

BAYLOR

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In this issue we point the spotlight toward three of Baylor's professional schools: the School of Law, the Hankamer School of Business and the newly named Diana R. Garland School of Social Work. Each of these equip students for specific career paths, bringing successful practitioners and scholars from the field into Baylor classrooms where they prepare students to practice their vocations in increasingly complex arenas.

You'll meet Dr. Samantha Vo, assistant professor in the Diana R. Garland School of Social Work, who came to Baylor in Fall 2013 with degrees from Dartmouth, the University of Chicago and the University of California at Berkeley. Dr. Vo examines the significant overlap between social behavior and economic realities. Her research agenda emanates from her experience with the social, political and economic strategies employed by cooperatives of rural coffee farmers in Central America.

Jim Wren, professor of law, applies marketing research techniques to the practice of litigation, providing future lawyers the analytical tools needed to help them advocate more effectively for their clients. Still representing clients and licensed for federal practice before the U.S. Supreme Court, the Fifth Circuit Court of Appeals, the U.S. Court of Federal Claims and more, Wren provides Baylor law students an informed window into the intricacies of advocacy and cross-examination.

Within the Hankamer School of Business, you'll meet Dr. William Reichenstein, the Pat and Thomas R. Powers Chair in Investment Management. As the world's economy becomes increasingly uncertain, Reichenstein's award-winning research delves into issues of immediate concern to a generation of workers approaching retirement: asset and wealth management, taxes, retirement investments, social security and more.

The professional schools are only one aspect of this issue of *Baylor Research*. You'll also read about Dr. Thomas Kidd, professor of history, prolific author, and senior fellow in the Institute for Studies of Religion. In addition to being an eminent scholar, Kidd is a favorite with Baylor students, using social media to connect research on 18th century North American religious history to issues in today's culture. You'll find his *Anxious Bench* blog at Patheos.com.

Finally, as shown in previous issues, research at Baylor is often the outgrowth of a collision between fields of study. In an increasing number of cases, it is also the outgrowth of collaborations between faculty at Baylor University, the Baylor College of Medicine and Baylor Scott & White Health.

Philosophy and medicine come together in the work of Dr. James Marcum, professor of philosophy in the College of Arts and Sciences and former Harvard Medical School faculty member. As director of the Medical Humanities Program, Marcum and his colleagues prepare students for careers in healthcare through a rigorous interdisciplinary program of study.

Dr. Bashoo Naziruddin, Director of the cGMP Islet Cell Processing Laboratory at the Baylor Research Institute in Dallas and Dr. Robert Kane of Baylor's Institute for Biomedical Research are working to increase the survival rate of transplanted pancreatic islet cells — a procedure offering the hope of a cure for the millions of individuals with type 1 diabetes.

Dr. Bin Zhan, director of the Molecular Biology Unit of the Center for Vaccine Development at Texas Children's Hospital, and Baylor biologist Dr. Choelho Sim, an expert on disease-bearing mosquitoes, are seeking a vaccine to stop the spread of filariasis, a leading cause of death in developing countries.

Dr. Yang Li and Dr. Brian Garner, faculty members from the School of Engineering and Computer Science, and Dr. Garrison Benton, an orthopedic surgeon at Baylor Scott & White Health, are developing a wireless biosensor system with the potential to greatly reduce the risk of falls in the elderly.

The last of these brings with it an unusual twist: I remember Dr. Benton as a young National Science Foundation Research Experiences for Undergraduates (REU) fellow in the summer of 1999, working in my lab at CASPER. Time flies! And Baylor's investment in a bright, driven undergraduate has come full circle in Dr. Benton.

It's my sincere hope that what's conveyed in these words is what I feel every time I walk onto the Baylor campus — walls are coming down, lines of inquiry are intersecting, and the Baylor community of scholars continues to grow. As always, our students — undergraduate, graduate and professional — remain at the center of the dialog. What a great time to be at Baylor!

*Sic 'em, and thank you  
for your interest in  
Research @ Baylor!*

To learn more, please visit our websites at [www.baylor.edu/research](http://www.baylor.edu/research) and [www.baylor.edu/bric](http://www.baylor.edu/bric).

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For further information visit our Web site at [www.baylor.edu/research](http://www.baylor.edu/research)  
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DR. TRUELL HYDE, VICE PROVOST FOR RESEARCH

# DR. BENJAMIN F. BROWN IV FUND

for INTERDISCIPLINARY and COLLABORATIVE  
SCHOLARSHIP helps BAYLOR in BRAZIL PROGRAM  
PROMOTE ADOLESCENT HEALTH

**A**t Baylor, part of *our mission* is to be a positive force for good wherever there is a need or opportunity to improve the lives of others, whether that is here at home or across the world.

With this in mind, many scholarly researchers have founded programs to meet the needs of the world that they see around them. One such program is the Baylor in Brazil Program, founded and led by Dr. Eva Doyle, professor of health, human performance and recreation in the Robbins School of Health and Human Sciences.

Under Doyle's leadership, a team of Baylor faculty and students have been promoting health and wellness among the children of Espírito Santo, located in Victoria, Brazil, since 2006. Every year, the team gives of their time, efforts and resources working on research to help strengthen and secure the future health of the community.

"If you want to impact the health of any population you should start with the children," Doyle says. "We are training school personnel, church personnel and volunteers to do this work while we are there and after we leave. We are not just going in and doing the work for them; we are helping them develop skills and knowledge that will last forever."

The project includes assessing the health-related behaviors of adolescents in the community, identifying needs based on that

assessment and then developing necessary health promotional materials to educate the children on better health practices. Doyle and her team hope the education provided through the program will help the children begin to focus on their health and adopt positive habits early in life. In the longer term, they hope the lifestyle changes will result in fewer health issues for the children when they are older, lessening the burden on the nation's socialized healthcare system.

Recently, the Baylor in Brazil program gained the capacity to more effectively document the specific health needs in the Espírito Santo community with the help of a research grant from the Dr. Benjamin F. Brown IV Fund for Interdisciplinary and Collaborative Scholarship. The fund, made possible by a generous gift from Dr. Clara Lovett in honor of her late husband, provides annual grants to Baylor faculty members who wish to engage in research and curriculum development on topics of global significance. With its focus on improving public health in an underserved community, the Baylor in Brazil program was a great fit.

"There is a measuring instrument used by the World Health Organization called the Global School-based Student Health Survey (GSHS) that we have implemented to help us more accurately and closely document the children's health needs," Doyle says. "The instrument is designed to collect information about adolescent behavioral risk factors and protective factors in schools. The Brown Fund helped us take the step we needed toward documenting the assessments of the children's health needs."

The data received from the GSHS instrument will help the team better identify the children's needs, allocate resources and target other populations for future intervention. Doyle and her team hope to expand their reach to other communities throughout Victoria and eventually to other states across Brazil. With those goals in mind for the future of the program, Doyle believes greater things are in store for her research program and for the people of Brazil.

