

SCIENTIA

A publication for College of Science and Health alumni

DEPAUL
UNIVERSITY
COLLEGE OF SCIENCE AND HEALTH



Raisa Munshi, Dean's Undergraduate Research Fellow, spent her summer at The Field Museum. See page 11.

Fall 2018

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GERALD KOOCHER STEPS DOWN AS DEAN

DOROTHY KOZLOWSKI NAMED INTERIM DEAN

After serving as the first permanent dean of the College of Science and Health (CSH) for five years, Gerald Koocher stepped down Aug. 31 to become provost and senior vice president for academic affairs at Quincy College in Quincy, Mass. Koocher, who remains a senior associate in psychology at Boston Children's Hospital and a lecturer in psychiatry at Harvard Medical School, returned to his roots.

"As many people know, my spouse of 45 years did not want to relocate to Chicago and remained in Massachusetts, making me a frequent weekend commuter over the last five years," Koocher says.

"When I received an unanticipated offer to join and assist Quincy College, she enthusiastically encouraged me to 'move home.' I will very much miss the friends I have made at DePaul, and I value the important mission of the university and the spirit of Vincentian ideals."

CSH grew substantially during Koocher's tenure, driven in part by the success of the Pathways Program with Rosalind Franklin University of Medicine



and Science, which enables students to save a year of time and tuition on their way to a graduate medical degree. The nursing program established a location at Rosalind Franklin and expanded from two to four annual admission cycles. Koocher's accomplishments also include the creation of the summer Dean's Undergraduate Fellowship Program (see page 11).

"Dean Koocher helped build the foundation that will serve the college into the future," says DePaul Provost Marten denBoer. "I thank him for his leadership and wish him well as he returns home."

Dorothy Kozlowski, the founding chair of the Department of Health Sciences, was named interim dean. A Vincent de Paul Professor of Biological Sciences, she is an expert in traumatic brain injury and co-director of the neuroscience program, which she founded.

"Dorothy has been a central figure at DePaul in health sciences education. In 18 years here, she consistently demonstrated dedication to her college and the university's mission, to student success and to advancing scientific research for the good of public health," denBoer says. "She will be an effective advocate for the continuing success of CSH and for her colleagues, who provided strong support for her appointment as interim dean."

CALCULUS, CONQUERED

CSH TEACHING STRATEGIES DRAW NATIONAL ATTENTION

College-level calculus should propel students into math-intensive careers, not dash their dreams via a failing grade. About a decade ago, DePaul's academic leaders asked faculty members in the Department of Mathematical Sciences to examine course methodology with an eye to increasing the number of students who pass calculus. Now universities across the nation are learning about CSH's innovative strategies.

The Mathematical Association of America (MAA) chose DePaul as one of 10 colleges and universities it is examining this year through its national Progress through Calculus study. Since 2010, MAA has researched processes and courses to identify best practices that can be adopted by other institutions.

The MAA team conducted two intensive campus visits with faculty, students and DePaul administrators during the past academic year. Its findings are expected to be published next year.

"It's prestigious for us to be selected for this study," says Ahmed Zayed, professor and department chair. "It says that the way we teach precalculus and calculus at DePaul should be emulated."

The department's strategies include mandatory problem-solving sessions each week, optional supplemental instruction by advanced math students, and software that enables students to watch instructional videos and take quizzes online. Classes are capped at 40 students, ensuring students get sufficient personal attention.

The MAA team also was intrigued by the department's calculus sequences tailored to students' career paths, Zayed says. In collaboration with CSH department chairs, the mathematics faculty crafted courses that emphasize concepts needed by students majoring in science and math, biological sciences and business.

"For example, faculty in the Department of Biological Sciences told us that their students don't really need some of the topics in our standard calculus curriculum, but they do need differential equations. So we created a sequence that emphasizes that," Zayed says. The department also developed an integrated course sequence that covers precalculus, trigonometry and calculus in three quarters as an alternative to the precalculus and calculus sequences that take five quarters to complete.

"The intensive course is very popular because many students don't want to spend almost a whole year covering precalculus. This course means they can fulfill their precalculus and calculus requirements during their first year," he says.

