

SCIENTIA

A publication for College of Science and Health alumni



When a child has behavioral or emotional issues, CSH experts can help. Learn more about building healthy families on page 6.

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UNPACKING YOUR CAREER

Dean Gerry Koocher discusses the vocational process



Only rarely will a student identify a career path early on and follow it without detours. Many students enter college certain of their major only to change it one or more times during their undergraduate career. Others arrive on campus undecided but find themselves intrigued by an inspiring professor or a fascinating class. Still others enter their chosen profession but change direction in midcareer as new opportunities arise.

My own career trajectory has taken a number of turns that I never anticipated in high school, college or even graduate school. As a high school student, I fell in love with the sciences, particularly electronics and chemistry. I won science fair prizes and felt certain that I had a future in polymer chemistry (yes, plastics!). In college, a course in physical chemistry convinced me that I wanted out of that major, but I had no idea where to turn. A family friend asked what I felt passionate

about, and I immediately thought of my work as a summer camp counselor for a local YMCA. "Well, try child psychology," came the advice.

I signed up for a course and had the good fortune to land in the class of a

"My own career trajectory has taken a number of turns that I never anticipated."

truly gifted and inspiring teacher. Several other wonderful faculty mentored me, and I ultimately pursued a PhD in clinical child psychology. After many years as a psychologist based in a medical school, I had the opportunity to move into administration as a program director, a department head and now an academic dean. These are not outcomes or jobs that I could ever have imagined as a high school or college student.

As you read this, I hope that you too are reminded of your pathway and have some interesting tales to tell about the role that DePaul played in shaping your direction—whether thanks to classmates, faculty members who taught or mentored you, or other experiences you had here. If you have an interesting story to tell about your career path, please write to me at gkoocher@depaul.edu. I hope to share some of what I learn from you in future issues of Scientia.



TO INFINITY AND BEYOND

EXPLORING THE PROPERTIES OF A Menger SPONGE

An elaborate origami structure that stands five feet tall sits in the lobby of the John T. Richardson Library. At first glance, visitors may think it's simply an interesting art installation. But if they stop to read the sign posted nearby, they'll learn that the sculpture is actually a Menger sponge, a type of fractal that has an infinite surface area but zero volume. In other words, the Math Club is behind this elaborate feat.

"A Menger sponge is a 3-D representation of the Cantor set [a set of points lying on a single line segment that has a number of surprising properties]," says Megan Davis, a member of the Math Club who is pursuing a combined BS/MS degree in applied mathematics. Essentially, the sculpture represents the limit of an infinite process of subdivision and deletion; a Menger sponge is composed of many cubes with the center blocks removed, until "the whole thing becomes a kind of lattice with no volume inside, just surfaces of infinitely pitted and thinned walls," according to an article in Gizmodo.

The Math Club made their sponge out of business cards emblazoned with a square logo meant to represent hollowed-out cubes. Dozens of students and faculty members folded the 35,000 business cards into cubes over eight months. "For a while, the sponge lived in the tutoring room in the math department, so whenever anyone needed a break from working, researching or doing homework, they could go help with assembly," Davis says. "It was a cool way for different people to come together and talk about math."

Incredibly, the sponge is held together without any tape or glue. Strategic folding creates flaps that tuck into one another, producing a durable structure that weighs about 120 pounds. "The most challenging part of the project was folding the cards and building in the corners," Davis remembers. "The cards were quite finicky, and when we got to the corners, we had to be careful."

Associate Professor Kyle Petersen estimates that the project took a combined 300

hours of work. "In principle, each new level of the sponge is 'just' 20 times as much work as the previous level," he notes. A level 0 sponge is a single cube made of six business cards that can be assembled in approximately two minutes. A level 1 sponge is made from 20 cubes, so it requires 20 times as many resources. In this case, that would mean 120 cards and at least 40 minutes. Meanwhile, a level 2 sponge is made from 20 level 1 sponges, and a level 3 sponge is made of 20 level 2 sponges.

The Math Club's sponge is half of a level 3 sponge—the group sliced it diagonally so viewers could peek into the interior cross section. With each level adding 20 times more work, the diligent card folders became intimately familiar with the idea of exponential growth. "For many computer programs, a dozen iterations like this are no problem, but for humans like us, who experience life at a constant rate of speed, the exponential process feels like an eternity after only two or three iterations," Petersen says. "It was a very humbling experience that way."

