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On the Cover: © Kagenmi | Getty Images
TCU is a dynamic, living and breathing thing. Every part of the university is important, and some are absolutely essential. One essential part is research. I love research.

Without research, a university grows stagnant and diminishes its capacity to educate.

Scholarship informs teaching like nothing else. The university’s curriculum is designed to convey what is known. Active researchers invite students to explore the unknown based on what is known. Education leads to testing the boundary between these two, and research moves that line.

Teaching informs scholarship like nothing else. By explaining a complicated concept, teachers will begin to see what they do not yet know and understand. Storytelling goes along with the discovery process. Engaging students in the stories makes the process inviting, exciting and effective. Serious students at all levels drive research agendas with their questions and curiosity.

Upon beginning my first graduate degree, I was assigned to Jerry Meike, a professor of mathematics and statistics at Wright State University, as a mentee and assistant. He was a wonderful teacher who showed me the value of offering varied examples. When students don’t understand a mathematical concept, it doesn’t do much good to go over the same example and explanation for them. They need to see different examples to illustrate the concept because they didn’t get it from the first example.

One day I commented to him that I would like to earn a Ph.D. and “know it all.” He corrected me quickly. Earning the Ph.D., a research degree, requires understanding how much more there is to discover. A human can never know it all. Dr. Meike sparked my lifelong love of discovery.

Now I know that research is a process through which knowledge is created, discovered and shared in hopes the human condition can be better understood and thus improved.

Just as the university has many parts, the research enterprise has many parts, all making unique contributions. The arts and humanities explore and expand our abilities to interpret and convey the human story. Science explains the physical and social aspects of life. Business designs the complex industries and economies so essential to advancing the human condition. Health and technology disciplines use science to craft responses to human needs.

The lens of each discipline inspires students to think critically. Perhaps those students will become the scholars who continue to expand the boundaries of what is known.

Ask a researcher to share the story of their scholarship, and you will see that research is beautiful. The geologist finds beauty in the dull rock. The computer scientist is in awe of the beautifully designed code that implements a complex algorithm. The religion scholar is excited by the discovery of an old parable that sheds light on early human spirituality. The research stories in this issue of Endeavors provide a multisensory look at the storyteller’s passion for discovery. I hope they will ignite your desire to explore how we can better understand, and then improve, the human condition.

Bonnie E. Melhart
Associate Provost for Research and Dean of Graduate Studies and University Programs
Operating in Infinity
A mathematician is pushing algebra into the quantum universe.

BY CAROLINE COLLIER

In theory, José Carrión’s research in operator algebras could improve understanding of quantum mechanics, which could one day inspire new dimension-shifting technologies.

However, any such invention would occur far in the future and, really, is outside Carrión’s area of expertise. “I’m not an expert in quantum mechanics,” said the assistant professor of mathematics. “I can’t even claim any deep knowledge into it.”

But Carrión knows the basics: Werner Heisenberg’s 1927 proposition of the uncertainty principle redefined physical reality as an interplay between matter and energy whose manifestation is dependent upon the observer.

Since then, physicists have developed technology based on quantum principles, including encryption techniques used across the internet. Mathematicians have been building numerical systems, including operator algebras, that might one day explain why a butterfly beating its wings in Texas could cause a tsunami in the Indian Ocean.

But Carrión is more concerned with a “tiny corner of operator algebras” than with the butterfly effect or quantum computing. His specialty studies movements in spaces, but not the sort that can be plotted on 3-D grids. Quantum spaces are infinite, extending in every dimension and direction, and the moving “objects” are clouds of probable locations rather than tangible points.

Working with equations when infinity is a variable is a mind-boggling task, but algebra has been used to solve mathematical mysteries since ancient Babylon. The method is simple: Use what is known to figure out what isn’t, which is what Carrión does.

Some of the operator algebras Carrión researches employ nuclearity, or “modeling this infinite-dimensional object using finite-dimensional data.” The professor’s current project aims to link this “internal modeling” process with an outward-modeling technique known as quasidiagonality. He describes the latter as this: “Shine a light through [the infinite-dimensional models] and look at the shadow. The kinds of lights that you’re shining through this give you shadows that you can understand, finite-dimensional things.”

By examining the models side by side, Carrión searches for symmetry, a principle also at the heart of quantum mechanics, where relationships exist in the physical world without obvious causality. If a heretofore-hidden link emerges, luck might play a part he said. “The interconnectedness between all these different theories isn’t something that you start out planning for. It just happens.”

For instance, the professor said that recent discoveries have linked computer science with operator algebras. Quantum superposition, which is like saying a particle can be in two places at once, could revolutionize computing with faster speeds, stronger encryption and denser data-storage possibilities.

For now, Carrión said he prefers sitting in his chair in ordinary reality and conducting math research, a process that involves reading journals, proving the occasional theorem and allowing time and space for old-fashioned thinking.

“You kind of have to carry these ideas around,” he said. “You have to live with them and dream about them and constantly be thinking about them. Have them present all the time, and once in a while, you will have a light bulb go off.”
Planting the Future

Research on healing plants still a passion for Manfred Reinecke

BY SHIRLEY JINKINS

Twenty years after co-publishing a definitive paper on how certain plant-based acid compounds disrupted an HIV-enabling enzyme called Integrase, the healing ways of medicinal plants continues to fascinate Manfred Reinecke.

The emeritus professor of chemistry’s signature work, published in 1996 with Ed Robinson (now deceased), contributed to new therapies that turned HIV into a treatable condition instead of a death sentence. “It wasn’t a goal of mine specifically to find an effective treatment for AIDS,” Reinecke said. “I was looking very broadly at medicinal plants.”

Research funds came during some of the darkest days of the HIV crisis, said Reinecke. “We had three or four NIH [National Institutes of Health] grants going at the same time.”

Though the field has moved beyond HIV, there is plenty of research to do. “Cancer is always at the top of the list,” Reinecke said. “It’s full employment for medicinal chemists.”

For most of his academic career, Reinecke sought like-minded researchers who appreciated the healing properties of plant-based remedies that ancient peoples depended on around the globe.

One of those researchers was Joseph Bastien, professor at the University of Texas at Arlington, who was a priest in Bolivia. In the South American country, Bastien knew a community of Kallawaya herbalists who used and documented more than 900 effective plant remedies. (Bastien is one of the collaborators in Reinecke and Robinson’s classic paper.)

Two-thirds of Reinecke and Robinson’s published work is in the chemistry field, while the other third addressed findings about biologically active agents. “Before chemists came along, for centuries, a major source of medicine was plants,” Reinecke said. “It was trial and error. Then, for the past 100 years, people have gone into the plants to see what compounds cause the result.”

It’s not a matter of simply collecting plants in a field and then seeing what their compounds are and finding out later what they might influence, Reinecke said. “You don’t go out and pick them; you have some rationale for studying them.”

“You can alter plant molecules to make them more effective, to eliminate the side effects,” he said. “Once the structure of the molecules is known, scientists can make the same compounds that are not naturally based.”

Reinecke was instrumental in helping the Fort Worth-based Botanical Research Institute of Texas become a reality in 1987. The facility has one of the world’s largest inventories of medicinal plant specimens, gleaned from other researchers and universities.

“The use of plants as medicines goes back hundreds, even thousands, of years,” Reinecke said. “They have been found to contain substances that are anti-cancer and that fight infectious diseases.”

Manfred Reinecke researches heterocyclic chemistry and natural products, especially bioactive compounds of medicinal plants. Aside from conducting independent research, Reinecke edits the scholarly journal Natural Product Communications.
The Monnig gallery’s meteorite collection features samples of more than 2,300 rocks with origins in our solar system’s asteroid belt. If visitors to the gallery leave with one takeaway, what would you hope it is?

If you want to understand Earth, you have to look at meteorites. They take us to places we can’t go. We can’t go down to the core of the Earth, no matter what Hollywood tells us, and the only real way we have of looking at anything like the Earth’s core is to look at meteorites. They also take us to a time we don’t see. Earth is so active, and we’ve destroyed at least half-a-billion years of its history. If you want to understand what happened in the half-a-billion years, you have to look to meteorites.

Are you attempting to grow the gallery in a specific direction with new acquisitions?

When Oscar Monnig gave us the collection, there were fewer than 400 different meteorites. There were a lot of some of them because he collected everything, but only 400 different ones. And when I joined the collection, [unofficial curator] Art Ehlmann had traded those, used the endowment to sort of build up the collection to just over 1,400 different meteorites. I’ve been here [since 2009], and we’ve added another 1,000 different meteorites.

I’m always trying to grow the collection behind the scenes because we are one of the two largest university-based collections in the world. And I think that’s a huge feather in TCU’s cap.

I try, because funds are limited, to add things that the collection doesn’t have in great quantity, things that are special. I have a soft spot for Texas meteorites. If a Texas meteorite becomes available, I’m normally going to try and procure it.

Have some meteorites been on Earth for thousands of years or longer?

Yes. They can be very weathered. A lot of the meteorites that are picked up in the desert, you see a lot of rusting in iron because they were formed in an atmosphere pretty much without any oxygen.

Most meteorites are what we call finds, which means someone just happened across them. There are a certain number of falls that occur every year, which means you see it fall and you go and pick it up. Those are highly sought after because they’re pristine, and if they’re of an unusual type, a lot of the time you don’t want them altered by water. So if you can pick them up when they first fell, when there’s no terrestrial contamination, they haven’t been rained upon, that’s really valuable to science.

In 2010, you traveled to Antarctica to search for meteorites. Was the expedition a success?