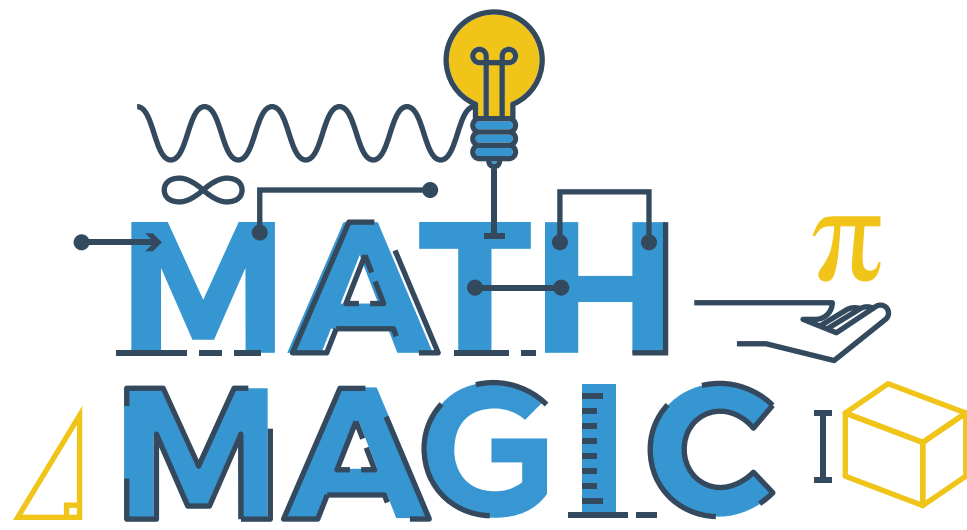
Zayed is pleased that his department's strategies may help students across the nation. "Calculus is not supposed to be a filter to stop students from going into STEM fields," he says. "It's an honor to make a contribution to the national dialogue around how to help students succeed."



The calculus team from DePaul and San Diego State University collaborate on the calculus study. From left to right: Ahmed Zayed, chair of DePaul's Department of Mathematics; Matt Voigt from San Diego State University; Bill Butterworth, associate chair of DePaul's Department of Mathematics; and Chris Rasmussen from San Diego State University.

"In our department,
it's not just one size
fits all."

—Ahmed Zayed,
chair, mathematical sciences



STEM CENTER TEACHES CPS TEACHERS HOW TO DELIGHT, INSPIRE STUDENTS

"Mrs. Boyd, there is something different about you as you teach math class now. I don't know what it is, but whatever it is, keep doing it because it's getting funner, even though you're challenging us and making us work more hardest!"

That praise from a second-grader on Chicago's South Side was music not only to his teacher's ears, but also to those of Lynn Narasimhan, director of the STEM Center. The teacher, Carmella Lewis-Boyd, is taking Narasimhan's new K-5 math teachers curriculum, and the "funner" lessons that she learned were a hit with her students.

"I anticipated Tuesday [DePaul classes] so that I could listen, discuss, watch, analyze and reflect more on math," Boyd wrote in one of her assignments. "Because of this class, my students learned something new every Wednesday! I never missed a Wednesday at work because I wanted to model or discuss or practice whatever we learned ... the night before without telling my own scholars why!"