WOMEN AT WORK



INVESTIGATING GENDER BIAS IN LEADERSHIP AND NEGOTIATION

It's 2017, and women make up less than 20 percent of the United States Congress. In 2015, women who worked full time typically earned 20 percent less than their male counterparts, according to the Institute for Women's Policy Research. A 2014 poll from the Pew Research Center found that only 8 percent of Americans believe women would do a better job of managing a professional sports team than men; 54 percent say men would be better at this task.

These conundrums are familiar topics for Professor Alice Stuhlmacher, chair of the psychology department, who has been researching gender and leadership for much of her career. In the interview below, she offers insight into the persistence of gender stereotypes and strategies to combat bias.

How is the psychology department contributing to a better understanding of leadership and gender in the workplace?

Psychology, and industrial-organizational psychology in particular, uses science to better understand human behavior and create more fair and productive environments. In terms of gender issues, Professor Jane Halpert has done work on pregnancy discrimination, Associate Professor Douglas Cellar has evaluated sexual harassment training, and Associate Professor Suzanne Bell and Assistant Professor Goran Kuljanin have studied teamwork and team-building across different types of leadership structures and workplaces. Our doctoral students also have studied many gender-related

topics, such as work-life integration and perceptions of LGBT leaders.

Your research focuses on negotiation, leadership and gender issues. How are those issues interrelated?

The stereotype of an effective leader is someone who appears confident, dominant and assertive. These traits are very similar to the stereotype of an effective negotiator. In reality, a variety of styles can be effective for leaders and negotiators, but there is a tendency to think of leadership and negotiation as consistent with the stereotypical characteristics of men. So a man, rather than a woman, might come to mind more easily when picturing who has leadership potential. Similarly, in thinking about who is a good negotiator, it is common to picture someone with masculine characteristics who will push for resources for themselves. When women act assertively, they may be disliked and face backlash because they do not fit expectations. We may not notice it, but employees negotiate all the time for opportunities and resources; if men and women are getting different outcomes, this compounds inequity over time.

I have published several meta-analyses (analyses of existing studies), which are great for moving research ahead. My latest meta-analysis found that, depending on the situation, patterns can reverse; for example, women tend to be better at negotiating for someone else than men. Others' meta-analyses show that women are more democratic and inspirational leaders than men. The work environment

can have a big influence on how effective women and leaders can be. Creating a positive environment is critical.

On that note, are there steps employers can take to reduce gender bias?

Yes, and those steps are related to the work environment. It starts with attending to the processes used to select, hire and promote, as well as how opportunities and resources are made available. Research shows that the recommendations below reduce the impact of biases. Employers should:

- Analyze the job before looking for candidates. What does the job really require? Stereotypical skills may not actually be the most important.
- Share position openings widely. On the job, supervisors should ensure that opportunities and procedures are transparent, avoiding selective information sharing.
- Involve a diverse panel in screening applications in the selection process.
- Avoid unstructured interviews. These are open to biases and do not predict very well who will be a good employee. Ask each candidate the same questions, and use other techniques to validate skills and abilities that people report.
- Check the panel's emotional reactions when interviewing candidates and ask if decisions are being influenced by being drawn to people who seem similar to themselves.



IT STARTS WITH ATTENDING TO THE PROCESSES USED TO SELECT, HIRE AND PROMOTE, AS WELL AS HOW OPPORTUNITIES AND RESOURCES ARE MADE AVAILABLE.

THE THRIVING FAMILY

EXPERTS OFFER ADVICE ON BUILDING HEALTHY FAMILIES

Like any social structure, families are complicated. Luckily, whether a family is struggling to build healthy habits, reduce disruptive behaviors or encourage social-emotional development, CSH's faculty and staff experts in family research and therapy can help.

Associate Professor Jocelyn Carter, director of clinical training and director of the Healthy Families Lab, is interested in finding "new and innovative ways to improve physical health in children and adolescents, such as through physical activity interventions, focus groups, cooking classes and active video games." In her community-based research, Carter has also sought to understand how cultural factors contribute to youth activity levels. Here, she shares ideas for families looking to build healthy habits.