I spent just under two weeks training in McMurdo [station] and then six weeks camping on the ice — eight of us in the middle of the continent, looking for meteorites.

We found 1,250 meteorites. Antarctica concentrates them for you. When you’re looking in Texas, you’re...
“There’s still something very thrilling about holding a piece of Mars, or holding a piece of the moon and thinking about how astonishing the solar system is.”

Rhiannon Mayne, Oscar and Juanita Monnig Endowed Chair of Meteoritics and Planetary Science

pretty much looking at where it fell. In Antarctica, anything that falls on the ice sheet is going to get buried in the ice sheet, and we know the direction the ice is moving in, so if you go to an area where the ice is constantly being removed, you’re going to keep exposing new meteorites at the surface.

You were holding monthly sessions where anyone could bring in a rock they suspected to be a meteorite. You’ve had to temporarily suspend the sessions but want to resume them, as people came from all over the state for your decision. Why do you think people are fascinated with the idea of holding something that came from space?

The unknown is so attractive, and I think it’s also something that harkens back to a lot of people’s childhoods. I have a 4-year-old, and I think [children] see the world slightly differently. A lot of adults never quite lose that attitude for space, which is exciting in a way. There’s still something very thrilling about holding a piece of Mars, or holding a piece of the moon and thinking about how astonishing the solar system is.

I have pieces in the collection, lots of the most common types, but they contained the earliest solids that formed in the solar system. Sometimes I have to stop and remind myself what I am surrounded by. I might see these every day, but what is in this cabinet is truly astonishing in the grand scheme of things.

You have been publishing papers on differentiation and meteorites specific to the asteroid Vesta. Where is your research headed next?

I've made the shift to try to work on stuff within the collection because it's so amazing. I basically have a scientific playroom upstairs.

As a curator, it’s very easy to log them as, “This is this number; this is that number,” but I’ve started looking at them as, “What questions can this rock answer?”

I just had a master’s student who has gone off to work on a Ph.D. We’re going to be using rocks from the collection in his research to try and answer some really big-scale pictures on the solar system, trying to test some of the models for the formation of our solar system.

One of the things that a lot of people say now is that the planets didn’t form where they are today. So if you look at the giant planets, the idea is that they have migrated from where they initially formed. We’re looking at doing some research on rocks in the asteroid belt to say, “Well, let’s test that. Can we still see patterns that we would have expected in the asteroid belt today?” If we can, that might tell us something about how these planets migrated. If you move something as big as Jupiter around in the solar system, it affects everything.

— Caroline Collier

Editor’s Note: The questions and answers have been edited for clarity and length.
Thinking about thinking may sound like an opaque academic pursuit, but Uma Tauber can reel off dozens of applications for metacognition, her field of expertise. Among them: improving learning in schoolchildren and college students, workers and the elderly.

With a new multimillion-dollar grant, the assistant professor of psychology will spend the next five years investigating the most effective strategies to help high school and college students retain key concepts and information.

“It’s easy as a cognitive psychologist to sit in my lab and make recommendations about what students and teachers should do,” said Tauber. “But this research will consider the messier situation of actual student lives and actual educators in order to look at what practices they engage in and what they believe is important for their own learning.”

Such questions dwell at the heart of metacognition, which Tauber, who arrived at TCU in 2013, defines as “your ability to think about your own thoughts.” Throughout her career, Tauber has maintained a particular interest in memory.

**ACING THE TEST – NOT**

“After every exam, I have students come talk to me about how they thought they were going to do really well because they were certain they had learned the information, but they wound up doing poorly and were shocked.”

That disconnect between perception and reality has long fascinated Tauber, as does discovering how to mitigate it.

“I’m very interested in helping students best form their knowledge not only so they can get through college but also to help them develop a sophisticated understanding on a deeper level of the concepts and material, which they can take with them after they graduate,” she said. “The ability to use what you’ve learned in a comprehensive way and apply it in a new context is the gold standard in cognitive psychology.

“For example, as a businessperson you hope you can run your new employee through a training program and have that employee ultimately apply what they’ve learned in different contexts.”

**BAD NEWS ON CRAMMING**

Tauber recommends testing as an effective strategy to enhance learning, particularly for students. “Tests have a very positive influence on learning, and that includes self-testing,” she said. She encourages her undergraduates to use flashcards or challenge themselves to write down what they remember from a lecture, then compare that to the notes they took in class.

For comprehensive exams such as finals, Tauber recommends “distributed practice,” or spacing out studying over days or weeks. “Students often report that they feel like they learn more in one big session, which we call massing but is more commonly known as cramming,” she said. “It may give you some benefit in the short term, but you’re not likely to retain the information in the long run, which is obviously the goal of learning at a university level.”

In November, the James S. McDonnell Foundation awarded a $4.6 million grant to Tauber and five research colleagues from other universities.

To assess student learning as part of the McDonnell Foundation grant, Tauber and her doctoral student, Amber Witherby, will concentrate their research on TCU undergraduates and Fort Worth-area high school students. Tauber’s colleagues at Boston College, the University of Pittsburgh, Iowa State University, the University of Texas at Austin and Purdue University will run concurrent studies. The researchers and their graduate students plan to meet at least twice a year to share their results.
“The grant will open a lot of doors for us in terms of expanding our research,” said Witherby, a third-year doctoral student in psychology who came to TCU to work with Tauber. “Uma is really a rock star in the field, and the amount of research she does in her lab is astounding.”

In addition to the McDonnell Foundation work, Tauber intends to continue studying elderly people, a focus of her work since she started her master’s degree program at the University of Colorado in Colorado Springs. In the last few months, dozens of healthy volunteers age 65 or older have gone through testing in her Metacognition, Memory and Aging Lab.

“Memory for the elderly can have profound consequences,” said Tauber. “If an older patient thinks he understands what a doctor has told him to do about his diabetes or another diagnosis that requires a lot of management on that individual’s part, it could have serious health consequences if the patient is wrong.”

GRANDMA’S VOCABULARY

Tauber said, however, that her investigation into memory and the elderly doesn’t represent “a bleak aging story.” Several types of memory, including semantic, improve with age, she said. “Older adults outperform TCU students on vocabulary tests nearly every time.”

During the fall semester, Meg Jahns, a research assistant in Tauber’s lab, and fellow student Taylor Simons received grants from TCU’s College of Science & Engineering Research Center to fund their work with the older participants.

“The most interesting thing to me is how worried our older participants are about their memory,” said Jahns, a senior psychology and child development major. “When I’m 75 or 80, I hope I’m doing as well as they are.”

Simons, a senior psychology major, became lab manager in the fall. “One of the things that makes the lab so unique is the level of research we get to do as undergraduates,” she said.

“Dr. Tauber brings such passion to everything she does, and she treats all of the students working in her lab like we know what we’re doing.”

Tauber said she missed the day-to-day contact with her students when she took time off from teaching for the birth of her twins, Grant and Lydia.

“My favorite part of my job is the mentoring,” she said. “It’s always very easy to write my students letters of recommendation because they are so sharp and so motivated. I honestly would get very little done without their support.”
Hidden Potential of QR Codes

Marketers plant videos, graphics and discounts, if only Americans would look.

BY LISA MARTIN

A mainstay of digital retail marketing throughout Asia, the quick reference, or QR, code — that square, two-dimensional scan box found on everything from food packages to clothing hangtags — has struggled to realize its full potential in the U.S.

QR codes can link consumers to vast amounts of product information and even coupons at the push of a button.

“They might contain graphics and videos, making a very efficient way for a brand to get its story out there,” said Jay Sang Ryu, assistant professor of fashion merchandising. For example, fashion designers might link video clips of celebrities posing in their clothes, or a cosmetics company could embed a video of a makeover that features a new product.

“A big part of the QR code is making the experience as interactive as possible, which is something that appeals to millennials,” Ryu said. “But the retailing industry needs to put forth a concerted effort to educate and explain how to use the codes so consumers will get on board.”

Ambivalence or ignorance about the codes result in missed opportunities for shops, brands and consumers. In a recent research study, Ryu looked at whether towns and cities can incorporate QR codes as part of a larger marketing strategy to lure shoppers to local brick-and-mortar stores.

“My new research is about branding a city through the image-oriented industry such as fashion, arts and popular culture,” said Ryu, who cites as examples Paris’ renown for fashion and Los Angeles’ ties to entertainment. “I want to know how [these associations] help consumers form positive or negative attitudes toward a city and how those affect their intentions to purchase products associated with the city.”

The codes might become a secret weapon in connecting consumers to an interactive, informative experience, said Ryu.

Developed in Japan in the mid-1990s as smartphones became ubiquitous there, QR codes didn’t get much attention in the U.S. until the last few years. The buzz surrounding QR codes, which require a smartphone to unlock content, gained traction during the 2011 holiday season, when retailers such as Macy’s used the codes to offer in-store promotions and giveaways.

Ryu cited research that shows the number of U.S. advertisements featuring QR codes increased more than 600 percent in the second quarter of 2011 over the same period of 2010. Today, about 30 percent of U.S. mobile users have scanned a QR code, mainly in search of product information or discounts. Moreover, Ryu said, the rise of mobile payment via QR codes “is especially notable.”

Shopping patterns and trend tracking have long interested Ryu, whose mother founded her own fashion label. The professor’s latest study targets Decatur, Texas, whose population is roughly 6,400. Leaders of the small town about 45 miles north of Fort Worth want to entice more shoppers to visit homegrown retailers.

“From surveys I’ve done with young consumers, I’ve found out they are willing to travel about 30 miles for bargain shopping and indigenous or authentic products,” said Ryu, who continues to collect research data for the project. “But the main drawback for consumers of all ages concerning shopping in small towns is the perception that there’s not a variety of products.”