Closing the gap

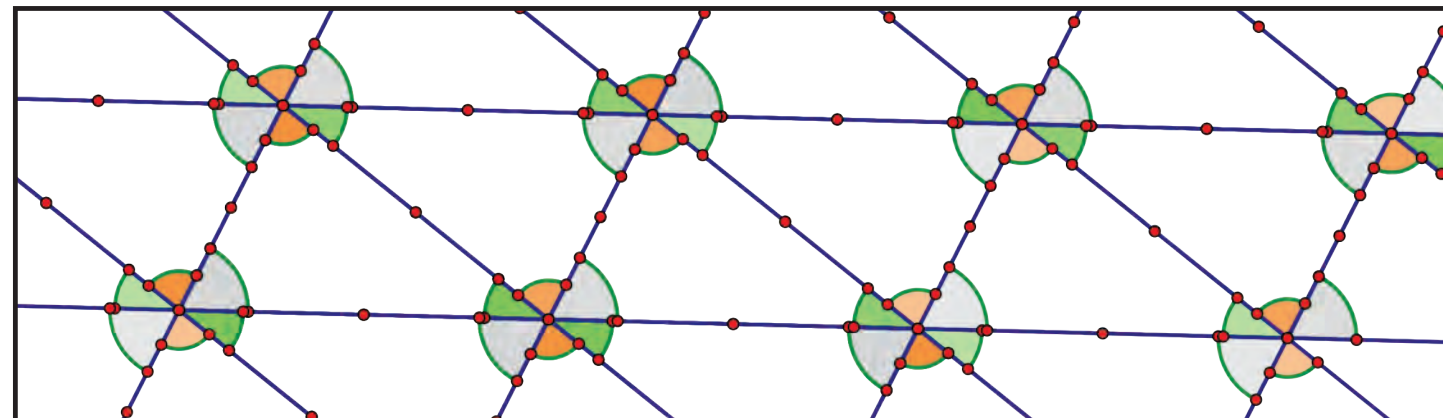
Boyd is part of the first cohort to enroll in the Elementary Math Specialist Project (EMSP). The project is modeled on the Chicago Algebra Initiative, a partnership between the Chicago Public Schools (CPS), DePaul, the University of Chicago and the University of Illinois at Chicago (UIC). CPS requested help from the universities in 2004 when it discovered that only 7 percent of CPS eighth-graders had the opportunity to take high school algebra, compared with 35 percent of students nationally. Faculty from the three universities created a program to provide middle school teachers with the knowledge and credentials they needed to teach eighth-graders algebra for high school credit.

The success of that program caught the attention of the CME Group Foundation and the Chicago Community Trust, which provided grants to create a similar program for elementary school math teachers and cover their tuition. Forty-five teachers from Chicago's under-resourced

South and West sides are partway through the seven-course program, and the program hopes to offer additional cohorts.

"Our big goal was to get teachers thinking differently about what a good math class looks like and what their students are capable of doing," says Narasimhan. The CPS teachers replaced rote memorization with games and hands-on tasks that illustrate the relationships between numbers. They started challenging their students with complex problems that might take days to solve. Then they talked with each other about how the new tactics had worked.

Narasimhan says that math educators typically are taught how to instruct students on everything from beginning fractions to calculus, regardless of the grades they plan to serve. EMSP takes a different approach.



Teachers have students create colorful tessellation patterns like this to better understand the relationships between angles.



Photos by DePaul University/Jamie Moncrief

The STEM Center also hosts workshops for area teachers such as this one in 2016.

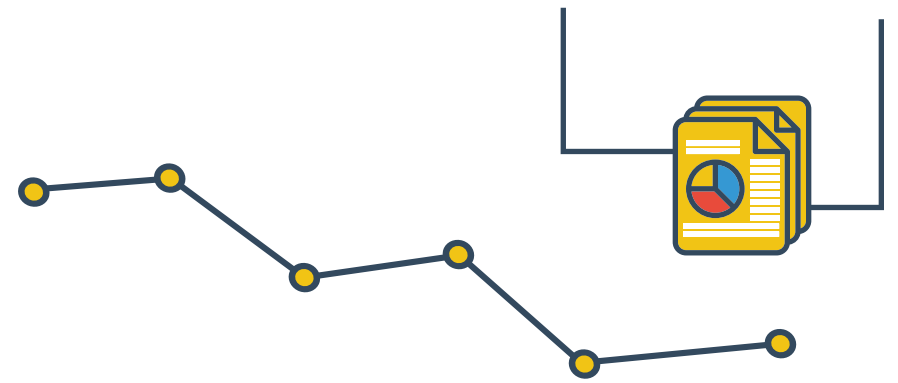


Teachers shared insights on how the new techniques worked in their classrooms.



Lynn Narasimhan

Photo by DePaul University/Jeff Carrion



"We believe that teachers should experience what they are going to teach in some depth. They should really understand the connections and how to help their students make those connections," she says.

Learning through making mistakes

That process was eye-opening for teacher Emily Nuttall, who learned addition and subtraction as a child by following the steps in a song. "I was getting 100s on my papers, but I really didn't understand what I was doing," she says. "These classes have forced me to think about the way that I've learned in the past."

Instead of focusing on correct answers, she now emphasizes the relationships between numbers that lead to those answers. Her students take time to wrestle with problems and have more authority over their own learning.