"There is a way for us to accomplish quality research, community service and community development all working together to cooperatively promote health and wellness in the communities of Brazil that need it."



# NEW RESEARCH GRANTS

help SCIENTISTS BROADEN *their* RESEARCH  
through COLLABORATION

**T**hree of the stories in this year's *Research* magazine feature research supported by a collaborative program that brings together researchers from institutions sharing the Baylor name.

Each of these projects is funded through the **COLLABORATIVE FACULTY RESEARCH INVESTMENT PROGRAM (CFRIP)** and jointly sponsored by Baylor University (Waco, TX), Baylor Scott & White Health (Temple, TX and Dallas, TX) and Baylor College of Medicine (Houston, TX).

The CFRIP program invites faculty members at each institution to submit proposals leveraging the expertise of their colleagues on one or more of the other campuses. In its first year, the program provided nearly \$250,000 in research support for five collaborative research projects.

Dr. Truell Hyde, Baylor University's vice provost for research, says the CFRIP program is specifically designed to bring together faculty across the Baylor institutions in order

to take advantage of the research capabilities present across their various campuses.

"We're fortunate to have so many Baylor research institutions located just a short drive from one another," Hyde says. "The initiatives supported by this program encourage collaborations between scientists from each of these campuses and are producing new and innovative research."

The group of scientists leading the 2014/2015 round of projects includes three investigators from Baylor College of Medicine, two from the Baylor University Healthcare System, three from Baylor Scott & White Health and four from Baylor University.

Hyde says these collaborations represent the fruit of ongoing efforts on the part of Baylor leadership to encourage collaboration among their respective faculty.

"Over the past few years, we have held informal conversations as well as more structured events to explore areas where our faculty members' overlapping expertise could help expand each other's research capacity. With investment from each institution, CFRIP is a tangible result of that partnership."

## 2014/2015 CFRIP AWARDS

"Anti-filarial vaccine discovery through transcriptome analysis of *Brugia pahangi*"

**Dr. Bin Zhan**, Baylor College of Medicine  
and **Dr. Cheolho Sim**, Baylor University

"Covalent protection of islets with multiple agents including 'self' peptide"

**Dr. Bashoo Naziruddin**, Baylor University Medical Center  
and **Dr. Robert Kane**, Baylor University

"Defining the role of FOXM1-regulated metabolome in African American triple negative breast cancer"

**Dr. Arundhati Rao**, Baylor Scott & White Health  
and **Dr. Arun Sreekumar**, Baylor College of Medicine

"Electrically-small, power-efficient wireless wearable antenna for falling prevention"

**Dr. Garrison Benton**, Baylor Scott and White Health,  
**Dr. Yang Li**, Baylor University  
and **Dr. Brian Garner**, Baylor University

"New-onset post-AVR atrial fibrillation"

**Dr. Angela Hochhalter**, Scott & White Health  
and **Dr. Giovanni Filardo**, Baylor University Medical Center

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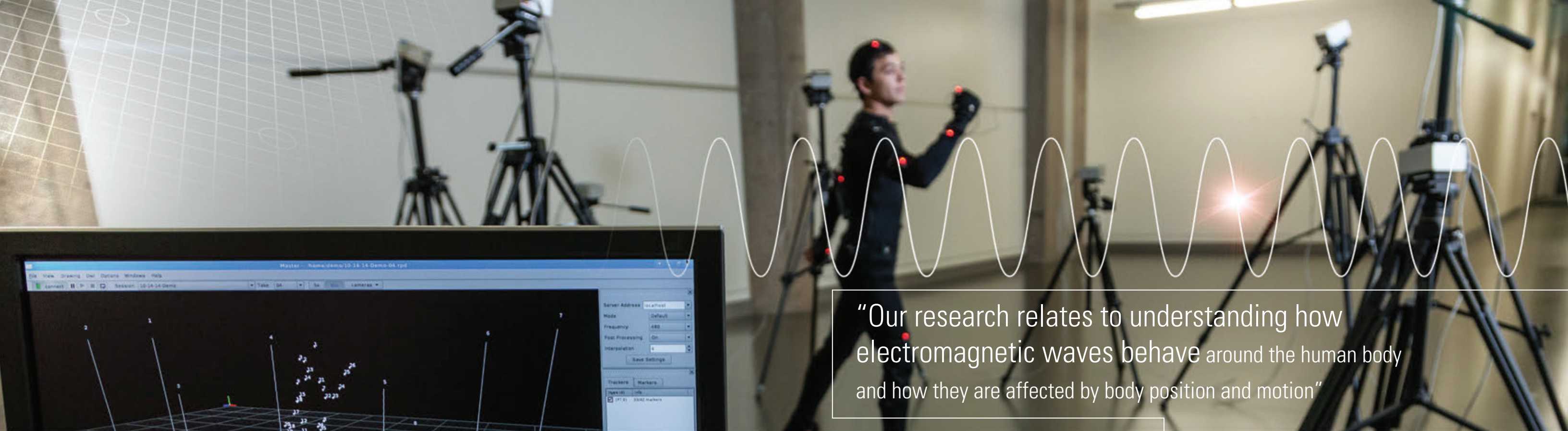


# MAPPING MOTION

A TRIO *of* BAYLOR RESEARCHERS IS DEVELOPING A SYSTEM *of* WIRELESS BIOSENSORS *to* MONITOR MOVEMENT *in* FALL-PRONE SENIORS

DR. BRIAN GARNER + DR. YANG LI + DR. GARRISON BENTON

**A**s the American population has aged, injuries from falls have increased dramatically. The Centers for Disease Control and Prevention estimates that one out of three adults aged 65 and older suffers a fall each year. In 2012, 2.4 million nonfatal falls occurred among the elderly, resulting in direct medical costs topping \$30 billion. Falls have become the main cause of injuries to older adults, and are the leading cause of all traumatic brain injuries.



“Our research relates to understanding how electromagnetic waves behave around the human body and how they are affected by body position and motion”

Many falls are preventable with good habits and reasonable precautions, such as getting regular exercise, finding alternatives to dizziness-inducing drugs or simply identifying and removing stumble hazards from the home.

Researchers have found that many elderly individuals develop patterns of motion that make a fall more likely. Finding a way to detect and report these “precursor” motions to physicians could enable them to intervene in time to prevent a potentially life-threatening accident. But for the technology to be practical, a subject’s movements need to be monitored and reported continuously throughout daily life. Currently, that requires cumbersome equipment that limits researchers’ work to laboratory settings.

But all of that could be about to change. Thanks to new developments in wireless body area networks (WBANs), there has been a recent explosion in portable and wearable technology such as Google Glass and smart watches. WBANs allow electronic devices to communicate with one another over a highly localized radio frequency network. These can be likened to a Wi-Fi network confined to a particular home or office building, but on the scale of an individual person. WBANs offer the promise of individualized patient monitoring, but even the most efficient systems available now have a problem — *battery life*.