GET MOVING

Research shows that children and adolescents who are more physically active perform better in school, have higher cognitive functions and are found to be in better mood states. Being physically active also helps children and adolescents build healthy and active bodies. It is well established that being physically active in early childhood prevents obesity, both immediately and later as an adult. Most of our participants love exercising with their parents, and we love seeing them "compete" against each other.

MODEL A HEALTHY DIET

Improving your own diet can help your children learn more about what types of foods they should be eating, and it can

help encourage them to try foods they may not otherwise be willing to try.

SERVE VEGGIES

Having vegetables as a regular part of dinner can help to establish long-term healthy eating habits in children. At least one study found that vegetables served during dinner predicted higher intakes of vegetables five years later. Similarly, reducing the availability of unhealthy items, such as sugary drinks, can help establish healthy long-term habits as well. Treats are fine once in a while, but the bulk of each meal should include vegetables, fruit, proteins and whole grains.

As director of the Parent-Child Interaction Therapy (PCIT) Clinic, part of DePaul Family and Community Services (FCS), Christina M. Warner-Metzger, PhD, guides families through techniques to improve relationships, reduce parenting stress and decrease children's misbehavior. Caregivers wear personal listening devices as they play and interact with their child, which allows a therapist observing behind a two-way mirror to offer real-time coaching and feedback. Warner-Metzger, who is one of only 21 PCIT International Certified Master

Trainers worldwide, says, "It's a collaborative and supportive process as caregivers learn how to deepen the relational connection with their child while establishing important family and social boundaries." She offers advice below. If you need additional support, contact FCS at (773) 325-7780.

GET HELP ASAP

If your child's behavioral or emotional difficulties are impacting his or her daily life at home or at school, early intervention is key. Children often do not "grow out of" serious behavioral issues, such as frequently defying adults, hurting others, throwing objects or destroying possessions, and causing disruptions in day care or a classroom setting. Left unchecked, behavioral and emotional problems may negatively impact social development, academic progress and family functioning.

EDUCATE YOURSELF

There are conflicting messages in popular media regarding the best ways to help children develop socially, as well as how to parent a child who misbehaves or becomes emotionally dysregulated. PCIT has more than 45 years of research supporting the techniques used to help families regain balance. When seeking



help for childhood issues, caregivers are encouraged to be informed consumers by visiting websites emphasizing scientifically based approaches, such as the Society of Clinical Child & Adolescent Psychology's website, effectivechildtherapy.org.

PROMOTE PLAYTIME

Recent research indicates the importance of play for children's brain and social skills development, including the long-term impacts of play on academic and emotional functioning. Because of our busy, technology-filled lifestyles, we often overlook the power of play. For healthy development, caregivers are encouraged to turn off the TV, tablet and smartphone, and instead create time within the family schedule to play with their child. Data show that five minutes of positive play between parents and children can make a profound difference in children's behavior and life adjustment.

Cecilia Martinez-Torteya, assistant professor of clinical psychology, is director of the Relational and Early

Assessment Team (RELATe), another FCS program. Caregivers turn to RELATe when they are experiencing conflict with their child, when they feel overwhelmed with sadness or anxiety, or when their children have been exposed to violence or disruptions in caregiving. "We focus on early parent-child relationships because they are key influences for long-term child socioemotional functioning," Martinez-Torteya explains.

Doctoral students in clinical psychology observe the family and identify parenting strengths and weaknesses based on an attachment-oriented framework. Through video feedback, the doctoral students walk caregivers through concrete examples to help them better understand and improve the parent-child dynamic. To promote a strong and healthy relationship with your infant, toddler or preschool-age child, try the strategies Martinez-Torteya recommends below.

GIVE HUGS

Engage in lots of verbal and physical affection! Your young child is learning about who they are and how relationships

work—loving interactions help children see themselves as worthy and lovable, and promote close relationships.

RESPOND TO EMOTIONAL NEEDS

Young children depend on their caregivers for co-regulation and support, even as they gain increased independence. Try to identify the ways your child lets you know he or she needs a moment of connection. Many children communicate this indirectly, so make sure you are responding to your child's needs—is my child afraid and needing to be reassured? Is my child tired and needing some downtime? Is my child exploring a new environment and needing me to make sure he is safe?—even if they are not the same as their wants.