"One of my favorite strategies is having students discuss the 'best mistake of the day,'" she says. "My students are excited, talking about all the ideas that come from that one mistake. Instead of feeling like, 'I made a mistake, I'm not smart,' they're seeing mistakes as another opportunity to learn."

Her students hone their critical-thinking skills by tackling problems above their grade level, which paid off handsomely last year. Students from a nearby high school came to the elementary school one day to practice teaching math;

Nuttall's third-graders accidentally ended up in a class for fifth- and sixth-graders.

"My third-graders, they had a ball. They were asking questions, they were figuring things out and they were making logical connections. The high school students didn't realize what was happening. They thought my students were just small fifth-graders. It blew my mind," Nuttall says.

Inspiring students from under-resourced communities to perform well above expectations is the project's long-term goal, Narasimhan says. "This is the first time we've worked so much with educators this early in the pipeline," she says. "While not every elementary school teacher will become a specialist in math, we're hoping to establish a core who can share their strategies with their colleagues."

To strengthen the appeal of the program, the EMSP team is working with the state to establish an elementary math specialist endorsement for teachers who complete the curriculum; Narasimhan hopes it will be finalized during the current academic year. Additionally, participants who complete the curriculum need only five more graduate courses to earn a master's degree in math education from either DePaul or UIC.

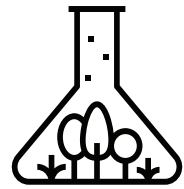
EMSP is being featured in an Education Week webinar on Nov. 8; find out more at bit.ly/DePaulElementaryMath. For more information about the EMSP program, email cnarasim@depaul.edu.



**NEW PROGRAMS
NEW PROGRAMS
NEW PROGRAMS
NEW PROGRAMS
SEE WHAT'S NEW:**

We've Got a Degree in That

From data science to school nursing, CSH is responding to workplace shortages and burgeoning demand with additional interdisciplinary graduate and undergraduate degrees and programs.



Master of Science in Environmental Science

Launching this fall, this graduate program prepares students to manage biodiversity and ecological systems with a particular emphasis on urban applications, including urban forestry, green roofs and city parks. The program is the only one of its kind in northern Illinois.

"We're offering two options. The professional track gives students very specific, vocationally oriented training that includes an internship with our partners on the land," says environmental science Professor Liam Heneghan. "In the research track, students write a thesis. While many of them are considering a PhD program or research-based careers, the thesis can prepare these students for specialized work with land management agencies."

The cross-departmental program draws on courses in environmental science, biological sciences, geography and sustainable urban development. In addition, students hone their grant-writing skills through a course offered by the Department of Writing, Rhetoric and Discourse.

For more information, visit go.depaul.edu/envsciinfo.

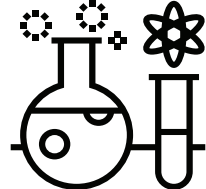


Bachelor of Arts in Data Science

To help meet the strong demand for business and industrial strategists who can analyze massive amounts of data and make recommendations, the Department of Mathematical Sciences unveiled an undergraduate degree in data science in 2016. The program emphasizes the statistical aspects of data science while including courses in computer programming and software. Offering twice as many electives as technologically focused programs in data science, the degree prepares graduates for careers ranging from market analysts to data architects. Students are encouraged to pair the degree with a major or minor in a different field of study.

"Data science does not merely collect and report data. It also looks at it from different angles to determine what the data means and, through prediction, forecasting and modeling, how it can be applied," says Associate Professor Desale Habtzghi.

For more information, visit bit.ly/DePaulDataScience.



Bachelor of Science in Biochemistry

In response to student requests for a foundation in both chemistry and biological sciences, the chemistry department, in consultation with the biology department, created a new degree in biochemistry that launched last winter. Students take introductory chemistry and biology courses and then tailor their degree to their career interests by selecting from an array of upper-level courses.

Many current CSH biological science and chemistry majors have switched to the new degree, and students from other universities are transferring to DePaul, says Paul Vadola, assistant professor of organic chemistry. Freshmen began enrolling directly into the major this fall.