As part of his research, Ryu developed a promotional package for Decatur that includes a postcard embedded with a QR code.

“Retail technology is the future,” he said. “Anything that helps brands connect with their customers can improve the chances of success.”

Jay Sang Ryu specializes in place branding/marketing, retail technology, digital marketing and other innovative retail formats.
As a first-year elementary school art teacher in Shreveport, La., Amanda Allison struggled to connect with her students who had disabilities. But that ongoing challenge shaped her professional journey.

While teaching future art educators, Allison realized her passion centered around serving vulnerable children and adults. Twenty years after that initial classroom experience, Allison and her students at TCU have earned acclaim for designing therapeutic art programs for everyone from Alzheimer’s patients to orphans in Africa.

“The time is right for the therapeutic arts,” said Allison, associate professor of art and coordinator of the art education program. “Just providing marginalized populations with a chance to make art can have a transformative impact on their lives.”

Unlike an art therapist (typically a licensed professional counselor who employs the visual arts as a way to connect with clients), an art teacher in a therapeutic setting might prompt or guide people or groups through the act of creating with the goal of fostering self-esteem, reducing stress or simply shifting focus to something beautiful, if only for a brief time.
"Looking forward to the next 10 years, we’re going to do everything we can to fulfill the tremendous need in our community."

Amanda Allison, associate professor of art and coordinator of the art education program

“A critical ideal that anchors our program comes from anthropologist Ellen Dissanayake, who wrote the seminal work, Homo Aestheticus: Where Art Comes From and Why [Free Press, 1992],” said Allison, explaining art education majors take courses in studio art, art history and education. “Her research shows that making art is as necessary to human survival as shelter, food and clothing.”

SEEING WITH NEW EYES

Allison’s dedication to the field led her to provide practical, real-world experiences for undergraduate students. “Last semester, I took a group of students to Safe Haven [an agency for victims of domestic violence] where one night we had the mothers paint pictures of their young children,” said Allison, who also advises nonart majors who seek to incorporate the arts into professions ranging from psychology to speech pathology.

“While making the project, the women, who had all just come out of abusive situations, started looking at their children in a new way, like really staring into their eyes to focus on the colors they saw there,” Allison said. “What those mothers created offered them immediate validation and maybe even gave them a new type of coping strategy.”

Six years ago, Allison reached out to the Alliance for Children, a nonprofit children’s advocacy center in North Texas. Her students created and donated dozens of “Teen Art Packs,” which consist of sketchpads, colored pencils, crayons, glue and stickers. The first page of the instruction booklet they created reads:

This sketchbook is where you think outside the box.
Don’t be afraid to break the rules if you want. We are TCU students and worked super hard making this for you.
We gave little direction hoping that you would take it and run with it.
So … take risks, stimulate your senses, be creative, but most importantly — be an artist.
Alliance for Children’s counseling team

uses the art packs during one-on-one sessions with teenage clients. In addition, the group’s family advocate supervisors distribute the packs to teens scheduled to testify in court, a judicial experience that can veer from tedious (waiting at the courthouse for days) to terrifying.

“Going to trial and having to face their offender, as you can imagine, is a very intense experience,” said Jamie Harton, the organization’s community liaison in Arlington. “These art packs can give them an outlet for the overwhelming emotions that going to court can create.”

PROVIDING AN OUTLET

Allison’s current and former students also have worked with several other nonprofit groups and school districts.

Alex Sharp spent the past four years teaching art at James L. West Alzheimer’s Center in Fort Worth. “These classes focus on self-expression and empowerment of adults living with Alzheimer’s by giving them a voice through the art-making process,” said Sharp, who works as an art teacher at Highland Park High School in Dallas. “I have learned that art provides an outlet for control and communication, recognizes overlooked potential and increases the quality of life of those living with the disease.”

Tessa Evans, a junior, worked with Ugandan orphans in 2016. Courtney Morey, who graduated from TCU in 2012, developed the orphanage’s art program, which Evans enhanced during her two-week residency in the East African country.

“I found watching the children have a voice during the art-making process incredibly rewarding,” said Evans, an education major from San Diego. “They were so joyful and loved being recognized for their uniqueness and creativity.”

EMPOWERING OTHERS

In November 2016, TCU’s House of Student Representatives passed a resolution to support the addition of a minor in therapeutic arts, a move that surprised — and delighted — Allison.

“A student committee performed research and did all of this entirely on their own, and the College of Fine Arts wasn’t even notified until it was passed,” Allison said. “That gives me great confidence that student demand for this program is strong.”

Allison hopes someday to see a therapeutic arts institute at TCU. “Right now, we have a 100 percent placement rate with our students,” Allison added. “At the end of this last semester, there were a dozen arts jobs still not filled because we didn’t have the students.”

“Looking forward to the next 10 years, we’re going to do everything we can to fulfill the tremendous need in our community.”

Amanda Allison’s research interests include supporting art teachers as they instruct students with disabilities. Her artistic specializations include watercolor, mixed media and digital photo manipulation.
Listening and learning have long been linked, but improving children’s ability to do the former doesn’t always help the latter.

Hearing problems — even when corrected — can put students at a disadvantage. Young children with cochlear implants often still read at levels below their peers in high school.

Emily Lund, assistant professor at the Davies School of Communication Sciences & Disorders, is exploring whether a lack of phonological awareness — the understanding of how sounds make up words — is related to vocabulary knowledge in children with cochlear implants.

To conduct the research, Lund received a $282,807 grant from the National Institutes of Health. Her study aims to improve the understanding of early literacy development in children with cochlear implants to better treat literacy delays.

With undergraduate assistants, Lund studied the differences between children with cochlear implants and those with normal hearing, in terms of their understanding of the sonic components of words. She wanted to determine if children with cochlear implants knew fewer dense words, which sound similar to other words. She also investigated whether children connected similar sounds in different words and performed worse on phonological awareness tasks.

Lund explored an early literacy deficit in once-deaf children that does not directly result from their speech-perception limitations. “The findings could indicate that giving children who were deaf access to sound through a cochlear implant isn’t sufficient to help a child develop literacy skills organically,” she said. “We also need to consider how we teach these skills to children who aren’t used to learning through listening.”

Kids with perfect hearing also can have trouble learning to read. Danielle Brimo, assistant professor at the Davies School, researched the effectiveness of current grammar-based methods for teaching children who display below-average language or reading comprehension.

“Unfortunately, there is limited research in our field that supports effective grammar interventions for school-age children,” she said. “The goal of this study is to provide practitioners with an effective intervention they can use.”

Brimo examined whether children improve grammatical knowledge more after receiving explicit instruction — traditional methods emphasizing language forms and grammar rules — or implicit grammar instruction, which focuses on meaning rather than rules or form.

Brimo also studied whether aspiring educators and speech practitioners have the language skills necessary to teach grammar-deficient children effectively. The professor and Tina Melamed, who has since received a master’s degree in speech pathology, completed a pilot study with students in education and speech-language pathology at TCU. The researchers also surveyed pre-professional students at Abilene Christian University and the University of Virginia.

The pilot survey indicated students who took language-development courses did not have any advantages over students who did not have such coursework, Brimo said. “These findings suggest that the language-development coursework that prepares students for clinical practice needs to be revised.”

Emily Lund’s research interests include spoken and written-word learning in children with hearing loss, with particular emphasis on how parent-training affects language learning.

Danielle Brimo’s research examines the language and literacy skills of children with and without language and reading impairments. She is interested in how morphological awareness and syntactic awareness affect children’s spelling, word-level reading and reading comprehension.

Emily Lund and Danielle Brimo are colleagues in the Davies School of Communication Sciences & Disorders.
From misunderstanding social norms to enduring severe physical disabilities, a childhood with autism can involve struggles.

For parents of children with autism, life can involve difficulties too. “The rate of depression in that population is about two to three times higher than the average,” said Naomi Ekas, assistant professor of psychology. “It’s a pretty stressful experience.”

While the parents’ frustrations are justified, keeping a good attitude is crucial, said Ekas, who is developing a set of research-based methods to help parents find the positive in what can be bumpy, chaotic lives.

At least 1 in 68 children in the U.S. has a diagnosis placing them “on the autism spectrum,” reports the Centers for Disease Control and Prevention.

NAOMI EKAS IS USING POSITIVE PSYCHOLOGY TO EASE THE STRESS EXPERIENCED BY PARENTS OF CHILDREN WITH AUTISM.

BY CAROLINE COLLIER
“It’s this constant stream of worry,” said Chalea Andrejko, a Fort Worth sign-language interpreter and mother of two children with autism.

Andrejko said her anxieties lessened when she realized she couldn’t change her kids or the reactions of strangers who didn’t understand their confusing autism-related behaviors. She instead focused on improving her own mindset.

“I worry a whole lot less about what other people are thinking now.”

Andrejko’s revelation is the type of message Ekas wants to share with parents who are having a difficult time. For parents who may be close to succumbing to hopelessness, she said: “It’s particularly important to say, ‘You know, this might not change, but here are some tools and some strategies that we can give you to cope.’”

In studies conducted over the internet or in an on-campus lab, Ekas met parents, including Andrejko, who learned to thrive while caring for a child with autism. By studying parents’ activities and perspectives, the professor hopes to translate the findings into a set of therapeutic tools.

**COUNT YOUR BLESSINGS**

One of Ekas’ recent studies uncovered how thankfulness can ease stress for mothers of children with autism.

Participants took part in a two-month “gratitude intervention.” Half of the moms wrote a brief letter expressing thanks to someone of their choosing once a week, a letter they didn’t have to actually send. The other half, the control group, wrote a weekly list of activities they did over the same period.