Sensor batteries must be able to operate for weeks or months at a time; currently, however, batteries last only a few days at most. And it seems the tiny antennas used to transmit the sensor’s signals are among the worst power consumers.

“Long term, our goal is to implement a power-efficient wearable wireless body sensor network that continually monitors a person’s movements and sends that data to a centralized database where it can be evaluated,” says Dr. Yang Li, assistant professor of electrical engineering in Baylor’s School of Engineering and Computer Science and one of the three collaborating researchers on the project. “But our current objective is to design and optimize efficient, wearable sensor antennas that can be worn during regular daily living.”

Li heads up antenna and sensor development for the project. He has worked with wireless signal transmission in many challenging indoor and outdoor environments ranging from airliners to forests. But this project presents a completely different set of challenges.

“Sensor performance is affected simply by the presence of the human body; the signals can be obstructed by body segments as they move,” Li says, adding, “And then we have to correlate motion data from the sensors with the actual risk of falling.”

This will require simultaneously tracking the positions and movements of hands, elbows, arms, legs, knees, feet, even the motion of a subject’s torso. Fortunately mapping movement is right up Dr. Brian Garner’s alley.

A Baylor associate professor of mechanical engineering, Garner uses sophisticated motion-capture cameras and software to plot — and then duplicate — the intricate movements of humans, horses and other animals. It’s the same technology that was used to make animated characters like Gollum from *The Lord of the Rings* and *The Hobbit*

appear more lifelike. But tracking movement is one thing; compiling and transmitting the resulting data is something else again.

“Our research relates to understanding how electromagnetic waves behave around the human body and how they are affected by body position and motion,” says Garner. “This understanding will guide us in designing more efficient antennas, making it possible for smaller and smaller sensors to operate longer and longer.”

Though they are engineering faculty colleagues, Li and Garner had not interacted much until they attended an on-campus workshop in 2013. Garner’s biomechanics expertise meshed with Li’s focus on wireless technology and they hit upon the idea of a small, wearable wireless system to monitor human motion. But the two could not seem to settle on a specific application for the technology, and neither had the medical knowledge the project would require.

Garner had become acquainted with Dr. Garrison Benton a few years earlier when his daughter had an accident. Benton was the Baylor Scott & White Health orthopedic surgeon who set and splinted her broken arm. He learned that Benton wasn’t only a skilled surgeon, he also held a mechanical engineering degree from Baylor. So Garner and Li reached out to him for input.

“We spoke the same engineering language!” Li says of Benton. “He offered the interesting question of evaluating the risk of falling for geriatric patients, and that led us to collaborate on applying wireless sensors to track their motion, to predict their fall risk.”

Together the three researchers are continuing to refine their design concept. Each brings an individual perspective to their work. As a physician and engineer, Benton foresees a highly portable medical system that capitalizes on some of the technology already developed for wearable devices.

“Already we are seeing the emergence of wireless ‘on-body’ sensors coupled with smartphone technology in ways that will improve our health. Our hope initially is to apply this nonintrusive technology to people at risk of falling. Hopefully we can prevent falls and fall-related injuries, improving their well-being and giving their loved ones some peace of mind,” Benton says.

Similarly, Li sees an ever-widening array of potential applications for the system.

“This technology will find other applications beyond healthcare, anywhere a person’s vital signs, performance, movements or response to extreme environments need to be monitored — firefighters, policemen, members of the armed forces and astronauts, for example. This may very well be the emerging technology today that cellular phones were just a few decades ago.”

For Garner, the project is more personal.

“I lost my grandfather to a heart attack when I was 12; he was just 59. I’m certain that if the medical care we have today had been available to him, he could have lived many more years. I hope this technology will raise current care capabilities to an even higher level by broadening medical oversight that is currently confined to the clinic and lab settings, bringing it into regular, daily life.”

# CELLMATES

## TWO BAYLOR RESEARCHERS STRIVE *to* IMPROVE SURVIVABILITY *of* TRANSPLANTED PANCREATIC CELLS

**W**hen *professional racing cyclist* Justin McQuerry sweeps past crowds of cheering fans, few would suspect that he and his teammates have much more in common than a passion for winning — they are all type 1 diabetics.

McQuerry and his fellow racers are members of Team Novo Nordisk, a global all-diabetes sports team of cyclists, triathletes and runners. They ride to make a point: type 1 diabetes may be a potentially devastating disease, but it doesn't have to hold anyone back.

"I was diagnosed at age 2 years, 9 months, so I really don't know much else other than living with diabetes," McQuerry explains. "Growing up I never really thought much of managing my diabetes; it was just a part of my daily routine."

Type 1 diabetes occurs when "beta cells" in the pancreas come under assault from the body's autoimmune system and stop making insulin, a hormone crucial to regulation of sugar in the body. As in McQuerry's case, the disease usually strikes in early childhood.

New drugs, insulin pumps and other advancements have

made it easier and less painful for diabetics to cope with their disease, improving their quality of life while extending their life spans by decades. But unfortunately, a cure remains out of reach.

Or does it?

Transplantation of an entire pancreas or of the pancreatic "islets" that contain beta cells has been practiced for over 40 years with results that have been dramatic at times. But widespread and routine use of the procedure faces several obstacles. First, there are very few viable organs available for transplantation, and islets themselves are very difficult to condition for transplantation. Only a few institutions have the necessary infrastructure to attempt it. Even when islets can be transplanted, the same autoimmune process that caused the patient's diabetes can destroy the new islets, sometimes in only a matter of hours. Inflammation of the islets adds to the problem, as does the danger posed by the clots

formed when blood cells clump together on the islets. Each of these challenges is formidable.

"It's not a new issue; people have described the problem for a long time and are using several approaches to protect the islets, to minimize the damage," says Dr. Bashoo Naziruddin, director of the Baylor Research Institute's cGMP Islet Cell Processing Laboratory in Dallas. Naziruddin, a transplant immunologist, has spent decades studying islets and working to improve the transplantation success rate. For the last several years he has been aided by a steady stream of top-notch graduate students in chemistry and biochemistry, many of whom come to his lab from Baylor University's Institute of Biomedical Studies in Waco. Baylor chemistry professor Dr. Robert Kane is the institute's director. Several years ago one of Kane's students was developing ways to attach molecules to the exterior of a cell. Naziruddin heard about the project.

"I told Dr. Kane that pancreatic islets would be a good cell model to use because they just make insulin. It's easy to track down where the insulin is secreted, how much is secreted; so after any modification you do it's easy to check the biological

function to see the effect." That turned out to be very good advice, and the two soon began to evaluate techniques to give the islets a kind of Harry Potter-esque "invisibility cloak" that keeps them from being seen as a threat by the body's immune system.

"That's the goal, to 'camouflage' the islets so they are hidden from the blood cells that attack them," Naziruddin explains. "I really had no expertise in surface modification of islets, so I reached out to Dr. Kane."