"Having the biochemistry undergraduate degree opens up opportunities for more types of advanced degrees that a chemistry major is less prepared for," he says. "Now students can pursue advanced degrees in immunology, chemical biology or a number of other areas."

For more information, visit bit.ly/DePaulBiochemistry.



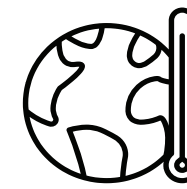
Bachelor of Science in Neuroscience

Just as the field of neuroscience has physical and behavioral components, the college's neuroscience major draws from the natural, behavioral and computational science fields. More than 150 students are enrolled as neuroscience majors. Co-directed by professors Dorothy Kozlowski and Sandra Virtue, the degree incorporates biology, psychology, chemistry, philosophy, mathematics and computer science.

"Psychology, biology and philosophy are the founding fathers of neuroscience," Kozlowski says. "You can see the biology of the brain, but you need psychology and philosophy to provide a framework for asking questions about behavior and the mind."

Although students previously had the option of concentrating in neuroscience while pursuing a degree in either biological sciences or psychology, the neuroscience degree, now in its third year, better meets market demand. The degree includes courses such as neuroethics and neuroscience research methods and offers students expanded research and internship opportunities.

For more information, visit bit.ly/DePaulNeuroscience.



Minor in Climate Change Science and Policy

Climate change affects everything from business and policy to public service and public health. The college's climate change minor, introduced in 2017, draws on an array of natural and social science courses to prepare undergraduates to address the issues, no matter what sector they work in.

"You can't make good policy without understanding the science, and you can't conduct good scientific research without understanding the policy implications," says Mark Potosnak, associate professor of environmental science, who proposed the degree in conjunction with Hugh Bartling, an associate professor of public policy.

The minor includes three required courses—climate change, climate change policy and either oceanography or weather and climate—and three electives. Options include environmental economics, communicating climate change, sustainable development and remote sensing.

For more information, visit bit.ly/DePaulClimateChangeMinor.



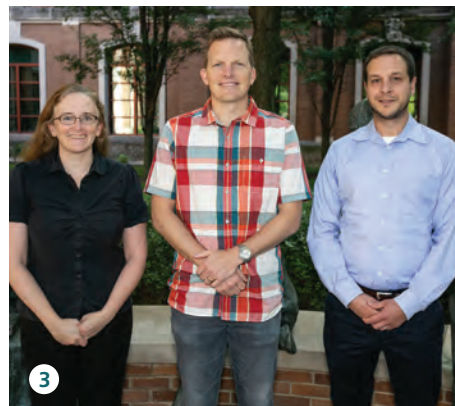
School Nurse Certificate

There aren't enough licensed school nurses in the nation, a problem expected to worsen locally as many school nurses retire over the next five years. To help address the shortage, the School of Nursing and DePaul's College of Education created a certificate program that takes just nine months to prepare Illinois registered nurses who already have bachelor's degrees to sit for the state licensure exam.

To earn the certificate, nurses take four online courses and complete an internship, supervised by a school nurse, at a K-12 school. After they complete the internship, students are eligible to take the exam for the Professional Educator License, a requirement for Illinois school nurses.

For more information, visit bit.ly/DePaulSchoolNurse.

LAB NOTES



Keynote Speakers

Professor and Associate Dean Susan McMahon spoke in March 2018 about community psychology and mental health at Banaras Hindu University in Varanasi, India, and on stressors, school context and psychological outcomes as they relate to urban youth at Tribhuvan University in Kathmandu, Nepal.

Ahmed Zayed, professor and chair of the Department of Mathematical Sciences, spoke on the energy concentration problem at the Third International Conference on Computational Mathematics and Engineering Sciences in Cyprus, May 4–6. He was also an invited speaker at Strobl18: Harmonic Analysis and Applications, in Strobl, Austria, June 4–8. He spoke on the convolution theorem for fractional integral transforms.

Associate Professor James Montgomery presented “Serving Society Through Soil Science: A Case Study of the ‘What’s in Your Soil?’ Project” in August at the World Congress of Soil Science in Rio de Janeiro, Brazil.

1 Special Commencement

Former Dean Gerald Koocher (far right) and School of Nursing Director Matthew Sorenson robed for a special graduation celebration for Raina Leon (center) at her synagogue in June. Leon, an Orthodox Jew, earned a Master of Science in Nursing with distinction but was unable to attend the commencement because it was held on Saturday, the Jewish Sabbath. The nursing graduates wearing white are members of Leon’s study group.