Andrejko participated, even composing a heartfelt thanks to her ex-husband.

The study “was a nice way to think about all the things you’re grateful for in life,” she said. “When you’re counting your blessings … it makes you feel more positive about everything.”

Andrejko wasn’t alone. Ekas reported that the mothers required to be thankful experienced an improved sense of well-being, and the emotional buoyancy lasted for more than a month. The gratitude group also reported greater marital satisfaction and an uptick in parental confidence.

To Ekas’ surprise, the control group enjoyed similar benefits. Why? “We think maybe just the act of writing,” the professor said, “or reflecting on the things that they were able to accomplish that they might not see in the moment.”

**SEEKING HAPPINESS**

Ekas’ specialty is positive psychology. The field, she said, inverts the usual “what’s wrong with you?” diagnostic approach. Instead of labeling behavioral problems or neurological anomalies, researchers examine the aspects of life typically associated with happiness.

“I think people connect to that. When average people are surfing online, they’re searching for how to live a happier life,” the professor said. “They’re not Googling how to live a less negative life.”

Gratitude was one of several positivity dimensions Ekas examined in recent years in the context of parents of kids with autism. Other studies looked at faith, having hope for the future and creating a meaningful life, which the professor described as “being part of something bigger than yourself that is positive.”

Autism Speaks, the world’s largest autism-focused advocacy organization, shared the results of a study conducted by Ekas and the University of Miami’s Michael Alessandri.

The researchers found evidence that noticing the benefits related to an autism diagnosis strengthened the sometimes frayed marital bonds between parents of children with autism.

Advice about healthy perspectives helps, Ekas said, but their experiences will never be “just sunshine and lollipops.” Ekas wanted to expose her students to the realities of caring for children with autism, some who may rely on parental care for life. To that end, the professor organized a monthly “respite” night at a Fort Worth school, where student volunteers entertain the kids while frazzled parents enjoy a free night.

Ekas encounters many students who say service is their life goal, but they can harbor a common misconception. “They say, ‘I need to be doing therapy to help people.’ I tell them, ‘No you don’t. You can do research and you can help people.’”

**When you’re counting your blessings … it makes you feel more positive about everything.”**

Naomi Ekas, assistant professor of psychology

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**Investigator Naomi Ekas helps children with autism and their families through evidence and research.**
Executives Under the Microscope

Whether greed or generosity, leaders’ extremes mean trouble ahead for their companies.

BY RACHEL STOWE MASTER

Following the Great Recession, many investors pointed fingers at the millionaires in charge of multibillion-dollar corporations, but were the accusations of avarice on target?

Michael Hitt couldn’t find business research linking greed to the bottom line. Existing studies tend to intertwine greed with hubris. Thus, he launched a study to determine if extravagant salaries of top executives hurt shareholder returns, undertaking a painstaking process to separate greed from arrogant behavior.

“Just because an executive is highly paid doesn’t mean that he or she is greedy,” said Hitt, distinguished research fellow in management, entrepreneurship and leadership. “We defined [greed] as the pursuit of extraordinary wealth.”

Analyzing CEOs who led the wealthiest firms in the U.S. between 1997 and 2006, Hitt scrutinized data from more than 300 publicly traded companies where boards of directors determined executive compensation. He then tied the salaries to the firm’s performance over time to compare compensation to what would be considered standard based on the company’s performance.

Hitt published his research results in the Journal of Management with co-authors Katalin Takacs Haynes at the University of Delaware and Joanna Tochman Campbell at the University of Cincinnati. The results showed that greed does have a negative relationship with shareholder returns, but companies can moderate the effect by reducing managerial discretion, lengthening tenures of top executives and creating stronger boards of directors with more members who are otherwise unaffiliated with the company.

About 70 percent of chief executives chair the board of directors for their companies, Hitt said.

“So if you’re chairman of the board, you also have input on who serves on the board, and you control the agenda to a degree and likely have more influence over subcommittees,” he said. “CEOs in those roles have more discretion to act. Where they had more discretion, we found the existence of more managerial greed.”

Another study contrasted selfish and selfless leaders and found that neither extreme was good for the firm. Greed can result in an emphasis on short-term performance, but Hitt said leaders who take altruism to the extreme can fail to satisfy shareholders, which then might compromise a company’s viability.

Hitt, Haynes and Matthew Josefy at Indiana University published results of the greed-versus-altruism study in the Journal of Leadership & Organizational Studies. Now the researchers are collecting data on the attributes of high-performing and low-performing CEOs to identify factors contributing to, or deterring from, their companies’ success.

“You need people who are confident, who are motivated and who also balance that with altruism, but not to an extreme,” Hitt said. “They want to help others, and they want to see others gain value along with them and their firms. Those are the ones who tend to be the best leaders for the firm, and those firms are likely to have the best long-term performance.”

Michael Hitt’s research interests include strategic management, international strategy and strategic entrepreneurship.
Talking it Through

Spoken words have healing powers.

BY RACHEL STOWE MASTER

Following a traumatic situation, how best to cope? Consider talking it out.

It isn’t just good advice, said Kristen Carr, assistant professor of communication studies. She conducted a study to find out how different manners of thinking and talking through life’s rough spells influenced personal growth in their wake.

“I was curious how the stressful impact of adversity and the degree of rumination — that is, repetitive thinking and talking — affected the process of seeking social support,” she said.

Over a year, Carr asked online survey participants to identify the most difficult or stressful event they experienced in the previous three months. Responses included a child’s medical condition, family arguments, financial issues, divorce, depression and being the victim of a violent crime.

The professor asked a series of questions to assess the degree of stress using an ascending 7-point scale. “On average, participants reported that the stressful impact of the event was 3.73, indicating that these events were moderately to significantly stressful,” she said.

Survey participants also reported on their attempts to grapple with the negative event. Carr focused on “deliberate rumination,” purposeful, solution-oriented thinking about a problem, and “verbal co-rumination,” the incessant discussion of a problem with another person.

Although upsetting events led to a rise in both types of communication, Carr found deliberate rumination increased the perceived risk of seeking social support, while verbal co-rumination decreased the perception of that risk.

Seeking the sympathies of others resulted in more post-traumatic growth. “This study demonstrates that after a significantly stressful experience, talking with others about that adversity is more beneficial than simply thinking about it yourself, even when those conversations are repetitive and predictable,” Carr said.

“Having someone willing to repeatedly engage in discussions surrounding a particularly stressful experience is likely to provide a sense of relational closeness and solidarity, regardless of its effectiveness — or ineffectiveness — in solving the problem,” Carr said. “Perhaps it allows people to share the burden of that adversity with someone who cares about them, which makes the experience feel a bit less heavy and promotes healing and growth as a result.”

Carr presented her research findings at the National Communication Annual Convention in Philadelphia in November with the paper “Rumination and Perceived Risk in Seeking Social Support as Mediators of the Stressful Impact of Adversity and Post-Traumatic Growth.”

The professor is working on other projects to investigate resilience through the lens of interpersonal communication. “My overarching goal in this line of research is to better understand when talking about adversity helps,” Carr said, “and in contrast, under what circumstances conversations about stress are less productive or perhaps even harmful.”

Kristen Carr’s research interests involve the communicative development of resilience and growth after stressful life experiences and the relational consequences of interpersonal communication while negotiating non-normative events.
Long after the Horned Frogs trounced Ole Miss in the Peach Bowl, the legacy of that storied season continued with groundbreaking research into head trauma. In fact, key findings involving the 2014 Big 12 championship team may have wide-ranging implications for anyone who participates in contact sports.

Jonathan Oliver, assistant professor of kinesiology, started with a simple premise: Football players are hit on the head throughout the season, but most of those impacts aren’t serious enough to be labeled concussions. Athletes often return to practice or play before a full recovery from concussions, so the professor wondered if that puts athletes at risk for more serious damage. And if so, what could be done?

Oliver isn’t alone in asking questions about head trauma, on and off the gridiron. The deteriorating health of some former professional football players, along with postmortem diagnoses of CTE, has sparked a nationwide conversation about long-term neurological implications.

In the study’s findings, which were published in the *Journal of Neurotrauma* and in *Medicine & Science in Sports & Exercise*, Oliver took a closer look at docosahexaenoic acid, the most abundant omega-3 fatty acid in the brain.

“DHA has received considerable..."
attention as a possible intervention to mitigate pathology associated with concussion, but only in animals,” said Oliver, who is a lifelong athlete. “We sought to determine if DHA would provide a neuroprotective effect over the course of the season in these football athletes.”

In other words, could DHA not only speed healing in players, but also help prevent injuries in the first place? To investigate his research theories, Oliver recruited Dr. Michele Kirk, TCU’s team physician, and David Gable, assistant athletic director of sports medicine.

“When Jonathan came to me, he didn’t know I’d already been prescribing omega-3s for years to my patient-athletes,” said Kirk, director of the sports medicine fellowship program at John Peter Smith Hospital in Fort Worth. She also maintains a private practice in sports medicine. “One of the great things about fish oil, which is the most common source of omega-3, is that there are almost no side effects, even at high doses, and it’s very good for your heart.” (Although fish oil is associated commonly with omega-3, fish obtain omega-3 from a diet rich in algae, the source used in this study.)

Oliver, Kirk and Gable designed a study that started during the TCU football team’s summer conditioning (57 days), continued through fall camp (23 days) and culminated during the season, which spanned 109 days. During this time, research assistants from TCU’s kinesiology program gave players a daily dose of a DHA supplement in liquid form manufactured by DSM Nutritional Products. Beyond providing the algae-derived DHA, the Dutch company donated $100,000 for the research study. Other financial support came from the Harris College of Nursing & Health Sciences, the TCU Provost’s Office and several universities in the U.S. and Europe.