"Right," Kane continues. "We started looking at practical approaches to attaching molecules in a way the islets could tolerate them. We established fairly quickly that we could do the chemistry; then we had to decide what to attach, what molecules would hide the islets."

Although an ambitious project, early results are encouraging and the two institutions bring an array of capabilities to bear on the problem, making Kane confident.

"My lab is very good at looking at things at the atomic scale. We do organic chemistry, we look at what bonds are formed, we know how to manipulate things on that scale. Dr. Naziruddin is very good at manipulating things on the cellular and organ scales, and he is in a clinical environment as well. So our work goes all the way from the atomic scale up to the human scale," he says.

"The 'bench-to-bedside' approach is what we call it," Naziruddin adds. "We not only have a major transplant center, we also have the ability to do basic research. We have over 600 human trials going on right now, so anything we find in the lab could be translated into a clinical setting very quickly."

That would suit McQuerry just fine.

"A cure would literally be life-changing," he says, adding, "but as a cyclist and an endurance athlete, I will always be dedicated to good nutrition and living a healthy lifestyle."

DR. BASHOO NAZIRUDDIN + DR. ROBERT KANE




COFFEE

COMMUNITY  
AND  
CULTURE

BAYLOR SOCIAL WORK  
PROFESSOR *studies*  
COOPERATIVES  
*that* HELP LATIN  
AMERICAN FARMERS  
OVERCOME  
CHALLENGES

DR. SAMANTHA VO





"Research gives us a framework for thinking critically about communities, clients and interventions"

When most of us *pour a cup of coffee*, we don't think much about how the beverage in our mug got its start. But a lot has to happen behind the scenes to turn raw coffee beans into the *roasted, ground and packaged product* we find at our local supermarkets.

For Dr. Samantha Vo, an assistant professor in Baylor's Diana R. Garland School of Social Work, thinking about the conditions under which coffee is grown is just part of a larger question regarding how people in marginalized communities work together to achieve social and economic objectives. While farming is never an easy occupation, Vo says that many Latin American coffee growers face a unique set of social, political, economic and environmental challenges. "Because the global coffee market is dominated by a handful of multinational companies since the demise of the International Coffee Agreement, it can be difficult for individual farmers to earn a living wage producing coffee beans," she explains. "Many independent farmers don't have the political and economic clout to do things like negotiate fair prices for their crops or access capital to purchase necessary equipment. Small farmers are also vulnerable to environmental changes because they often do not have the capacity to diversify their income."

To counteract these difficulties, many farmers choose to organize into cooperatives – groups of small farms that pool resources and share costs to help level the playing field between these individuals and larger, corporate farming operations.

But these cooperatives are more than just economic arrangements. They form the backbone of social and political life for many people in Central America, a fact Vo observed first-hand while working in the region as a social worker prior to joining the Baylor faculty.

"Cooperatives are central to the story of well-being for people in these communities," she says. "In many rural areas, there is limited government presence, so cooperatives often step in to fill the void of social services. The cooperatives help to fill a vacuum otherwise vulnerable to drug trafficking and undocumented migration."

Because cooperatives play such an important role in engaging with the community, Vo says, it is important for scholars to understand their methods and strategies to determine why some efforts succeed while others fail.

## Resilience, not deficiency

Social work research often identifies problems that limit prosperity. While it's important to understand a community's needs, Vo says that focusing only on deficiencies can lead to implementing short-sighted solutions. There is more to be gained, she says, from learning what groups are doing to overcome problems on their own through political activism and community organization.

"What we've learned from these cooperatives has potential implications for people in similar situations in other locations around the world," says Vo, who joined the Baylor faculty in 2013 after earning her Ph.D. at the University of California at Berkeley. "Approaching the research from a strengths perspective flips the script – these farmers could easily be portrayed as victims, but instead they're agents of progressive social change."

## Professional preparation

As a professional school, Baylor's Garland School of Social Work is focused on preparing its students for their future careers. Most of the school's graduates will enter private practice or work for government agencies or non-profit organizations. With relatively few students planning careers in academia, it might seem strange for social work faculty members to be actively involved in research. However, according to Vo, research skills are central to social work practice at all levels.

"Research gives us a framework for thinking critically about communities, clients and interventions," she says. "It's not just about knowing what works and what doesn't, it's about understanding why some things work better than others in particular situations."

In addition to her work with cooperatives in Central America, Vo has other ongoing research projects that directly involve Baylor social work students. This summer, she and a group of students will travel to the Dominican Republic to carry out program evaluation research in collaboration with Buckner International. She says that exposing her students to research experiences so early in their academic career positions them to make a positive contribution to the field of social work after graduation, no matter where they choose to work.

"There is no 'typical' career path for a social work major," she explains, "but one commonality is that our students are driven by a desire to help people and make a positive difference. Whether their eventual careers involve working directly with clients, participating in community organizations or carrying out political advocacy, we want to prepare our students to carry out 'compassionate practice,' meaning practice that is guided by an empirical understanding of what types of interventions might be appropriate or inappropriate in a given situation."



A man in a dark suit and red tie stands in a trading floor, leaning on two chairs. Above him is a large circular electronic display showing stock market data, including the 3M logo and '3M CO'. The room has a modern, professional feel with wood paneling and multiple monitors.

# STRATEGIES FOR \$AVING

DR. WILLIAM REICHENSTEIN

BAYLOR RESEARCH  
REVEALS *the* INVESTMENT  
*and* WITHDRAWAL  
STRATEGIES *that* LEAD  
*to a* COMFORTABLE  
RETIREMENT

**F**or many Americans, *saving for retirement seems like a daunting task*. Investors often face a dizzying array of choices, from pre-tax vehicles like employer 401(k) programs to after-tax options like Roth and other individual retirement accounts. At the time of retirement, there are more choices to be made regarding the timing and source of distributions.

For each of these decisions the stakes are high. Making the wrong choice can cause unnecessary tax burdens and potentially leave insufficient funds for a comfortable retirement. Fortunately, there's help.

Dr. William Reichenstein, the Pat and Thomas R. Powers Chair in Investment Management at Baylor's Hankamer School of Business, has taught and performed research in finance since 1978. His research helps individuals maximize the value of their retirement savings by optimizing strategies both during their working years and later during retirement.

His work has appeared in popular publications such as *Barron's*, *Forbes* and *Smart Money*, and he is a frequent contributor to the *Wall Street Journal*.

"I got into this field to help people," says Reichenstein, the author of more than 160 peer-reviewed articles in professional and academic journals. "Most people haven't thought much about the best financial strategies, so it's critical that they have the information they need to make informed choices."

While many people don't give much thought to the distribution of their investments, Reichenstein says that even those who take an active approach often don't make the best decisions on where to allocate their assets – an error that can be compounded later in life if the investor does not consider tax implications when taking distributions after retirement.