PRACTICE SELF-CARE

Parenting a young child can be a fun and rewarding experience, but it can also be confusing, stressful and frustrating. Find strategies that help you feel better and get you through the difficult times. Try yoga, meditation, exercise, spending time with friends or whatever works for you.

STOPPING STENO

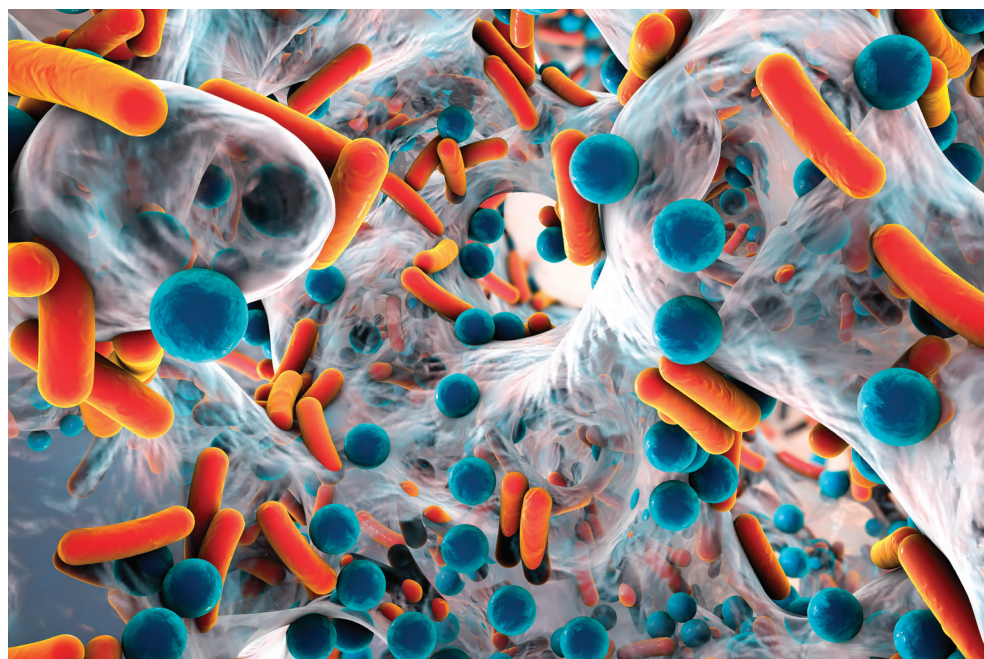
THE FIGHT TO HALT A DANGEROUS PATHOGEN

It sounds like something out of a sci-fi horror film: An aggressive pathogen that kills as many as 70 percent of its victims by causing an infection in the bloodstream, bone, tissue, brain, heart, eye, skin or practically any other body part. But this is no Hollywood invention. It's *Stenotrophomonas maltophilia*, a common bacterial pathogen that can be deadly for patients with compromised immune systems.

Associate Professor Joanna Brooke, a medical microbiologist and bacteriologist, wants to change that. The organism, which Brooke calls "Steno" for short, has the ability to form thick biofilms in your lungs, on the surface of surgical instruments, around sink faucets and on other living and nonliving surfaces. These biofilms are composed of bacterial cells surrounded by a matrix of macromolecules, such as protein, DNA, nucleic acids, lipids and carbohydrates. Unfortunately, the cells in the films tend to be drug-resistant, making them very difficult to eliminate.

Difficult, however, doesn't mean impossible. In her lab, Brooke is pursuing several promising strategies to combat Steno. "We just published a paper showing it's possible to use chemical compounds, combined with drugs, to increase the efficacy of drugs that used to be effective against Steno," Brooke says. This was the first research study on Steno to take this approach; Brooke conceived of the idea after reading that *Pseudomonas aeruginosa*, a similar organism that can form biofilms with Steno, responded to chemical treatment.

In addition to the chemical route, Brooke has had some success in using a bacterial predator that can interact with Steno and kill it off. Brooke and a graduate student are also trying to determine whether a virus could eliminate drug-resistant Steno living



Biofilm of antibiotic-resistant bacteria

in nature. "It's not just found in hospitals," Brooke notes.