“If you go to the drugstore and buy fish oil capsules, you have to be careful about the dosing because you may only be getting 300-400 mg of the actual fish oil even if you’re taking a 1,000 mg capsule,” Gable said. “The only problem with the liquid form was it didn’t taste very good. Jonathan went back and worked on the formula to make it easier for the players to tolerate.”

In spite of initial objections to the flavor, the investigators said the players were fully invested in the research. “We sat down with them beforehand and explained they would not just need to take daily doses of the DHA over an extended period, but that we would have to do timed blood draws too,” said Oliver.

“[Football Coach Gary Patterson] and the players had a sense that what we might learn with their help could have the potential to impact future athletes,” Oliver said. Indeed, the study’s results shed light on how to detect, combat and possibly prevent head trauma.

Many of the players seemed convinced the supplement helped speed their recovery from injuries. In fact, several of them requested the supplement after the trials ended. “It’s not like drinking a Red Bull where you feel more energy right away,” said Gable. “But the players understood that it was all about what’s happening in the body to help protect them if they [got] hurt.”

The study revealed that neurofilament light (NFL) was protective. Oliver explained that neurofilaments are major components of the axon, which makes up part of a nerve cell. For years, researchers linked neurofilaments (particularly NFL) found in cerebrospinal fluid and blood with Alzheimer’s disease, amyotrophic lateral sclerosis (Lou Gehrig’s disease) and other neurological disorders.

When it comes to NFL, Oliver said, “We do not want to see a sharp increase above someone’s normal levels, which would suggest some type of damage.”

The study showed that the players’ NFL levels climbed throughout the season, even though they did not reach levels high enough to indicate a concussion. Players who saw the most action on the field experienced the most overall increases. Another study had athletes take various daily doses of DHA. Those players on higher doses showed smaller increases in their NFL levels.

“I think we were all a little surprised to see the neurofilament increasing throughout the season in all players,” Kirk said. “What was especially interesting was to learn that repetitive hits to the head — even when they’re not severe enough to cause a diagnosed concussion — could be causing damage.”

The study pinpointed a measurable biomarker — the NFL — as a way to diagnose concussions and lesser head traumas. Oliver, Kirk and Gable plan to expand their research beyond the football season to see whether the players’ NFL levels return to normal when they aren’t training or playing.

“The thing about concussions is there’s so much we still don’t know,” Gable said. “If there is a way to make it safer on the field for our players, we absolutely want to do that. And we want to look at other sports too. What about the kid who gets an elbow to the head on the basketball court?”

Oliver, Kirk and Gable emphasize that their research isn’t about changing a beloved sport. “We like football. All we want to do is make football safer for our athletes,” said Kirk. “Omega-3s may be one way to do that. And having a biomarker like NFL may change the way we diagnose and treat head injuries in the future.”

“What was especially interesting was to learn that repetitive hits to the head—even when they’re not severe enough to cause a diagnosed concussion—could be causing damage.”

Jonathan Oliver, assistant professor of kinesiology
YOUR INNER CHILD MAY SPOIL YOUR DIET

Kids who went hungry may overeat as adults, psychology professor finds.

BY SHIRLEY JINKINS

A childhood marred by poverty and food insecurity can stay with people as they age, even manifesting as adult obesity. Sarah Hill, associate professor of psychology, published two recent studies exploring the subconscious mind’s powerful influence over the urge to eat.

“When you grow up in an environment of unpredictability, it often includes unpredictability in access to food,” Hill said. “What we hypothesized was growing up poor would lead people to eat when they were not hungry.”

Uncertainty about the availability of meals often causes people to overeat. “It makes sense to eat when you’re not hungry because you can store calories,” she said. “That’s been the case throughout most of [humankind’s] evolutionary history.”

Dialing back that ancient impulse can be difficult. And the more desperate the childhood situation, the harder the recalibration. “It’s kind of like taking a long road trip,” Hill said. “If you have half a tank of gas, you still might get gas where you can because you don’t know what’s ahead.”
Hill and her research team found that, without conscious intent, people who grew up poor would overeat long after reaching the safe destination of financial security.

**POVERTY’S LONG SHADOW**

A two-year grant from the Anthony Marchionne Foundation helped fund one of Hill’s investigations into the link between early financial security and adult eating habits. Hill and a team of graduate students conducted the study using TCU undergraduates as research subjects.

“All the differences we found were based on their childhood environment,” the professor said. “We did not find that their current economic condition had any effect.”

In the first part of the study, researchers asked 31 female students from various socioeconomic backgrounds about their hunger levels and then offered them snacks.

In the second part, 60 female students fasted for five hours before participating. Half the subjects drank Sprite upon arrival; the other half had water. After 10 minutes, researchers recorded the students’ blood-glucose levels and then gave them food.

Finally, 82 research participants repeated the fasting-drinking sequence before having their energy levels assessed by the blood-glucose measurement. They could then eat as many snacks as they desired.

In each group, participants from higher-income childhood homes better regulated caloric intake. When students from more privileged backgrounds drank Sprite, they ate less. Students from lower-income backgrounds ate more regardless of the drink.

**SURVIVAL MECHANISM**

Hill’s group was not the first research team to find a link between childhood poverty and adult obesity. But the professor’s work is innovative in proposing that the association might be tied to children’s developmental adjustments to resource-scarce environments.

Overeating, an innate survival mechanism, can result in obesity as the child grows into a more stable adulthood with readily available and affordable food.

“We found support for our hypothesis” across the three parts of the study, Hill wrote in the research paper, published in the journal *Psychological Science*.

Among people who grew up in more affluent environments, food intake varied according to the immediate physiological energy need. These people consumed more calories when their energy need was high versus when it was low.

For people who grew up in low-income environments, however, food intake appeared to be guided primarily by opportunity, Hill said. “They consumed high numbers of calories whether their current energy need was high or low.

“There’s a role that body awareness plays into all of this,” she said.

“For those who tend toward obesity, there is less awareness of bodily cues in general. They’re not really sensitive to when they’re full.”

**THE LURE OF COOKIES**

The second study conducted by Hill’s team examined the belief that healthy foods are more expensive and less convenient to prepare and how environmental food cues affect that belief.

“We found evidence that one’s food-related motivations may impact their beliefs about the cost of healthy eating,” Hill said. The components of a healthy diet, in truth, are no more expensive than foods low in nutritional value.

Hill’s research methodology included interviewing groups of fasting students in either a neutral room or one with the smell of baking cookies.

“Our brain does a lot of self-deception. In the presence of a tasty cue, we’ll tell ourselves stories about why we should eat these foods,” Hill said. “Food is about acceptance and community, but it comes at a social cost.”

Study participants who expressed the belief that healthy foods were more expensive than those weaker in nutritional value often had a higher body-mass index and poorer eating habits.

Participants who rejected the idea of unaffordable healthy foods tended to be people who were dieting or otherwise concerned about body image or weight, as gauged by survey responses.

“Because restrained eaters are highly motivated to restrict their caloric intake, they regularly generate effortful cognitive and behavioral defenses in the presence of tempting foods to prevent themselves from indulging,” Hill wrote in the paper, published in the journal *Appetite*.

Nondieting participants tended to agree more with the idea of unaffordable healthy food when in a cookie-scented room than when in an unscented room.

The opposite pattern emerged for participants who were trying to restrict caloric intake. They reported more skepticism in the expense of healthful eating in the cookie-scented room compared to those in the unscented room.

“The results of our studies provide evidence that consumers’ beliefs about the cost of healthy eating may be influenced in important ways by their food-intake goals,” Hill said. “The results of these studies suggest that thinking objectively about food may be challenging for consumers, particularly in contexts with an abundance of palatable food cues.”

Hill’s research plans include additional studies of the hormones ghrelin and leptin, which also influence eating behaviors, and adults’ various motivations to regulate caloric intake.

Despite the research, a grim future of illness and obesity isn’t inevitable for people who come from harsh beginnings or hold false beliefs about healthy food, Hill said. “Anyone, with great willpower, can change their eating habits.”
Cynthia Shearer asked her music-loving father to name history's best big band leader.  
His answer: Fletcher Henderson.  
Skilled ears may recognize Henderson's silky, brassy tunes in The English Patient or Boardwalk Empire, but music history tends to forget his status as the originator of jazz swing.  
Sad, Shearer said, because throughout the 1920s and 1930s, Henderson, a pianist and arranger who hailed a few dozen miles from Shearer's family home in southern Georgia, mentored later jazz titans from Louis Armstrong to Benny Goodman.  
Shearer, assistant director for the William L. Adams Center for Writing at TCU, said her late father's adulation inspired her Henderson biography for the Oxford American's Georgia music issue. An author of two music-heavy novels, she intended to deliver a music review-turned-history lesson in her lyrical, Southern-steeped writing style.  
Shearer went to the Amistad Research Center in New Orleans where she devoured any available information about Henderson's life and his roots in rural Georgia at the family's mahogany piano. The treasure trove, she said, was in now-digitized archives of black newspapers, especially the Chicago Defender.  
Shearer uncovered a story of how bold and insidious racism undermined the legendary swing star. Henderson, born in 1897 to a former slave in Cuthbert, Ga., spent his formative years surrounded by the profligate murders of African-Americans.  
“He came out of a place where lynched bodies were thrown in the churchyard,” she said.  
After leaving Georgia and attaining relative fame in New York City, Henderson returned to tour the South, even performing in Oklahoma after the “Black Wall Street” massacre in Tulsa. Shearer was the first to unearth that the NAACP funded his tour, positioning the innovator as a musical ambassador for racial harmony. Henderson fit the role, she said. “He was brought up to think of himself as someone who had to push the color bar.”  
The bandleader's noble intentions and astronomical talent did not translate into tangible wealth.  
The accepted historical narrative blames Henderson himself for fading into time, pointing to a bad attitude or poor business sense.  
The accusations were out of tune with what Shearer learned of the man, she said.  
“It started to feel like I needed to try to correct the record about his personality.”  
After Shearer delved through old newspapers to find the context beneath the reductive tale of Fletcher Henderson, the talented but cantankerous bandleader, her biography morphed into a historical exposé on how white record label owners and mobsters fleeced black musicians.  
She found that out of financial desperation, Henderson sold his best arrangements, the world's first taste of swing, to one-time protégé Benny Goodman for $37.50 apiece.  
Later Goodman was coronated as the “King of Swing.”  
Shearer said shuffling Henderson back to the epicenter of the genre ruffled the feathers of some music historians. Their criticism, coupled with a painful re-exposure to the South's ugly, racist past, stung.  
“There were points where I thought, ‘I don’t know why I'm doing this.’ But she persevered, in part to correct the wrongs of the past, one of which includes returning Fletcher Henderson to his rightful legacy: the true, original King of Swing.
Teaching the Teachers