2 Faculty Fellows

Matthew Sorenson (left), director of the School of Nursing, was named a Fellow of the American Academy of Nursing, nursing’s highest honor. Suzanne Bell (right), professor of psychology, was named a fellow of the Association for Psychological Science and of the Society for Industrial and Organizational Psychology.

3 Moving Up

Congratulations to recently promoted and tenured faculty at CSH. Kyle Petersen (center) is now a full professor, and Eric Norstrom, Karl Liechty (right), Jalene LaMontagne, Sarah Connolly (left) and Enrico Au-Yeung are now associate professors with tenure.

4 Beasts at Bedtime

Parents and teachers can use children’s books to introduce environmental themes to young readers, posits Professor Liam Heneghan. “Beasts at Bedtime: Revealing the Environmental Wisdom in Children’s Literature” explores how authors weave an appreciation of nature and wildlife and a desire to protect wild places into classics ranging from “Peter Rabbit” to “The Lord of the Rings.” Learn more at bit.ly/BeastsAtBedtimeUC.

5 The Meg

Kenshu Shimada, professor of paleobiology, explains in The Smithsonian that identifying giant prehistoric sharks such as megalodon is more complicated than the summer film implies. A small number of teeth and bones enable researchers to infer each species’ size, form, tooth organization and even growth pattern. Read the story at bit.ly/DePaulSmithsonian.



TO CROATIA, WITH CURIOSITY



“THESE INTERNATIONAL EXPERIENCES OPEN DOORS FOR DEPAUL TO BE RECOGNIZED AS A VERY PRESTIGIOUS AND IMPORTANT UNIVERSITY.”

—Susan McMahon, Vincent de Paul Professor of clinical and community psychology and associate dean



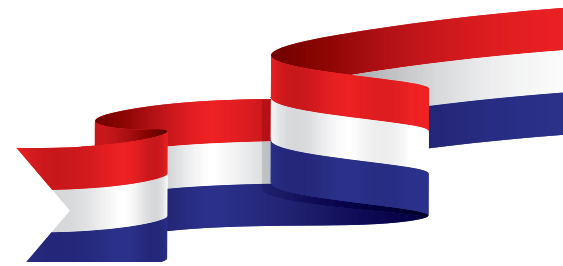
Stocking shelves at a Croatian food pantry allowed students to compare how food pantries operate in different countries.

From learning how to eat prawns to presenting research to an international audience, the 8th Student’s Symposium in Varaždin, Croatia, was an eye-opener for two psychology students. The two-week trip was underwritten by DePaul’s chapter of the McNair Scholars program, which helps students from underrepresented backgrounds pursue graduate degrees and careers in academia.

“McNair prioritizes international exchanges and experiences as an opportunity for personal growth, to broaden experiences with research, and to enhance students’ worldview,” says Susan McMahon, Vincent de Paul Professor of clinical and community psychology and associate dean, who accompanied the pair plus a recent graduate and a sociology student. In addition to participating in the conference, students and faculty from the University of Zagreb, Faculty of Organization and Informatics, and several universities in the United States performed community service, visited schools and national landmarks, and dined together. “We got to know one another through the exchange of research, information, expertise, life experiences and service.”



Croatian students helped explain their nation’s history during field trips to historic sites.



Student Gabbi Lynch says she benefited on several levels from traveling abroad. “I gained confidence from learning what it’s like to be at a conference, especially in another country. I’ve gained perspective on the bigger picture.”

Student Grisel Lopez-Alvarez valued the opportunity to see the United States through other people’s eyes. “I learned about different types of collectivism and individualism, different cultures and how they can affect interactions,” she says. “In my research and in graduate school, I want to look at culture and how it affects negotiations.”



Students visited historic sites dating back to the Roman Empire as well as ruins preserved from the war in 2001.



HUMAN NATURE INEXTRICABLE FROM SCIENTIFIC ADVANCES

There's nothing arbitrary about Jim Burns' (MBA '73) assortment of degrees: bachelor's and master's degrees in biological sciences, an MBA and a doctorate in liberal studies, all crucial to medical innovation.