"Following conventional wisdom on withdrawal strategies in retirement can ignore the impact of taxes and lead people to make short-sighted decisions," he explains. "I've found that a better strategy is to view tax-deferred accounts (TDAs) like traditional IRA or 401(k) as a partnership. Because of taxes, the government effectively owns a portion of the principal in TDAs, but we should look for opportunities to withdraw funds from TDAs when tax rates are unusually low."

In addition to strategic management of TDAs, Reichenstein's research also helps retirees decide when to begin taking benefits from Social Security, which can be an especially complex decision depending on life expectancy and earnings history.

"A married couple four years apart in age has about 70,000 different possibilities for when to begin taking individual and spousal benefits," Reichenstein explains. "For most people, Social Security is the most important retirement benefit, so it's very important to make the right decision."

In addition to his appointment at Baylor, Reichenstein is also head of research at Social Security Solutions, Inc., a firm he co-founded that has developed software to help individuals decide when to begin receiving their Social Security benefits. Users can input information on their birthday, life expectancy and Primary Insurance Amount (i.e., their benefits level at full retirement age), then the software provides customized guidance tailored to the investor's specific situation. The company also provides software to help financial planners advise their clients.

Reichenstein says his research is important not only because of how it helps individuals manage their money, but also because of how it positively impacts his students. Even though relatively few of his undergraduate and graduate students will pursue careers in private financial management, they will all be responsible for making decisions about their own personal finances. He sees helping his students become knowledgeable about retirement planning as one of the biggest benefits of his work.

"My research is meant to help people make sound decisions, and that absolutely feeds into the classroom. I want my students to not only be able to make smart decisions, but also to understand the basis for those decisions."



"... a better strategy is to view tax-deferred accounts (TDAs) like traditional IRA or 401(k) as a partnership"

# MAKING THE CASE

A BAYLOR LAW SCHOOL PROFESSOR'S RESEARCH *helps* LAWYERS TAKE *the* GUESSWORK OUT *of* CONNECTING *with* TRIAL JURORS

PROFESSOR JIM WREN

Jim Wren, professor of law at the Baylor Law School, believes that a *legal education should prepare students* to do more than think like lawyers – it should equip them to deliver solutions for their clients.

Knowing the law and how it applies to a client's situation is just the beginning. Attorneys must also be able to make difficult choices about the most impactful way to present a case to a trial jury.

To help him prepare his students to be the most effective advocates for their future clients, Wren applies research methodologies from a variety of fields to the practice of litigation, including a quantitative social science technique that was originally developed for business contexts.

"This research began with asking to what extent we could identify the most persuasive elements of a case and predict the response of potential jurors," Wren says. "We want to know how we can find people who are more likely to respond to particular elements of a case and more accurately predict how a particular jury will respond. Lawyers make choices about what to emphasize; this doesn't change the story we tell, but it might change the way it's presented."

Some of Wren's most recent research involves a technique called Rule Developing Experimentation (RDE), which was developed by Dr. Howard Moskowitz and marketing researchers seeking a more precise method of maximizing a product's consumer appeal. It involves presenting research subjects with prototypes containing randomly selected features and studying which combinations of features the subjects prefer. Using regression analysis, researchers can then identify attributes that make subjects more likely to prefer certain features.

In one early application of the technique, a manufacturer found that consumers often said they liked their coffee "strong" or "smooth," but the company was unable to translate that feedback into new blends that increased sales. Using RDE techniques, researchers presented taste testers with multiple coffee samples, each created using different blends of beans that gave the samples unique flavor profiles. RDE allowed the company to determine which of a large number of potential blends were most favored by specific segments of consumers. Even more importantly, they were able to identify naturally occurring traits in the consumers that predicted which blend of coffee they would prefer and the form of marketing to which they would be most responsive.

In a legal context, Wren says that RDE improves on traditional methods of jury research by revealing clues to jurors' preferences that can't be discovered through simple demographic analysis or focus groups.

"The demographics of a jury are a mere clue to possibilities, but they don't always tell the whole story," he says. "This research helps us to go beyond demographics and find out what people's attitudes are likely to be in ways that are relevant to the case."

Wren's passion for applying and testing theory makes him a great fit at Baylor Law School, where solving contemporary legal problems through research is a critical part of helping prepare students for success.

"Being active in research helps keep me and my colleagues at the forefront of our field," he says. "By bringing together disparate research from different fields and explaining how to use it for trial law, we can give our students the best possible preparation for practice."

**D**r. James Marcum, professor of philosophy in Baylor's College of Arts and Sciences, believes strongly that *competent and comprehensive healing requires thorough knowledge* of the science behind the human body's function, as well as a respect for the personhood of the patient.

While some dismiss these emotional tools as unnecessary for doctors who rely on evidence-based scientific knowledge, Marcum, who is also the director of Baylor's Medical Humanities Program, sees the art of healing and the science of medicine as two sides of the same coin, with both competencies equally necessary to provide optimal patient care.

"Medicine is a moral enterprise, not a social or behavioral science," he explains. "Patients want their doctors to see them as a person, not a diseased body part. Physicians need to connect with their patients as humans because that connection gives patients confidence that their doctor is doing what's best for them."

Marcum is no stranger to the hard science of medicine. He holds dual Ph.D. degrees in physiology and philosophy and was previously a faculty member in the Harvard Medical School's department of pathology.

#### DR. JAMES MARCUM

He came to Baylor in 2001 to teach philosophy of medicine, an area that he says is in many ways both a young field and an old one.

"All the way back to Hippocrates, medicine has existed on a continuum between art and science," he explains. "Early physicians were more like priests – faith-based healers who performed rituals meant to draw on the healing power of the supernatural. Later, doctors became natural philosophers who sought to understand the world through an intellectual approach to studying its processes."

Prior to the early 20th century, medical schools in the United States varied greatly in their curriculum and admission requirements. There was little uniformity in the scientific rigor of the coursework schools offered, and many had admission requirements that seem shockingly lax today. Some did not even require applicants to graduate from high school before enrolling.

The tide began to turn in 1910 when Abraham Flexner published a set of recommendations for medical education based on the standard model in use at The Johns Hopkins University School of Medicine. Flexner called for medical schools to emphasize more strongly rigorous scientific training as part of their admission and graduation requirements, leading to nationwide changes in curriculum at both the undergraduate and

## A MORAL ENTERPRISE

BAYLOR'S MEDICAL  
HUMANITIES  
PROGRAM  
PREPARES FUTURE  
HEALTHCARE  
WORKERS *to TREAT*  
PATIENTS, *not*  
DISEASES

professional levels. While the desire to improve doctors' technical and scientific expertise is laudable, it quickly became evident that placing greater emphasis on science caused many physicians to undervalue the art of healing – the human element of treating disease.