A ‘whodunit’ approach to ninth-grade biology

BY SHIRLEY JINKINS

Move along, there’s nothing to see here, except public school teachers becoming more effective in their biology classrooms.

Molly Weinburgh, professor of science education, is continuing her interactive evolution in science education with a project called “Biology: A Crime Scene Investigation.”

The “crime scene” aspect of the project, which targets ninth-grade biology, uses blood typing and fingerprinting kits, blenders and separation devices for students to look at DNA samples.

Weinburgh received a two-year, $250,000 grant from the Texas Higher Education Coordinating Board. Her program gives ninth-grade teachers in multicultural schools guidance, hands-on mentoring and tips for engaging their students.

Teachers use biology texts and employ worded, mathematical and computational exercises. They receive stipends for participating in the programs, as well as materials and equipment for classroom experiments.

While making biology more relatable, Weinburgh said the teachers also reach English-language learners with the material. “It’s biological content, plus some training time with teachers who have not thought of themselves as teachers of math and language.”

With a 145-hour professional development commitment, the high school teachers devoted 15 days of summer break the first year and 10 days the second year. They also meet one Saturday a month during the school year as a group to share ideas, do labs together and discuss how to keep class experiments on track and successful.

On the required Saturday meetings, the teachers discuss their challenges and successes. They often report that classroom time management is one of their major challenges. One teacher might have two hours of class time for an experiment, while another might have just 45 minutes.

Collaboration among the teachers is an essential part of the program, said Weinburgh, who is also director of the Andrews Institute of Mathematics & Science Education. The teamwork helps teachers build their educational skills and gives them the confidence to succeed in the classroom.

The biology project continues Weinburgh’s specialty in mentoring public school teachers, using a creative approach for in-service training hours. “I love working with teachers and seeing what they deal with every day, academically and emotionally.”
With only pen and paper, Kiril Tochkov made a startling discovery.

“For a month and a half, I was writing like the medieval monk that was copying the Bible,” said the associate professor of economics, who scoured historic documents for his research on Sino-Russian relations with Carrie Liu Currier, associate professor of political science and director of Asian Studies.

Tochkov uncovered secret communications that illuminate the fragile relationship between Russia and neighboring China. In the 1950s and ’60s, Soviet diplomats in Beijing were listening to every speech given by Chinese leaders. They expected to hear some gratitude for the Soviet efforts that helped launch industrialization and modernize the People’s Republic of China.

“The Soviet ambassador or Soviet diplomat would count how many times he heard ‘thank you’ to the Soviet Union for economic help,” Tochkov said. “For example, he would say that ‘In a speech that lasted for 40 minutes, the Chinese leader mentioned the Soviet Union only three times,’ or ‘He would not mention the economic help we provided at all.’”

A snub was relayed back to the Soviet Foreign Ministry, Tochkov said. “They said it is very sad that our Chinese comrades were not expressing enough or sufficiently often enough the economic help that the Soviet Union was providing.”
The sensitivity shown by the Soviets was “constant, appearing in almost every document” from that era, he added. “That is an indication that there was a worsening [relationship] between the two countries.”

**HISTORICAL NARRATIVE A CLUE TO FUTURE TIES?**

A new research initiative at TCU explores the ever-changing relationship between Russia and China — two superpowers with growing muscle in the global economy and world affairs.

“It’s not the kind of alliance that we often see from a Western point of view,” Currier said. “Both [China and Russia] have a history of distrust with each other, and the marriage of interests is temporary. It could change in the next two or three years and that would not be surprising.”

What distinguishes the TCU project is the extensive analysis of both the political and economic ideologies in China and Russia over the past six decades (1950-2010).

Currier’s expertise in Chinese foreign policy, combined with Tochkov’s in Asian economics, provides for a deeper analysis of the Sino-Russian partnership that is not found in current literature. “We’re examining 60 years of history to give us a sense of how they align politically and economically,” she said. “The past helps us inform the future.”

The two professors theorize that changes in Sino-Russian relations mirror the degree to which the two countries are in sync — not just on the economic front, but in political ideology as well. Discord in both areas has triggered serious conflicts bordering on war, or years of animosity.

Times of friendship and cooperation are marked by harmony in political and economic views — as today’s partnership reflects. “Right now, the political and economic ideologies in Russia and China are aligned,” Tochkov said. “Both have more or less authoritarian political systems coupled with a state-capitalist economic model, which suggests that the partnership between them is strengthening.”

**A PRACTICAL MODEL FOR POLICYMAKERS**

Historical patterns will be used to create a novel analytical model that could predict the future course of Sino-Russian relations, said Tochkov and Currier. Such a model could shed light on the interplay between political and economic ideologies, and also gauge the “border effects” that impact trade.

“These give us an idea about the costs involved when goods cross the border and represent the actual hurdles in the trade and investment relations,” Tochkov said.

Today, the border effects between China and Russia are relatively high, meaning the official policy of close ties has not yet reached the ground.

“We see Presidents [Vladimir] Putin and Xi [Jinping] shaking hands and signing a bunch of treaties, but Chinese goods entering Russia still face logistic and bureaucratic obstacles at the border,” Tochkov said. “We can argue that the strategic partnership at the macro level translates into deeper economic integration between the two countries only if these border effects decline in the near future.”

Changes in the intensity of the Sino-Russian partnership will have immediate implications for Northeast and Central Asia, where the two countries are deeply involved, he noted.

**BOOMING INTEREST IN ASIAN STUDIES**

TCU faculty members hope their new Sino-Russian research will elevate the university’s Asian Studies program and further the boom in student enrollment.

“There’s been a lot of increasing interest in Asia across the country, and in the developing Chinese economy and the implications that would have in the United States — as well as for the global economy,” Currier said. “When I first took over the program [in 2006], we had six students and had to recruit really hard. Now, we have no problem maintaining 16 to 20 students for an interdisciplinary minor.”

The enrollment surge is a reflection of the changing tide, Currier said, “realizing that to do business globally, you have to know something about China.”

Currier and Tochkov plan to integrate their research into the classroom, with students participating in the empirical analysis. “One of the great things about TCU is that when the faculty has an active research agenda, students get the full extent of that,” Currier said. “As we conduct the research, they actually learn about the process, the difficulties and the political and economic challenges of doing this kind of research in these countries.”

“The past helps us inform the future.”

Carrie Liu Currier, associate professor of political science and director of Asian Studies
A VOLATILE ALLIANCE

From friendship to the brink of war, the partnership between China and Russia has always been fickle. A research study examines how cooperation between China and Russia hinges on both their economic and political views being in sync. TCU experts in political science and economics joined forces to analyze five distinct periods in Sino-Russian relations over six decades (1950-2010).

1950s:

FAST FRIENDS
China quickly aligns itself with the Soviet Union on the heels of the Chinese Revolution. The birth of the Chinese communist state is a near-perfect alignment with Russian political and economic ideologies:

- Both countries strive for an ideal communist society, adopting the principles of Marxism and Leninism.
- State economies in China and Russia operate without free-market mechanisms.
- Mutual economic help and intensive cultural exchanges mark the era. Russia sends tens of thousands of Soviet engineers and technicians to build China’s infrastructure and promote industrialization. A massive influx of Chinese are sent to study in the Soviet Union.
- The friendship begins to crumble in the late 1950s, as China’s leadership becomes frustrated with the slow pace of industrialization and starts the “Great Leap Forward” to elevate its economy. Russia is at odds with this and envisions gradual growth through five-year plans.

1960-1985:

THE BIG CHILL
Mutual mistrust and a fiery ideological rift lead to a bloody border conflict:

- Russia is at a standoff over China’s desire to expand into a huge communist economy — mobilizing millions of people in a short time.
- The rift prompts Soviet engineers and technicians to pull out of China in 1960, leaving many joint projects unfinished.
- A territorial dispute over Zhenbao Island, on the far eastern border between Russia and China, leads to military conflict in 1969. Hundreds of soldiers on both sides of the border are killed.
- A deep freeze in relations follows for the next 16 years.
1985-1991: ARM'S LENGTH
Cooperation is gradually restored as a young Russian reformer, Mikhail Gorbachev, tries to mend relations with China:

- After years of inefficiencies, Chinese and Soviet leaders realize the need for deep economic reforms. They create new economies based on market principles, while still holding a monopoly of power.
- In 1985, Gorbachev’s Soviet reforms foster a stronger alignment with China, in both political and economic ideologies.
- The breakdown of the Soviet Union in 1991 and the emergence of Russia, where the communist party was banned, introduces new frictions between the two countries.