Indeed, there are many different strains of the pathogen. The good news is that the chemical approach was effective against more than one strain, as Brooke and her co-authors, including five undergraduates, detail in their paper. From setting up and running experiments to analyzing data and writing and proofreading the manuscript, the undergraduates were heavily involved in all aspects of the research.

"When I take undergraduates into the lab, I don't want them only doing menial tasks like washing dishes," Brooke says. "I like for them to be involved in the actual benchwork, and I really like to see my students get published." Brooke recalls getting in touch with her student researchers after they graduated but before the paper

was accepted, asking, "Do you agree with what I'm saying here?" and "Could you check this?" Indeed, it was this hands-on mentoring that attracted Brooke to DePaul back in 2001; the college recognized her dedication with the inaugural CSH Faculty Mentor of the Year award in 2014.

Even after 16 years of working on Steno, Brooke concedes there's still much to be done. "One limitation is that we grow our biofilms on plastic plates—it's a test-tube situation, which is very different from the human body," Brooke explains. "That's why at the end of the paper, I say that it has potential, but it needs to be tested further." The next few years will bring more trial and, inevitably, error, but Brooke isn't fazed. "That's science," she says cheerfully. "It can be frustrating, sure, but it's exciting at the same time."

AN ACADEMIC LIFE

ONE ALUMNUS' JOURNEY TO THE PINNACLE OF HIGHER EDUCATION

There was a time when Isiaah Crawford (CSH MA '85, PhD '87), president of the University of Puget Sound in Tacoma, Wash., dreamed of becoming the next Arthur Ashe in tennis, or perhaps Bob Gibson or Lou Brock, two standout players on the St. Louis Cardinals baseball team in Crawford's hometown. But even though Crawford played tennis and baseball, his heart already belonged to academics. He knew that studying hard and staying focused could result in his ultimate career goal, one that arrived fully formed in high school after watching "The Three Faces of Eve," a 1957 film about a woman with dissociative identity disorder.

"I was fascinated by the entire concept," Crawford recalls. "I couldn't get to school fast enough the next day to get to the library and look up psychotherapy." From that moment forward, Crawford knew he wanted to be a psychologist.

After a successful undergraduate experience at Saint Louis University, Crawford was actively recruited by DePaul's psychology department for graduate school. Professor W. LaVome Robinson was among the faculty who recognized Crawford's talent and dedication early on. "Isiaah set a very high bar," she says. "He's still a great role model for any aspiring student."

The department's clinical community training program and the university's commitment to social justice appealed to Crawford's sensibilities. "I was most interested in looking at issues around health promotion and really became invested in HIV/AIDS prevention research," Crawford says. "It was a



controversial topic in the eighties, as you can imagine, but DePaul was very supportive."

Armed with his clinical psychology degree, Crawford intended to work in a community mental health clinic or perhaps a psychiatric hospital. But a fateful intervention by one of his mentors, Professor Leonard Jason, director of the Center for Community Research, set Crawford on a new path. "He strongly encouraged, motivated and cajoled me to apply for an open assistant professor position at Loyola University Chicago," Crawford laughs. Even though Crawford hadn't previously considered academia, he found the work suited him. He spent two decades at Loyola, becoming a tenured professor, chair of the psychology department, and, eventually, dean of the

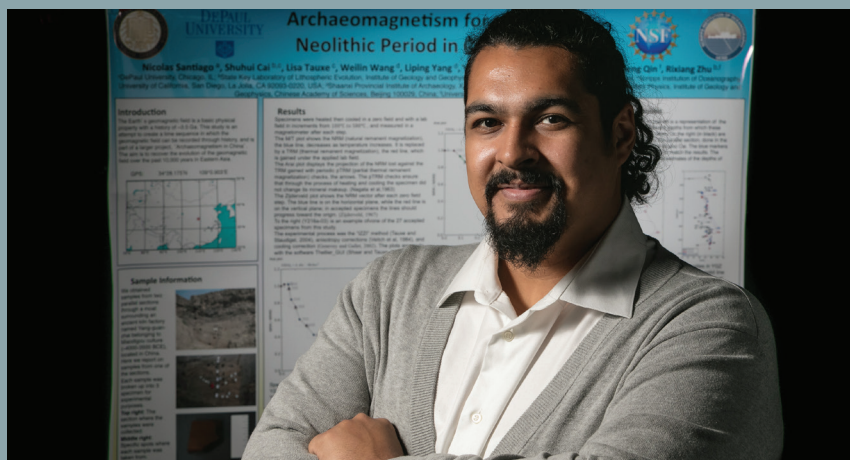
College of Arts and Sciences.