One early critique of this trade-off came from Dr. Francis W. Peabody, a Harvard Medical School professor. In a 1925 lecture, he praised the progress of science that had occurred in recent years, but argued that the art of treating patients should not be ignored. He challenged medical schools to turn students into physicians who could see the entire "clinical picture" of a patient, which he described as "not just a photograph...but an impressionistic painting" that takes into account a patient's home life, occupation, culture, emotion and spirituality. "One of the essential qualities of the clinician is interest in humanity," he concluded, "for the secret of the care of the patient is in caring for the patient."

Now, nearly 90 years later, Marcum says ample evidence suggests Peabody's criticism was correct.

"One of the most common complaints from hospital patients is that doctors don't listen," he says. "An important part of decision-making is intuition; doctors have to make their emotions work and get patients involved in treatment decisions. Managing relationships, demonstrating empathy and giving patients confidence require virtues on the part of the physician."

**B**ecoming an empathetic, virtuous person doesn't happen overnight, nor does it happen in a one-semester course. That's why Marcum believes education in the medical humanities is a lifelong process that should begin with developing skills as a student then remain a focus all the way through continuing medical education for practicing physicians.

"Studying medical humanities is important because it helps doctors develop a moral compass," Marcum explains. "It needs to be appropriate to the student's expertise and maturity level, but it is critical to helping students think about important issues in appropriate, socially acceptable ways."

Marcum is not alone in his belief that humanities study is important for future doctors. He points to recent changes to the MCAT – the standardized test used as an admission tool by most medical schools – as evidence of a growing consensus regarding the need for more humanities training in medical education.

"The push to make medicine a science tended to exclude the humanities. But more and more medical schools are recognizing the importance of humanities training, and that is reflected in changes to the MCAT. It now includes behavioral medicine and medical ethics, which encourage pre-med students to take courses like bioethics, critical thinking and sociology of medicine."

With medical schools placing such a strong emphasis on humanities education, Marcum says it's critical that Baylor provide a strong foundation to its pre-med students. That's also a big part of why he believes it is important for faculty to be active researchers.

"Baylor's reputation has always been tied to healthcare," he says. "Pre-med is our most popular undergraduate major, so we have to prepare those students to be leaders. If our professors' ideas aren't being tested by the larger academic community, then those professors aren't giving their students the best education possible."

But the importance of Marcum's research stretches far beyond just preparing students for success. He sees the function of his work as advancing scholarly conversations about issues that matter to everyone.

"As professors, we have to profess to more than just our students. We're professing to the academic community, too. Some of those conversations can be difficult or even painful, but that's all a part of the process of generating knowledge. Human understanding is critical to being a compassionate, caring person. If we're not doing research, we won't have a very deep understanding of the human condition."

# reTWEETING HISTORY

DR. THOMAS KIDD

A BAYLOR SCHOLAR  
*uses* SOCIAL MEDIA *to*  
PLACE HISTORICAL IDEAS  
*in a* MODERN CONTEXT

**R**esearch is meant to *generate knowledge*, but unless that knowledge is shared, it won't make an impact or advance scholarly conversations on a topic.

While it was once common for research to be shared only with readers of academic publications, a growing number of investigators are using social media tools to disseminate their research to a larger and more diverse audience than ever before.

It might seem strange for a historian to make use of the latest social media technologies, but Dr. Thomas Kidd, a professor of history in Baylor's College of Arts and Sciences, uses a number of these tools to connect his research to contemporary popular conversations. Kidd studies 18th-century North American religious history, specifically the history of evangelicalism. His work presents the

lives of central figures in the formation and spread of American religion as well as the role of religion in our nation's early history, topics that continue to resonate in current discourse about the role of religion in society.

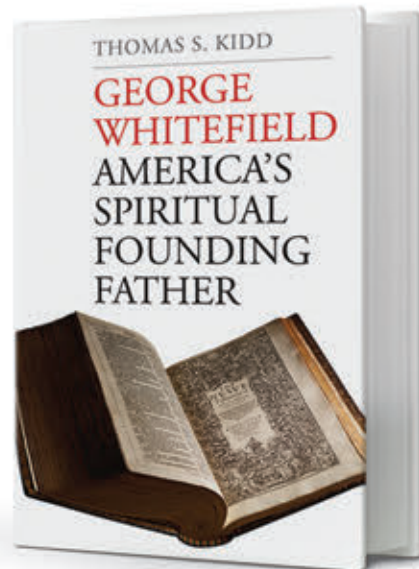
Kidd's most recent book, *George Whitefield: America's Spiritual Founding Father*, chronicles the life and career of an 18th-century Anglican minister who, despite being one of the most widely known and successful evangelists of the 18th century, does not enjoy the same popularity today as some of his contemporaries.

In many ways, Whitefield (pronounced "whit-field") was a man ahead of his time. Considered one of the first 'celebrity preachers,' he drew large crowds to revival services in both his native England and the American colonies. Whitefield is often compared to another famous evangelist, Billy Graham, the 20th-century Baptist evangelist who spoke to huge audiences at meetings and prayer services on six continents. Just as Graham was considered a pioneer for his use of television in his ministry, Whitefield also made use

of the technology of his day to help spread his message. When he traveled to a new area to preach, Whitefield would send advance teams to distribute printed flyers and handbills announcing his upcoming sermons.

"Whitefield worked incredibly hard, delivering tens of thousands of sermons in his career and traveling far more than any other preacher of his time," Kidd explains.

"He also had an innate talent for public speaking that was unsurpassed. Finally, he was open to new methods, such as outdoor services and the latest types of print



Whitefield also made use of the technology of his day to help spread his message. When he traveled to a new area to preach, Whitefield would send advance teams to distribute printed flyers and handbills announcing his upcoming sermons.

media, to get the message of the gospel out to as many people as possible."

Reviewers have praised Kidd's biography for its objective presentation of both Whitefield's successes and his notable shortcomings. Whitefield was a brilliant theologian and public speaker, but like many colonial Americans, he was a slave owner.

According to Kidd, presenting a fair and accurate biography of historical figures like Whitefield requires scholars to wrestle with difficult questions. Biographers must balance their desire to portray their subjects' significance with a duty to also report on their flaws.

Whitefield himself might have agreed. As Kidd writes in *America's Spiritual Founding Father*, Whitefield's own 1747 autobiography decried the "pious fraud" that authors commit when they present to readers "the bright, but not the dark side" of their subjects' character.

It would be easy, Kidd says, to treat Whitefield as only a Christian hero and disregard his status as a slave owner, or to consider all of his accomplishments fatally tainted by the fact that he owned slaves.

Kidd suggests a third path, emphasizing the need for biographers to deal honestly and forthrightly with both the positive and negative aspects of their subjects.

"... there's a unique benefit to students and a university when historians and other scholars are engaged in cutting-edge research and publishing"

"There is a special temptation associated with the lives of religious figures to treat them as if they were an entirely perfect and holy person," he explains. "Some may think that bringing up their failings somehow dishonors them and their work, but I don't think that it does. Of course, we also have to be humble enough to realize that we all have our failings and blind spots, and not be quick to judge people in the past. If we were in their situation, we might well have made the same mistakes that they did."