Economic ideologies are in sync but political ideologies clash, preventing China and Russia from restoring close ties:

- Both countries advance their market-based economies. China is becoming a global supplier of cheap goods, while Russia is struggling to reform its local industry and retain global economic clout.
- Despite harmony in market ideologies, the gap widens on the political front. Russia is interested in Western reforms, while China clings to communism.
- The transition toward a democratic society in Russia clashes with the brutal suppression of dissent in China.

2000s: CLOSE COMRADES
The partnership between China and Russia reaches new heights. United by a mutual appreciation for strong leadership, they defend their national interests while challenging Western dominance. China and Russia also share a new model of state capitalism with limited political freedoms:

- China is not critical of either Russia’s aggression in Syria or Russia’s annexation of Crimea in the Ukraine — two moves clearly condemned by other world leaders.
- As Western sanctions over its actions in the Ukraine unfold, Russia turns to China to ensure a market for its hydrocarbon exports. Both countries agree to build a natural gas pipeline for Russian crude oil into China and the first bridge connecting their borders.
- Russian President Vladimir Putin reverses many of the reforms of the 1990s and introduces his system of “managed democracy” in Russia, with a greater role for the state in economic matters.
- The two countries deepen their economic and political ties and join the elite club of emerging economies known as BRICS (Brazil, Russia, India, China and South Africa).

Sources: Interviews with Kiril Tochkov, associate professor of economics, and Carrie Liu Currier, associate professor of political science and director of Asian Studies at TCU. “Ideology and the Turbulent Nature of the Strategic Partnership between China and Russia: An Interdisciplinary Perspective,” grant application by Tochkov and Currier
What impact could the partnership between China and Russia have on the United States and its interests abroad?

TOCHKOV: During the past 70 years, China and Russia have emerged as the key competitors of the United States on the world stage. During the Cold War, the two countries, and especially their alliance, represented a major military and ideological threat to America and its global strategic interests. Since the 1990s, the geopolitical rivalry has been complemented by economic concerns as globalization deepened trade and investment ties. China has turned gradually into an economic superpower that dominates manufacturing and trade, while an increasingly authoritarian Russia has been trying to revive its military might through involvement in conflicts around the world.

Currently, we are standing at the threshold of a new era marked by a growing clash between the U.S. and the strategic alliance of Russia and China. Trade with China is often blamed for the loss of manufacturing jobs and the increase in the income inequality in the U.S. Russia has emerged again as one of the main geostrategic threats to the U.S. in a new version of the Cold War.

A deeper understanding of the relations between China and Russia will allow policymakers to devise strategies in containing the rivalry with these two countries from turning into trade wars and military clashes that would be detrimental to the U.S. and its partners around the world.

Is the current Sino-Russian partnership a temporary marriage of two countries seeking to strengthen their global influence? Or a fundamental shift in world power?

CURRIER: With Russia and China it is always a temporary relationship. They each are interested in preserving domestic stability in their own countries, and their approach to foreign policy is one that clearly reflects their own changing self-interest … In many respects, the things they have in common involve a distrust of the United States and dislike for U.S. policies/intervention abroad. The real threat the Sino-Russian alliance poses is a sense of growing economic strength independent of the West and a counterbalancing force to Western interests globally.

What are some of the key differences in what China and Russia want from each other?

TOCHKOV: China remains fixated on economic issues and is interested in expanding its trade with and investment in Russia. In contrast, the Russian government has been preoccupied with national security concerns and has been keen on restoring its global clout on the international stage at the expense of reforming its domestic economy and making it more competitive. Despite a slowdown, China’s economy continues to grow, creating demand for natural resources. Russia has not been able to diversify its economy, which still largely depends on exports of oil, gas and natural resources. Western economic sanctions and the steep decline in oil prices have devastated the Russian economy, compelling the government to seek alternative markets in East Asia and to offer major concessions in negotiations with China.

What challenges could undermine the current Sino-Russian alliance?

CURRIER: The Chinese ultimately have no true allies, and the greatest concerns for Chinese leaders are maintaining economic stability. It is possible that Russia and China can find themselves at odds economically, as there are already commercial challenges in border regions. And there is growing concern in Russia [and globally] with regard to how the Chinese do business and the massive influx of goods coming from China. When push comes to shove, both states know the partnership is volatile.

TOCHKOV: The lack of trust between the two countries is a major stumbling block for deepening economic ties. China has the financial funds, the labor and the technical knowhow to foster economic development in Russia, especially in the economically depressed regions of Eastern Siberia and the Russian Far East. However, the Russian government is very reluctant to encourage such cooperation because it does not want to turn Russia into a cheap supplier of commodities to China. In addition, Russians are fearful that China can establish its economic dominance in border regions that have been traditionally part of the Chinese empire. As a result, Chinese workers and companies are facing various hurdles when trying to do business in Russia.

— Mary Ann Kurker

A CLOSER LOOK:
The Sino-Russian Partnership
a Q&A with Carrie Liu Currier & Kiril Tochkov

Kiril Tochkov (left), associate professor of economics, and Carrie Liu Currier, associate professor of political science and director of Asian Studies.
Power and Protests
Rhetoric scholar revisits the militant revolutions of the 1960s.

BY CAROLINE COLLIER

Brad Lucas was born right after the Days of Rage, a 1969 spectacle in Chicago where frustrated protesters from the hippie counterculture staged a violent confrontation with police. Even though the associate professor of English was too young to understand, the protest signaled a turning point in tone for the social change movement.

Around the same time, scholars were conceiving a new field, the rhetoric of social protest. Pre-1960s rhetorical analysis focused on traditional forms of public communication, such as “formal speeches,” said Lucas who specializes in the academic field. “The rabble with their signs … wasn’t considered worthy.”

Television coverage in the 1960s changed the ways protesters conveyed their ideals. Scholars in rhetoric have since used the decade as a case study to expand understanding of how nontraditional political groups acquire influence over societal evolution.

Ideologies of the decade’s political groups ran the gamut from women’s liberation and racial justice to anti-imperialism and communist economics. But as wider society abandoned their causes, internal dissension flared over several points, including whether any measure of violence would be tolerated, and if so, defining those limits.

Lucas is mapping library archives around the country to find relics of the 1960s New Left, a social movement led by college students that promoted ideals of peace and equality across races, nationalities and genders.

By working through a growing, but haphazard, collection of public speeches, rally fliers, crumbs of meeting notes and forgotten newspaper coverage, Lucas hopes to contextualize the New Left’s shift in messaging from nonviolent idealism to calling for physical destruction, mostly of state-owned property.

Most of the professor’s research focuses on the communication strategies of two protest movements. One involves the Students for a Democratic Society, a group dominated by white college students that took part in the civil rights and anti-Vietnam War movements. The other is the Black Panther Party, the mostly black group that electrified the 1960s with its anti-capitalist, anti-racist platform, social service offerings and armed protection of black communities from perceived police violence.

The Black Panthers, Lucas said, “really kind of informed and shaped the whole New Left.” For example, in the years after several Black Panthers marched around the California Capitol with loaded rifles, Students for a Democratic Society, frustrated with politicians who gave only lip service to their demands, morphed into the bomb-happy Weather Underground.

Did the intentional change in public presentation undermine the groups’ objectives? One line of Lucas’ research examines the 1960s “declension” narrative, a popular explanation of how the transition from peaceful into warlike behavior unraveled the movement.

But the considerations around the political movements’ embracing violence were nuanced, Lucas said. “It’s not such an easy story.”

Lucas said the groups were emulating South American revolutionaries. “Che Guevara was an inspirational hero for a lot of the youth of the early ’60s. Revolution was possible,” he said. “And it wasn’t something that they just convinced themselves was theoretical. They actually thought they could pull it off.”

However, the story of the 1960s revolution isn’t over. Social-change movements persist today, and Lucas studies them too. What lessons would he share with students participating in social change efforts on their campuses? Lucas said they should consider suggesting change through traditional channels before taking to the streets. “Sometimes it’s effective … things like mediation, filing a complaint before grabbing the picket signs.”
From combating stress to enhancing sleep, the practice of mindfulness is increasingly accepted in Western culture as a way to foster well-being. On college campuses, the emerging field of contemplative studies offers a pathway to mindfulness through introspective systems such as meditation and dance.

At TCU, a faculty interest group started five years ago. Today the group encompasses professors from engineering, business, physics and other fields seeking to enhance their personal practices while expanding student understanding of mindfulness.

“Many of our students face stress, anxiety and depression, and would benefit from meditative practices, but [the students] say they’re too busy,” said Mark Dennis, associate professor of religion, who leads the group. “And while meditation is generally seen as a seated practice, mindfulness can become part of our daily lives through focusing on breathing or even simply walking.”

Andrew Fort, professor of religion who retired in December, defines mindfulness as “focusing awareness on the present moment and watching the mental flow without judgment.” The noted Hindu scholar has meditated daily for more than four decades.

“For years, Mark Dennis and I included a weeklong mindfulness meditation exercise in our Buddhism courses,” Fort said. “In addition to integrating contemplative exercises in their own classes, steering committee members also led exercises in other faculty members’ classes — from business to philosophy to media ethics.”