"Biology, marketing, finance, psychology, sociology—all part of developing state-of-the-art medical technology. You need to understand the biology behind medical advances, how to fund product development, the sociology of different patient populations and the psychology of people who are affected by it. It's all integrated," says Burns, a member of the CSH advisory board. "Bringing these things together is critical to how science and technology are progressing to improve patient care."

He should know. Originally planning to be a doctor, Burns instead became a strategic consultant, a health care venture capitalist, an entrepreneur and a chief

executive officer focused on cutting-edge technologies in the health care and pharmaceutical industries. He credits his rise from humble lab assistant to leadership roles in companies such as Assurex Health Inc. and MedPointe Pharmaceuticals to the power of mentors.

"MENTORS ARE KEY IN YOUR LIFE. THERE IS VALUE IN FINDING SOMEBODY WHO TURNS YOU ON TO NEW SUBJECTS."

A molecular biology teacher at the University of Illinois told Burns, then an indifferent undergraduate student, that he needed to get his act

together and packed him off to a colleague who needed lab assistants. That colleague rose rapidly into university administration, taking Burns with him. Burns found himself managing first the lab, then the research, then drafting publications and finally overseeing the professor's graduate assistants and student workers. A leader was born.

"I discovered that I like to translate the work from the inventor in the lab to the point where it can be applied in clinical practice," says Burns, who shepherded numerous breakthroughs to the marketplace. Throughout his career, he was drawn to the intersection of technology, hard science, sociology and psychology. Advances in medicine can't be viewed in isolation from the people they are meant to help, he says.

"Your genetics and epigenetics are affected by your experiences, sociological factors and your environment.

These changes are so powerful that they can be passed down to your children and multiple generations thereafter."

The college's push to create more cross-department majors and courses is right on target, he says. "The disciplinary lines in science and medicine are becoming increasingly blurred. The interdisciplinary nature of work in major medical centers lies beyond traditional college concepts," he says. "DePaul has the opportunity to push this arena forward."

Likewise, he advises CSH students and alumni to pay careful attention to what they learn from classes and experiences outside their core discipline: "Life is an amalgam. Everything is related. If you are curious and ask questions, then you will live an incredible life and make incredible contributions."

the SCIENTISTS of SUMMER

This past summer, 13 CSH students were able to conduct research, assist scientists and gain hands-on experience at locations throughout the Chicagoland area thanks to funding from the Dean's Undergraduate Research Fellowship.



"I'm running molecular tests on lichens collected from Puerto Rico and the Caribbean. The data will help scientists understand how their ecosystems differ and what is happening in those communities. As I am doing experiments, I must troubleshoot on my own when certain procedures are not resulting in good enough data. Instead of just reading a page in a textbook, I must gather information from many sources and critically think about my next steps."

—Raisa Munshi,
The Field Museum



"After flying scientific instruments aboard high-altitude balloons, recovering the payload can often be tricky, since weather is chaotic and can cause our payload to land in difficult locations such as in trees or bodies of water. I am designing a system to allow the payload to autonomously control its descent using a steerable parachute so that it will land in a desired location. I have learned the methodology for approaching large ambitious projects like my own and how to break it up into manageable pieces."

—Robert Coulson,
Adler Planetarium



"My primary project rearing Baltimore Checkerspot and Pearl Crescent butterflies combines extensive fieldwork with careful operations within the lab. The amount of time outdoors learning and collecting data is amazing. These experiences are just not something you can get in the classroom, which makes me appreciate this opportunity so much more."

—Joseph DeVito,
Peggy Notebaert
Nature Museum



"My primary project is a study geared toward improving the imitation skills of children, ages 16 to 60 months old, on the autism spectrum. I shadow people who do what I want to do when I graduate. Not only is it showing me what my ideal career genuinely looks like, but it also shows me how to get there. My supervisors here have been nothing but supportive about my future graduate school plans. They have been giving me study tips for the GRE, recommending programs and giving me overall great advice."

—Julia Barich,
Rush University Autism
Assessment, Research,
Treatment, and
Services Center

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SCIENTIA

We welcome your story ideas, questions and comments. Please contact Kris Gallagher at kris.gallagher@depaul.edu.

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