modern’ or acculturated consumer.”

The professors concluded that Nigerians have been affected and transformed by global acculturation.

Lysonski and Durvasula also have explored vanity and materialism in China; consumerism in New Zealand, Greece and India; and consumer decision-making styles in India.



Now the team is examining how global consumer acculturation affects brand preferences. “For example, look at the recent entry of Harley-Davidson into India,” Durvasula says. “Will the Harley panache transfer easily to India?”

Says Lysonski: “This research fills an important vacuum given the few studies that have been published in this area, especially outside the United States.”

ARE ENTERPRISE SOFTWARE SYSTEMS WORTH THE MONEY?

When companies spend \$100 million or more on major software programs, they hope to see a substantial return on investment.

So when noted management guru Nicholas Carr penned a *Harvard Business Review* article titled “IT Doesn’t Matter,” lambasting these so-called “enterprise systems,” it sent the software industry into turmoil. Dr. Mark Cotteleer, associate professor of management, started to dig deeper.

An IT industry veteran, Cotteleer has studied enterprise systems since they emerged in the early 1990s.

“Prior to the advent of these integrated packages, companies used individual software programs designed to address very specific business functions: sales, supply chain, customer service, etc.,” he explains. “Tech companies recognized a desire among firms to use a lone program to address the full spectrum of business functions.”

Companies were quick to get on board, catapulting the enterprise software industry into a multibillion-dollar juggernaut. That led Cotteleer and other management experts to study whether

enterprise systems work and — if so — are worth the money.

In his landmark 2003 *HBR* article, Carr basically said “no” on both points. Cotteleer disagreed and published empirical research to refute Carr. However, one question still nagged: Why are some companies losing millions of dollars after implementing these systems?

Convinced the software wasn’t to blame, Cotteleer focused on successful program deployment as a management function. His findings have a central theme: human behavior.

“When people are introduced to change, they will either adapt or find ways of working around it,” he says. “Companies are faced with a choice: change the software or change their approach.” Arguing for the latter, Cotteleer asserts that the onus falls on management.

Cotteleer’s overarching goal, though, is to get these ideas out of academic journals and into the hands of managers who can use them. To that end, he has written teaching cases for the Harvard Business School, focusing on such companies as Harley-Davidson, Cisco Systems and Tektronix.

THE PUZZLING PROBLEMS OF MYOFASCIAL PAIN

The first time Max Livingston saw Dr. Francisco Alencar, the 22-year-old law student couldn't open his mouth more than half an inch. He had headaches and blurred vision, and his head bobbed forward uncontrollably. His doctor found nothing medically wrong. His visit with the Marquette dentist who specializes in temporomandibular dysfunction was a last-ditch effort to find relief. Today, Livingston's pain is gone.

"He did more than save my jaw. He saved my life," Livingston says.

Livingston suffered with a classic example of a neuromuscular TMD called myofascial pain. The condition is chronic and may be brought on by stress, illness or other factors. It can involve headaches, jaw pain that radiates around the face and up to the ear or crown, toothaches or a burning sensation in the tongue or lips. In extremely serious instances, it can cause nervous system damage.

Because myofascial pain is not a purely medical or dental malady, it is difficult to diagnose and treat. It occurs when trigger points located in the muscles of the head, neck or face send pain impulses to the head, teeth, maxillary sinus, tongue or eyes. The pain is felt as facial pain, headache or toothache even if the trigger point is localized in a more distant muscle, such as the neck.

"So many people have these problems and there are no experts in the area. Since I wanted to make a difference, I decided to study the area," Alencar says.

In studies begun in 2004–05 and published in 2009, Alencar and research partners studied 290 patients with

chronic headaches to see how many had trigger points. They found 77 percent had trigger points and 89 percent of that group had highly active trigger points.

"When we palpated the muscles at the trigger points, we could actually cause headaches to occur," Alencar says.

The researchers tried injecting substances into the trigger points to stop the pain. They also tested a process called dry needling, where no substance is injected.

"When you place the needle in, you can feel a knot," Alencar says. "We use the needle to break up the knot, and then normal healing happens."

Treating TMD begins by listening to patients describe the pain. Understanding the duration and intensity is key to making a diagnosis. Treatment includes modifying behaviors that activate trigger points, such as stress, sleep deprivation, dehydration or grinding teeth. The surgical procedure called needling is done only when necessary.