Dennis, who specializes in East Asian religions, teaches a new honors colloquium — “Mindfulness and Millennials” — at TCU. “One of the requirements is that students engage in meditation and other practices for the entire semester,” said the professor, who studied yoga and meditation during the eight years he lived in India and Japan.

Dave Aftandilian, associate professor of anthropology, assigned meditation/contemplative practices in several of his courses, including one called “Anthropological Approaches to Nature and the Sacred.”

“In part I want students to have a chance to practice how [indigenous] peoples have traditionally come to know nature, which is primarily through direct personal experience,” Aftandilian said. “And, in part I just want them to get outside to experience ‘aha’ moments of personal connection with the natural world that I hope will stay with them long after they left my classroom.”

In terms of contemplative practices, Fort said a one-size-fits-all approach rarely works. “There is a big smorgasbord of things you can do, and virtually everyone can find something that works for them, but people do have to search for their thing.”

In 2016, John Dunne, the first distinguished chair in contemplative humanities at the University of Wisconsin-Madison, gave a lecture at TCU on contemplation and neuroscience. “Afterward, we brought him together with representatives of the emerging medical school,” Fort said. “There is increased value on mind-body relationships in the field of health care, where we’ve seen a rise in meditative practices related to pain relief and managing stress.”

Fort, who intends to stay active in the faculty group, hoped to see more undergraduate classes similar to “Mindbodyness: Contemplative Movement and Reflection.” He taught the class in 2015 with Susan Douglas Roberts, professor of dance. The two professors divided class time between contemplative movement practice and communication in the form of journaling, discussions or lectures. The students also participated in a day of silence.

“They especially valued learning what guest teacher Alejandro Chaoul [director of education for the Integrative Medicine Program at The University of Texas MD Anderson Cancer Center] called meditation pills, tools to quiet and center themselves during the daily rush of university life,” Fort said. “There was a striking emphasis on how much they welcomed and integrated simple and practical self-care skills of focused breathing and being present.”

Mark Dennis specializes in East Asian religions and teaches courses in Buddhism, Daoism and Confucianism; religion and violence; and world religious traditions.

Andrew Fort’s academic expertise is in classical Hindu thought.
U Túumben K’aayilo’ob X-Ya’axché’/Los Nuevos Cantos de la Ceiba, Volume II
EDITED BY DONALD FRISCHMANN, PROFESSOR OF SPANISH, AND MIGUEL MAY MAY
YUCATÁN STATE SECRETARIAT FOR CULTURE AND THE ARTS, 2015

Frischmann edited this follow-up volume to the original trilingual anthology, a best-seller in Mexico’s Yucatán peninsula. The second volume includes works in both Yucatec Mayan and Spanish by 30 contemporary writers who created short stories, prophecies, poetry and drama. Frischmann’s objective is to strengthen study of the Mayan language and worldview in the face of growing pressures to abandon ancestral language and culture and assimilate to Western ideals. — Caroline Collier

Queer TV in the 21st Century: Essays on Broadcasting from Taboo to Acceptance
EDITED BY KYLO-PATRICK HART, PROFESSOR AND CHAIR OF FILM, TELEVISION AND DIGITAL MEDIA
MCFARLAND AND COMPANY, 2016

Hart’s book explores queerness in contemporary television series including Buffy the Vampire Slayer, The Ellen DeGeneres Show, The L Word, Modern Family, Queer as Folk, RuPaul’s Drag Race and Will & Grace. It demonstrates how, in the majority of series, queer characters achieved visibility at the expense of minimizing much of their queerness.
— Makenzie Stallo

The Shapes of American Ballet: Teachers and Training before Balanchine
BY JESSICA ZELLER, ASSISTANT PROFESSOR OF DANCE
OXFORD UNIVERSITY PRESS, 2016

While most consider George Balanchine to be the sole creator of American ballet, numerous European and Russian émigrés played critical and largely unacknowledged roles in its development. Zeller’s book provides a new perspective on American ballet in the period before Balanchine’s arrival in the United States. Using New York City as a backdrop, the author explores rare archival documents to spotlight several significant European and Russian teachers.
— Makenzie Stallo

Plato on the Metaphysical Foundation of Meaning and Truth
BY BLAKE HESTIR, ASSOCIATE PROFESSOR OF PHILOSOPHY
CAMBRIDGE UNIVERSITY PRESS, 2016

Plato’s ideals on the nature of truth and meaning have been vital in the development of philosophy. Cultures throughout the ages deciphered his speeches and works to help build the foundation upon which modern thought stands today. In this investigation, Hestir explores the life of Plato and his interactions with other philosophers to present a view on Plato’s ideals that is divergent from other popular interpretations.
— Nick Ferrandino

Adam Ferguson and Ethical Integrity: The Man and His Prescriptions for the Moral Life
BY JACK HILL, PROFESSOR OF RELIGION
LEXINGTON BOOKS, 2017

In a world where consumerism is a growing influence, figuring out what it means to live a “good life” is increasingly difficult. Hill mixes the experiences and musings of Adam Ferguson, an 18th-century moral philosopher and scientist, with his own philosophical inquiries. Together, both author and subject contemplate the dangers of materialism and social fragmentation.
— Nick Ferrandino

Cultural Criminology: An Invitation, Second Edition
BY JEFF FERRELL, PROFESSOR OF SOCIOLOGY, KEITH HAYWARD AND JOCK YOUNG
SAGE, 2015

Cultural Criminology: An Invitation traces the history, current configuration, methodological innovations and future trajectories of cultural criminology, mapping the intellectual and political terrain of this emerging field. The book highlights and analyzes issues of representation, meaning and politics in relation to crime and criminal justice, covering areas such as crime and the media, popular culture, consumerism, globalization and social control.
— Will Konig
General He Yingqin: The Rise and Fall of Nationalist China

BY PETER WORTHING, PROFESSOR OF HISTORY
CAMBRIDGE UNIVERSITY PRESS, 2016

The book studies the career of General He Yingqin, one of the most prominent military officers in China’s Nationalist period (1928-49). Yingqin’s work in the Chinese Nationalist military served as the foundation of a close personal and professional relationship with Chiang Kai-shek that lasted for more than two decades. — Will Konig

At the First Table: Food and Social Identity in Early Modern Spain

BY JODI CAMPBELL, ASSOCIATE PROFESSOR AND CHAIR OF HISTORY
UNIVERSITY OF NEBRASKA PRESS, 2017

Campbell researched household accounts and university and monastic records to provide an overview of Spanish food customs in the 16th and 17th centuries. Through food choices, early modern Spaniards reflected their social identities, which involved gender, status, age, occupation and religion. — Kristen Weaver

Doctoral Research
A selection of TCU’s doctoral research candidates who are expanding the boundaries of knowledge

MARJORIE PROKOSCH, Ph.D. candidate in psychology
“CAUTION IN THE TIME OF CHOLERA: DISEASE THREATS DECREASE RISK TOLERANCE”
Prokosch’s paper focuses on disease cues — in the environment or in the body — that lead people to have a lower risk tolerance toward disease and display lowered risk-taking abilities. She co-authored the paper with Sarah Hill, associate professor of psychology at TCU, and the University of Michigan’s Josh Ackerman. — Makenzie Stallo

JORDON WHITE, Ph.D. candidate in psychology
“HIPPOCAMPAL Aβ EXPRESSION, BUT NOT PHOSPHORYLATED TAU, PREDICTS COGNITIVE DEFICITS FOLLOWING REPEATED PERIPHERAL POLY I:C ADMINISTRATION”
At the Alzheimer’s Association International Conference in Toronto, White presented data from an experiment in which peripheral poly I:C, an immunostimulant, was given to animals to test for the accumulation of amyloid-beta peptides, the accredited amino acids involved in Alzheimer’s disease. — Nick Ferrandino

JAMES CHASE SANCHEZ, Ph.D. candidate in rhetoric and composition
“ERASING THE NOOSE: THE (LACK OF) PUBLIC MEMORY OF MEXICANLYNCHINGS”
Sanchez brings attention to the forgotten history of Latino tragedies in a country where race is often viewed in terms of black and white. He presented this paper at the Rhetoric Society of America conference in Atlanta in May 2016. — Nick Ferrandino

MARIANNE BURNETT, Ph.D. candidate in chemistry
“INVESTIGATION INTO THE SYNTHESIS, CHARACTERIZATION, AND IMMOBILIZATION OF MODIFIED ELECTROCHEMICAL BIOSensors UTILIZING A BIOTIN-FERROCENE PLATFORM”
Burnett, whose goal is to develop electrochemically active biosensors for cancer diagnostics, presented her paper at the American Chemical Society National Meeting & Exposition in San Diego in March 2016. — Will Konig

MIRIAM VILLANUEVA, Ph.D. candidate in history
“LIFTING THE CURTAIN ON THE CULTURAL INFLUENCES OF THE TORRIJOS-CARTER TREATIES”
Villanueva’s study reinterprets dictatorships in the Spanish-speaking world by focusing on the cultural tools Panama’s regime used to seize control of the Panama Canal in the 1970s. She presented her paper in a panel on cultural politics at the Canadian Association for Latin American and Caribbean Studies Congress in Alberta, Canada, in June 2016. — Will Konig

HUNG DOAN, Ph.D. candidate in biophysics
“MECHANOTHERMALLY INDUCED CONFORMATIONAL SWITCH OF A PORPHYRIN DIMER IN A POLYMER FILM”
Doan’s research shows that by stretching a polyvinyl alcohol film, scientists can induce a conformation bias in the embedded porphyrin dimer. He presented the paper at the International Conference on Porphyrins and Phthalocyanines in Nanjing, China, in July 2016. — Will Konig
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