In 2008, Crawford moved west for the provost position at Seattle University, a role he held for eight years. Crawford is now partway through his first academic year at the University of Puget Sound, and he couldn't be more thrilled. Drawing on his behavioral science background, he's spending his first few months getting to know the people and programs that compose this small liberal arts university. "It's an extraordinary institution," he says. "I'm privileged to be in a period of listening and learning before we collectively move forward to develop our next strategic plan."

As a first-generation college student who received endless encouragement from his mother, grandmother and aunt, Crawford is particularly attuned to the needs of the underserved. "I remain very sensitive to the importance of being able to help create a path of opportunity for others who may not have as many resources," he says. "Everyone deserves an opportunity to be their best self and realize their full potential."

Crawford also believes in the power of education to empower students to become global citizens. "That has been very consistent with the types of institutions that I've had the good fortune to be a part of through my formative education and career," he says. "There's always been a strong commitment to prepare students for the highest tests of democratic citizenship and to take advantage of their educations to make contributions in the world." It's clear from Crawford's own track record that he has taken this value to heart.

LAB NOTES



Physics major Nicolas Santiago (pictured) received a 2016 SACNAS Student Presentation Award at the SACNAS national conference in Long Beach, Calif. In January, fellow undergraduate physics majors Noel Garcie, Yunyun Wu and Justin Potvin presented their research posters at the 229th meeting of the American Astronomical Society in Grapevine, Texas. *Photo credit: DePaul University/Jeff Carrion.*



In October, the National Association of Hispanic Nurses Association (NAHN) Illinois Chapter awarded \$1,500 scholarships to three Master's Entry to Nursing Practice students. Carlos Becerra, Cassie Cisneros and Brenda Pacheco were recognized for their exceptional academic achievement. Pictured: Cisneros and Elizabeth Florez, assistant professor in DePaul's School of Nursing and NAHN Illinois Chapter president-elect.



Seven undergraduates worked with two faculty coaches, Assistant Professor Douglas Bruce and Teaching Assistant Professor Michele McCay, to prepare for the Public Health Scholar Bowl, held March 31–April 1 at Saint Louis University. Teams presented a case study and also participated in a quiz bowl, competing against universities from across the country. DePaul finished seventh out of 12 teams in their first showing at the competition.