## Making history social

Kidd does not just disseminate his work through traditional publication channels. In addition to writing books and articles in the scholarly and popular press, Kidd is among the growing number of researchers who use social media as an outlet for their scholarship and commentary. He is active on Twitter under the handle @ThomasSKidd and is a frequent contributor, along with other evangelical historians, to *The Anxious Bench*, a blog dedicated to examining faith, politics and culture as they relate to religious history. He also writes a biweekly newsletter with updates on his current projects and reflections on current events.

It might seem strange for a historian to embrace modern communication technology, but Kidd believes that, at their best, technologies like blogs, tweets and podcasts serve a similar function to that of scrolls, books and newspapers of yesteryear.

A number of recent social protest movements illustrate the power of social media to bring attention to people and causes that may not receive much coverage from mainstream media outlets. In one example that Kidd blogged about on *The Anxious Bench*, the American Center for Law and Justice maintained a dogged social media campaign using the hashtag "#TweetforYoucef" in support of pastor Youcef Nadarkhani, a Christian convert who was arrested and jailed in Iran for three years awaiting trial for apostasy from Islam, a charge that could have been punished by execution. Thanks in part to pressure from the ACLJ and the U.S. State Department, Nadarkhani was convicted of a lesser charge, sentenced to time served and released in 2012.

While not all uses of social media have such noble goals or outcomes, even in their more mundane applications, Kidd sees benefits from reaching out to a global audience through platforms like Twitter.

"Although many great teachers have not been active in publishing, there's a unique benefit to students and a university when historians and other scholars are engaged in cutting-edge research and publishing," he says. "It is one thing to relate discoveries and arguments that scholars at other schools have made, and another for a teacher to introduce students to his or her own discoveries and arguments, which they are publishing with top academic presses and journals."



# TAKING THE BITE OUT OF MOSQUITO-BORNE DISEASES

DR. CHOELHO SIM + DR. BIN ZHAN

A PAIR of RESEARCHERS from SEPARATE BAYLOR INSTITUTIONS join FORCES to STEM the SPREAD of DEBILITATING TROPICAL DISEASES

The *World Health Organization* estimates that over a billion people – one sixth of the world’s population – are victims of tropical diseases, many of them insect-borne.

Some of these diseases are collectively referred to as “NTDs,” or “Neglected Tropical Diseases.” This is because NTDs largely afflict people living in poor, undeveloped or developing countries within the terrestrial cummerbund between the Tropics of Cancer and Capricorn. Consequently, NTDs are relatively low on the list of priorities of the developed world’s advanced medical research centers. That is something a pair of researchers from institutions bearing the Baylor name hope to change.

An associate professor at the Baylor College of Medicine’s National School of Tropical Medicine in Houston, Texas, Dr. Bin Zhan also heads the molecular biology unit of the Center for Vaccine Development located at Texas Children’s Hospital and the Sabin Vaccine Institute. Zhan began his career as a clinical physician, but a deep humanitarian concern for victims of filarial diseases — parasitic conditions spread primarily by mosquitoes — led him to transition to vaccine development and tropical medicine nearly two decades ago. In particular, Zhan focused on lymphatic filariasis, a debilitating condition characterized by a massive accumulation of fluid in the limbs.

“Filariasis is very widespread around the world,” Zhan says. “In fact, more than 20 million people are infected with this disease. Even if we have effective medicines to treat this disease, that doesn’t prevent transmission throughout a region, and that is our goal, to stop the spread.”

Toward that goal, Zhan has teamed with Dr. Choelho Sim, a Baylor University assistant professor of biology. Sim is a vector biologist, a scientist who is an expert on disease-bearing mosquitoes and how they spread sickness. His lab in the Baylor Sciences Building on Baylor’s Waco campus is stocked with thousands of mosquitoes bred for studies in disease transmission, including those that carry *Brugia pahangi*, one of several parasites that can cause filariasis. He and Zhan are employing an unusual strategy they hope will prevent the spread of the wormlike *B. pahangi* nematodes that infect filariasis victims.

“Our approach is called a ‘transmission-blocking’ vaccine,” Sim says. “Although this vaccine won’t be able to cure infected people, it interferes with transmission to others. It is sort of an altruistic vaccine. When mosquitoes bite people who have been immunized with the vaccine, the parasites in the mosquito’s blood meal won’t be able to mature to the stage where they can infect others.”

The nematodes begin their life cycles as tiny microfilariae that are released into the blood stream by female filarial worms dwelling in the host’s lymphatic vessels. In a mosquito, microfilariae in a blood meal from an infected animal or individual must escape the mosquito’s stomach — called the “midgut” — within 30 minutes after being ingested or they will be killed by the mosquito’s digestive enzymes. After escaping the midgut, they then must migrate elsewhere in the mosquito where they can mature to an advanced larval stage called “L3.” Only L3-stage larvae are infectious.

If successful, the vaccine will stop the development of the microfilariae before they can get to the L3 stage. When a mosquito bites a vaccinated human, the vaccine will prevent the microfilariae from moving beyond the mosquito’s midgut in time to avoid death by enzyme. The scheme can be thought of as inoculating people who then inoculate the mosquitoes that bite them.

But developing an effective vaccine depends on finding a good target molecule, one that is crucial to a microfilaria’s ability to exit the midgut and continue growing into an L3-stage larva. The two researchers will use the special capabilities of their respective institutions to find a suitable target and use it to develop the vaccine, but that is far easier said than done.

“This parasite has millions of kinds of molecules,” Zhan says. “We have to find the molecule that allows the microfilariae to escape midgut digestion and develop into L3-stage larvae.”

Sim continues, “We know that the DNA expresses RNA, and RNA eventually translates into protein. Our assumption is that at this stage microfilariae will express unique proteins that enable them to survive and break out of the midgut, so we’ll tackle the protein’s RNA. My lab will determine which RNA is expressed exclusively or ‘upregulated’ at this transition point in the mosquito.”

“And that will be a very good target for us here in Houston to use in developing the vaccine,” Zhan adds.

It is important work that has the potential for use against similar parasitic diseases, and for improving the lives of billions of people. But the researchers’ common desire to raise awareness of NTDs and promote expanded NTD research supports another significant goal of their work — prevention.

“Tropical diseases are the number one cause of death in developing countries, and they are becoming more and more common even here in America and other developed nations,” warns Zhan, citing Ebola, Chagas disease, and other highly infectious illnesses now spreading beyond the tropics.

“If we can stop them there, they won’t become a problem for us here.”