In Livingston's case, the combination of a previous illness, stress and heredity resulted in a crippling case of myofascial pain. He gives all due credit to the dentist who brought relief, saying, "Dr. Alencar is literally one of the smartest men I ever met."



WHAT DIFFERENCE DOES A LAWYER MAKE?

When Judith McMullen, professor of law, and Dr. Debra Oswald, associate professor of psychology, set out to gather empirical data about the impact of attorney representation in divorce cases, they knew it would be nearly impossible to determine the subjective measure of “success” in a divorce. Still, they sought to better understand whether a lawyer actually makes a difference in the outcome of a divorce case.

The pair studied divorce cases from one Wisconsin county and looked at two key questions: the length of the divorce process and the likelihood of alimony being awarded. In 46.4 percent of the cases they studied, both individuals had a lawyer; in 27.7 percent, neither had a lawyer; and in the rest of the cases, only one person had a lawyer.

They concluded alimony was more likely to be awarded if one had a lawyer, but Oswald points out that this population may have been more likely to have a lawyer in the first place. “Our research indicates that the people who need a lawyer — those with assets, children or longer marriages — were more likely to have one. People without those complicating factors could get their divorce in some cases faster and cheaper without a lawyer,” McMullen says. “It tells us that clients are more sophisticated about what they need than we give them credit for.”

McMullen says the findings could have an impact on family law curriculum. “There are a significant number of people going without lawyers in divorce and other civil cases, and our court system should know how to deal with them,” she says. She also notes that in some simple divorce proceedings, the lawyer’s primary purpose is to provide psychological reassurance to the client. “Lawyers aren’t trained as psychologists,” she says, “but we may need more emphasis on the counseling and negotiation skills attorneys are expected to have.”

The study will be published in the University of Utah School of Law *Journal of Law and Family Studies* later this year.



PRICING THE PRICELESS

Is it possible to determine the value of the Sistine Chapel? Can you put a price on the Alaskan Wildlife Refuge? Dr. Kevin Gibson, associate professor of philosophy, is trying to determine just that.

As an applied ethicist who focuses on business, Gibson is interested in the concept of triple bottom-line accounting. This form of accounting measures not only the cost or economic value of an item or resource, but also the social and ecological costs.

“There is so much discussion around sustainability today, but how do you measure that and know when it’s achieved?” he asks. “We must move beyond profits and bottom lines and create a new understanding of the cost and value of a good.”

Gibson is studying three United National World Heritage sites: Uluru Rock in Australia; the Sistine Chapel in Vatican City; and Hadrian’s Wall, on the border of England and Scotland. By traveling to each locale and studying the diverse aspects that make each site unique, Gibson hopes to gain a better understanding and definition of triple bottom-line accounting.

RELIEVING MUSCLE FATIGUE

How much exercise can multiple sclerosis patients handle? Why do they have lower bone density? How can we help the more than 90 percent of MS patients who complain of chronic fatigue?

These are just some of the questions Dr. Alex Ng, associate professor of exercise science, tackles in his research lab.

In the past, MS patients were told not to exercise because it could exacerbate their illness and cause them to overheat. But Ng believes that exercise can help MS patients on several fronts, including fighting fatigue and reducing the risk of bone fracture. Because the disease affects the sensory nerves, it was unknown how well MS patients could tell if they had pushed themselves too far. Normally, people are protected by “an exercise or exertion sense” that helps the body self-regulate, Ng says. To see if that holds true for MS patients, Ng asks subjects to exercise at a particular level and tests

if they can replicate the same level of intensity a week later. Preliminary results are positive.

Ng has spent his career studying muscle fatigue as it relates to a host of diseases, including MS, HIV and cancer. Some cancer survivors experience chronic fatigue 15 or 20 years after successful treatment.

“You’d expect to be tired after running a marathon, but you wouldn’t necessarily expect to be wiped out by making breakfast,” he explains.

Yet researchers still don’t understand what exactly causes chronic fatigue. Depression, variations in cardiovascular control, excessive stress response, muscle fatigue or cellular messengers called cytokines all could play a role. “I’d like to continue to look at the mechanisms so that we can fine-tune the therapeutic approach to fatigue,” Ng says.



NORTH AFRICA: WHERE WORLDS COLLIDE

Dr. Phillip Naylor really likes intersections — not the ones where pedestrians cross, but where cultures collide. Take North Africa, a veritable atom smasher in which African, European and West Asian influences have met — sometimes violently — for the past couple thousand years, with lasting historical consequences.