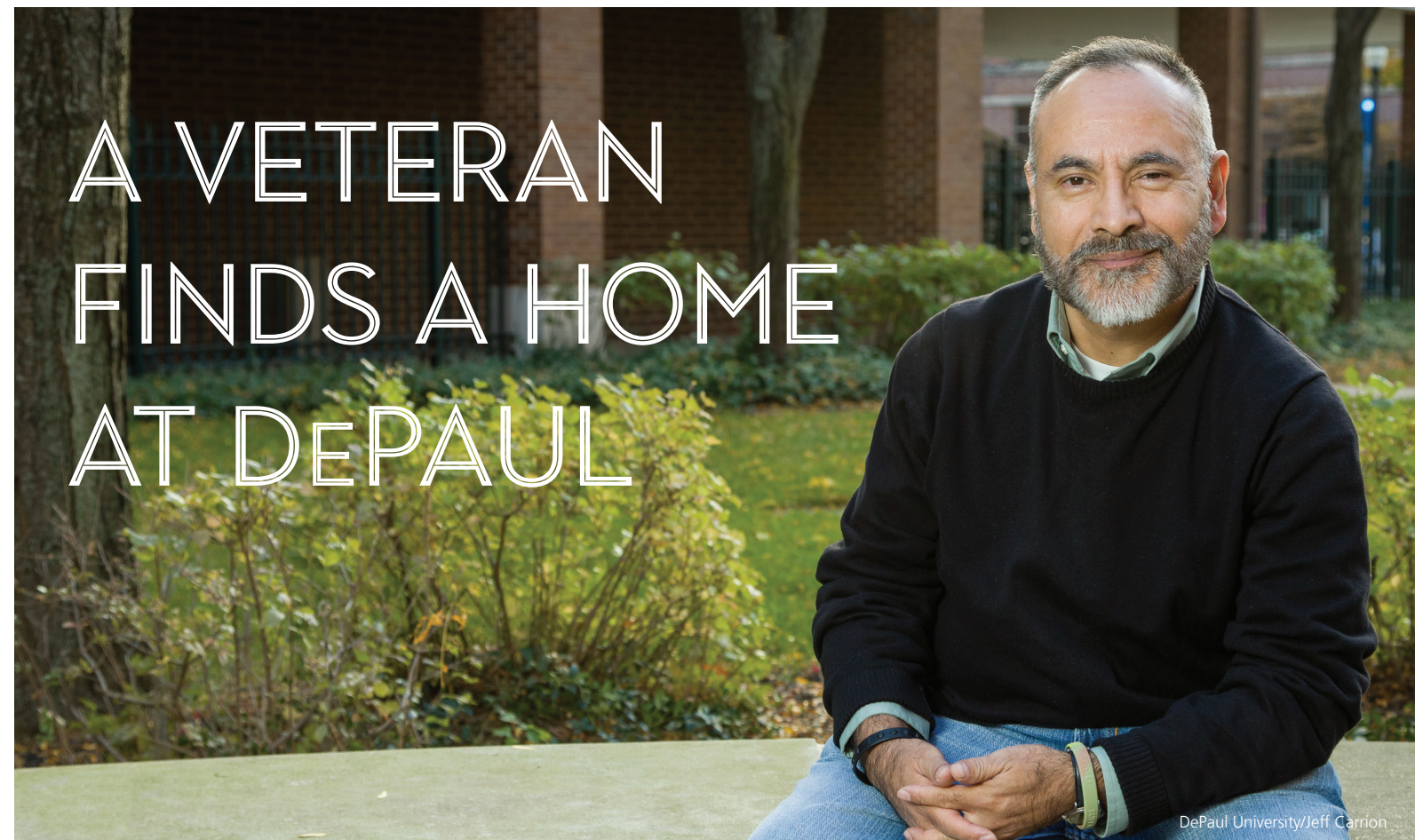


Earlier this year, Craig Klugman, professor of health sciences, delivered a talk during an alumni event in Wheeling, Ill., and then again in Los Angeles. Klugman drew on his background as

a bioethicist and medical anthropologist to discuss the complex issues that arise at the intersection of bioethics and social media.



Direct your browser to the chemistry department's blog to catch up on news about students, faculty and alumni. Aptly named The Catalyst, the blog replaces the department's long-standing print newsletter. Categories on the site include research tips, student success, faculty highlights and Chem Club. Visit depaulcatalyst.wordpress.com to learn more.



Jose Torres spent 22 years as a combat medic in the National Guard before deciding to pursue higher education. During his military service, Torres traveled the globe, from Central America to Iraq, but settling down in Chicago required a different kind of dedication. "When I left the military, I did not feel prepared to transition successfully to student life or to civilian life," Torres says. "I chose DePaul specifically because it has a great support network for student veterans."

CSH's health sciences degree was another draw. Now a junior, Torres hopes to make a career in health education. He believes many conditions in society and the military can be addressed through health education outreach, such as suicide prevention programs.

"My goal is to work with military veterans in health education and prevention initiatives," Torres says. "I want to advocate for health initiatives for all veterans, and in particular for Latino veterans, who are currently

underserved and underrepresented in the Veterans Affairs health system."

In addition to being a full-time student, Torres volunteers with The Mission Continues, a nonprofit organization that eases veterans' transition to civilian life by connecting them with local service projects. Torres is also working with the Jesse Brown VA Medical Center to form a support group for Latino veterans.

Since leaving the military, Torres has realized the importance of being proactive in self-care. He credits DePaul resources, such as the Center for Students with Disabilities and the Adult, Veteran and Commuter Student Services department, with supporting his academic journey and introducing him to fellow student veterans. One day in the near future, it will likely be Torres on the other side of the desk assisting future veterans in his role as a health educator.

This piece was adapted and edited from an article in Newsline.

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