# BRIC BY THE NUMBERS

The two-plus years that have passed since the Baylor Research and Innovation Collaborative opened its doors in January 2013 have brought remarkable growth



## Baylor Research at the BRIC

- Faculty and graduate students from three academic departments
  - Electrical Engineering
  - Mechanical Engineering
  - Computer Science
- Interdisciplinary Centers and Institutes
  - Baylor Institute of Air Sciences (BIAS)
  - Center for Astrophysics, Space Physics & Engineering Research (CASPER)
  - Center for Spatial Research (CSR)

## Collaborative Research

- International aerospace corporation L-3 continues to fund three graduate level research projects with Baylor mechanical and electrical engineering departments
- Texas Education Service Center Region 12 and Huckabee Architects, Inc. occupy 5,306 square feet for research and evaluation of next-generation teaching spaces and laboratories designed by Huckabee. These organizations have funded Baylor researchers to provide independent evaluations of curriculum interventions within a novel learning environment
- Five-year-old technology services and innovation company Birkeland Current has relocated its operations to the BRIC and participates in research projects with Baylor mechanical engineering, Region 12 Education Service Center, Huckabee Architects, Inc. and PRUF Energy Controls

## BRIC-based LAUNCH Innovative Business Accelerator

- Hosted the Texas Governor's Small Business Forum
- Hosted a design workshop for international software giant SAP
- Conducted Accelerated Commercialization Program workshop for five companies
- Welcomed the first resident business incubation client, CollegeCoach.Today, to the BRIC

## Honoring Our Economic Development Commitments to Our Regional Stakeholders

- Hosted over 400 tours and 8,000 visitors since opening
- Provided research staff, faculty and graduate research technical presentations in support of the Waco Chamber of Commerce and local businesses seeking to bring new technology-based businesses to the region



## GRADUATE DEGREES AT BAYLOR

Accounting <a href="#">MAcc</a> , <a href="#">MAcc/BBA</a>	Economics <a href="#">MS</a>	Nurse-Midwifery <a href="#">BSN/DNP</a>	Public Policy and Administration <a href="#">MPPA</a> , <a href="#">MPPA/JD</a>
American Studies <a href="#">MA</a>	Educational Administration <a href="#">MSEd</a> , <a href="#">PhD</a>	Nursing Leadership and Innovation <a href="#">MSN</a>	Religion <a href="#">PhD</a>
Army Baylor University Graduate Program in Health & Business Administration, Fort Sam Houston <a href="#">MHA</a> , <a href="#">MHA/MBA</a>	Educational Psychology <a href="#">MA</a> , <a href="#">MSEd</a> , <a href="#">PhD</a>	Nursing Practice <a href="#">DNP</a>	Social Work <a href="#">MSW</a> , <a href="#">MSW/MDiv</a> , <a href="#">MSW/MTS</a> , <a href="#">MSW/MBA</a> , <a href="#">PhD</a>
Army Baylor University Entry Level Doctoral Program in Physical Therapy, Fort Sam Houston <a href="#">DPT</a>	Electrical and Computer Engineering <a href="#">MSECE</a> , <a href="#">BSECE</a> , <a href="#">MSECE</a> , <a href="#">MSECE/PhD</a>	Nutrition Science <a href="#">MS</a>	Sociology <a href="#">MA</a> , <a href="#">PhD</a>
Army Baylor University Doctoral Fellowship in Orthopaedic Manual Therapy, Brooke Army Medical Center, Fort Sam Houston, San Antonio, TX <a href="#">DScPT</a>	Engineering <a href="#">ME</a> , <a href="#">ME/MBA</a>	Philosophy <a href="#">PhD</a>	Spanish <a href="#">MA</a>
	English <a href="#">MA</a> , <a href="#">PhD</a>	Physician Assistant Studies, Brooke, Madigan, Darnell and William Beaumont Army Medical Centers <a href="#">DScPAS</a>	Sport Management <a href="#">MSEd</a>
	Entrepreneurship <a href="#">MBA</a>	Physics <a href="#">MS</a> , <a href="#">MA</a> , <a href="#">PhD</a>	Sport Pedagogy <a href="#">MSEd</a>
	Environmental Biology <a href="#">MS</a>	Piano Pedagogy and Performance <a href="#">MM</a>	Statistics <a href="#">MS</a> , <a href="#">PhD</a>
	Environmental Science <a href="#">MES</a> , <a href="#">MS</a>	Political Science <a href="#">MPPA</a> , <a href="#">MPPA/JD</a> , <a href="#">MAIR</a> , <a href="#">PhD</a>	Taxation <a href="#">MTax</a> , <a href="#">MTax/BBA</a> , <a href="#">MTax/JD</a>
	Exercise Physiology <a href="#">MSEd</a>	Psychology <a href="#">PhD</a>	Theatre Directing <a href="#">MFA</a>
	Family Nurse Practitioner <a href="#">BSN/DNP</a>	Public Health <a href="#">MPH</a>	Theatre Studies <a href="#">MA</a>
	Geology <a href="#">MS</a> , <a href="#">PhD</a>		US Military – Baylor Nutrition <a href="#">MS</a>
	Health Care Administration <a href="#">MHA/MBA</a>		
	History <a href="#">MA</a> , <a href="#">PhD</a>		
	Information Systems <a href="#">MS</a> , <a href="#">PhD</a>		
	International Journalism <a href="#">MIJ</a>		
	International Relations <a href="#">MA</a>		
	Journalism <a href="#">MA</a>		
	Kinesiology, Exercise Nutrition, and Health Promotion (KENHP) <a href="#">PhD</a>		
	Mathematics <a href="#">MS</a> , <a href="#">PhD</a>		
	Mechanical Engineering <a href="#">MSME</a> , <a href="#">BSME/MSME</a> , <a href="#">PhD</a>		
	Museum Studies <a href="#">MA</a>		
	Music Composition <a href="#">MM</a>		
	Music Education <a href="#">MM</a>		
	Music History <a href="#">MM</a>		
	Music Performance <a href="#">MM</a>		
	Music Theory <a href="#">MM</a>		
	Neonatal Nurse Practitioner <a href="#">BSN/DNP</a>		

## UNIVERSITY RESEARCH CENTERS AND INSTITUTES

Academy for Teaching & Learning  
 Allbritton Art Institute  
 Baylor Advanced Research Institute  
 Baylor Institute for Air Science  
 Baylor Institute for Studies of Religion  
 Center for Astrophysics, Space Physics & Engineering Research  
 Center for Business and Economic Research  
 Center for Christian Education  
 Center for Christian Music Studies  
 Center for Community Learning & Enrichment  
 Center for Community Research & Development  
 Center for Drug Discovery  
 Center for Family & Community Ministries  
 Center for International Education  
 Center for Mass Spectrometry  
 Center for Microscopy and Imaging  
 Center for Ministry Effectiveness & Educational Leadership  
 Center for Molecular Biosciences  
 Center for Reservoir & Aquatic Systems Research  
 Center for Spatial Research  
 Institute for Faith and Learning  
 Institute of Biomedical Studies  
 Institute of Ecological, Earth, & Environmental Sciences  
 Institute for Oral History  
 J.M. Dawson Institute of Church-State Studies  
 Robbins Institute for Health Policy and Leadership



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