Naylor, an associate professor of history, writes about the region in his 2009 book *North Africa: A History from Antiquity to the Present*. An enthusiastic *Wall Street Journal* review calls it a “readable introduction” that serves as a “handy refresher course on a substantial part of Africa and the Arab-Islamic world.” It’s an understudied world, says Naylor, that many have failed to appreciate, much to our detriment.

“North Africa is strategically located, historically and geographically,” he says. “Given its experience with Europe, with Islam and with Sub-Saharan Africa, it can be a bridge to enhance understanding between peoples, cultures and religions.”

Instead, however, North Africa has too often been dismissed as the exotic “other” or simply neglected. As a corrective, Naylor traces the region’s history through three of its own brilliant thinkers, including Malik Bennabi, who observed that North Africans became “colonizable,” having “become fashioned by others rather than by themselves,” which led to a loss of historical consciousness.

“I wanted to have something that would illuminate the region for people and help them appreciate it,” Naylor says of his book. He also needed an accessible textbook for his North Africa class at Marquette. “I wrote it for a pragmatic reason,” he says. One that indicates, perhaps, just how much North Africa has been overlooked until now.

HOW TO DELAY ADOLESCENT SEXUAL ACTIVITY

During her career as a nurse practitioner, Dr. Kristin Haglund commonly dealt with teens whose sexual involvement resulted in pregnancies or sexually transmitted infections. Those are big enough problems, but they also often lead to other issues — problems with parents and relationships.

Now an associate professor of nursing, Haglund devotes her research to addressing adolescent sexuality. Her most recent study found that parental involvement and religious attitudes play a key role in preventing adolescent sexual activity. “I’m concerned with understanding teenagers as they become adults,” she says. “What makes it difficult for them to avoid sexual risks? What helps them stay developmentally healthy as they become adults? How can I help them avoid sexual risk behaviors?”

Haglund and Marquette nursing colleague Dr. Richard Fehring used data

from a nationally representative sample of 3,168 males and females ages 15-21 to study protective factors that decrease sexual risk behaviors. They found that religious attitudes toward sexuality, parent-based sexual education and two-parent households have a positive influence.

Adolescents who viewed religion as “very important,” for example, reported an average of 1.9 sexual partners over their lifetime and on average began sexual activity at 17.4 years. In contrast, those who viewed religion as somewhat or not important began their first sexual activity at 16.9 years and had an average of 2.9 sexual partners over their lifetime.

“Religiosity” — institutionalized beliefs, practices and ethics reflecting one’s faith — was an even greater influence when shared by the family.

“The influence of parental education about avoiding intercourse was strengthened when there was a close relationship



between the parent and the child,” says Haglund. “It’s important for parents to be explicit that they do not approve of their children engaging in sexual activity as adolescents. It’s a simple but effective practice.”

A NEW WAY TO SERVE SPECIAL NEEDS

When faced with students with special needs, schools have traditionally created specialized solutions, whether it was gifted and talented programs or one-on-one reading coaches.

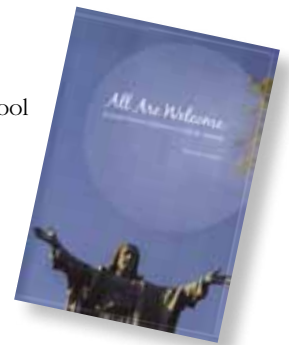
But Dr. Martin Scanlan, assistant professor of education, says this compartmentalized approach is increasingly difficult to implement as schools become more diverse — with different languages, special needs and skill levels.

Scanlan thinks the solution is a systematic approach called the Learning Consultant Model, which he details in his book *All Are Welcome: Inclusive Service Delivery in Catholic Schools*.

“The learning consultant is a faculty member with special education expertise who serves as a coach and mentor to other teachers,” Scanlan says. “This model tries to build the capacity of teachers and evolves the system as a whole to better meet everyone’s diverse needs.”

The teaching-the-teacher approach allows challenges to be addressed at classroom, school and district-wide levels instead of compartmentalizing the issues, he says. Learning consultants coach and provide resources to teachers who use instructional strategies to engage all students, and those with special needs are treated as integral members of the community.

Scanlan’s model already is being implemented in Catholic schools in Milwaukee and St. Louis. “Catholic schools in recent decades have struggled to articulate and finance service delivery systems that allow them to embrace students with disabilities,” Scanlan says. “These schools are increasingly recognizing this gap and seeking to close it.”



MARQUETTE BOOKSHELF

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



The Best Kept Secret: Single Black Fathers

By Dr. Roberta Coles, associate professor of social and cultural sciences (Rowman & Littlefield, 2009)



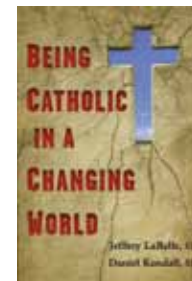
Theological Foundations for Environmental Ethics: Reconstructing Patristic and Medieval Concepts

By Dr. Jame Schaefer, associate professor of theology (Georgetown University Press, 2009)



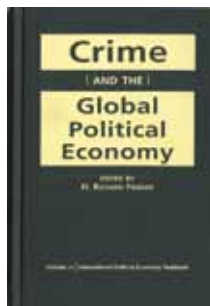
Children and Youth in a New Nation

By Dr. James Marten, professor of history (New York University Press, 2009)



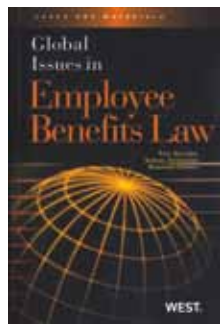
Being Catholic in a Changing World

By Rev. Jeffrey LaBelle, S.J., assistant professor of education, and Rev. Daniel Kendall, S.J. (Paulist Press, 2009)



Crime and the Global Political Economy

Edited by Dr. H. Richard Friman, Eliot Fitch Chair for International Studies (Lynne Rienner Publishers, 2009)



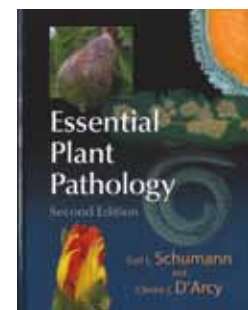
Global Issues in Employee Benefits Law

By Paul Secunda, associate professor of law, Samuel Estreicher and Rosalind Connor (Thomson-West, 2009)



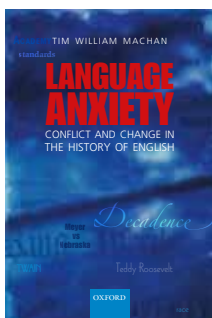
Faculty Stress

Edited by Dr. David Buckholdt, director of the Center for Teaching and Learning, and Dr. Gale E. Miller, professor of social and cultural sciences (Taylor & Francis, 2009)



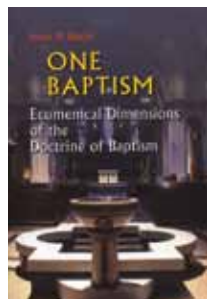
Essential Plant Pathology

By Dr. Gail Schumann, adjunct professor of biological sciences, and Dr. Cleora J. D'Arcy (American Phytopathological Society, 2010)



Language Anxiety: Conflict and Change in the History of English

By Dr. Tim Machan, professor of English (Oxford University Press, 2009)



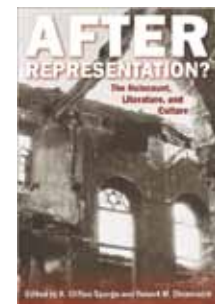
One Baptism: The Ecumenical Implications of the Doctrine of Baptism

By Dr. Susan Wood, professor of theology (Liturgical Press, 2009)



Global Social Economy, Development, Work and Policy

Edited by Dr. John B. Davis, professor of economics. (Routledge, 2009)



After Representation? The Holocaust, Literature, and Culture

Edited by Dr. R. Clifton Spargo, associate professor of English, and Dr. Robert Ehrenreich (Rutgers University Press, 2009)



RESEARCH AND SCHOLARSHIP AT MARQUETTE

- Marquette faculty applied for significantly more federal grant dollars during fiscal year 2009, and externally funded research requests exceeded \$35 million for the first time. Marquette faculty won several research awards as part of the federal stimulus package.
- Federal, state, foundation and corporation research awards all increased in fiscal year 2009, and corporate research dollars increased more than 50 percent from the previous fiscal year.
- Marquette faculty have strong partnerships with the Clinical and Translational Science Institute, Medical College of Wisconsin, University of Wisconsin system, and others.
- 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.