

SCIENTIA

A publication for College of Science and Health alumni

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FIELD NOTES

What's it like to conduct experiments in the field? Ten CSH students went to South Carolina to find out. Read about their adventures on page 6.

Spring 2016

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STRESS BUSTERS

Intervention Study Combats Stress in African-American Youth

Violence in the streets. Racism. School closures. Uncertainty about the future.

You wouldn't know it from the way the students enter the classroom, laughing and jostling each other, but these burdens weigh heavily on their hearts. "There are many stressful things they have to cope with on a daily basis," says W. LaVome Robinson, professor of clinical psychology. "It's easy to be devastated by that reality, but we're here to figure out how not to be."

These students are part of a cohort of hundreds of African-American freshmen from four public high schools on the West and South Sides of Chicago who are participating in a unique violence prevention study and intervention. Robinson is principal investigator for the National Institutes of Health-funded five-year research study. Her colleague Leonard Jason, professor and director of the Center for Community Research, and Sharon F. Lambert, associate professor of clinical/community psychology at George Washington University, serve as co-investigators.

The program equips students with strategies and techniques designed to reduce stress and defuse potentially violent situations. In each of the 15 weekly meetings, a trained facilitator leads activities and group discussions. "Even though the focus is on cognitive behavior, it's not supposed to feel like a class," Robinson emphasizes. "We make it fun and exciting." Two years in, this approach is already making an impact. Robinson says students are constantly asking to participate, but she has to turn them away to preserve the study's random sampling; half of the students are randomized into the program, while the other half attend a school-based health center program.

Follow-up skills assessments are conducted six and 12 months after the sessions conclude. With the second cohort ending soon, the investigators and CSH students will begin preliminary data analysis this summer. "This is an incredible opportunity for DePaul undergraduates," Jason says. "We have students serving as assistants to the facilitators and working with the data sets." Several undergraduates have already shifted their research focus due to their involvement with the project. "Not many research

teams are allowed to collaborate with Chicago Public Schools," Robinson notes. "We're providing uniquely valuable training for undergraduates."

Working in the third-largest school district in the country gives students an inside look at some of the most serious issues affecting urban education. "If you think about everything happening in the news today, it's clear that violence intervention and stress-reduction programs are so important," Jason says, alluding to recent police shootings, gang violence and the closure of many public schools. In fact, Robinson was surprised by the increased stress levels of this year's cohort compared with last year's group. "They have concerns about being attacked," she explains. "They want to know how to handle themselves, how to avoid deadly situations."

These anxieties underscore the urgency of the project, which Jason hopes will eventually expand to all levels of the school system. "This is only the first step," he asserts. "We want to help students successfully navigate their social environments whether they're in kindergarten, senior year or any grade in between."

PEER-TO-PEER HEALTH POWER



Junior Katie Ackerman is one of six undergraduates—and the only CSH student—on the Health Education Action Team (HEAT), a group of certified educators who work to educate, engage and empower DePaul students on health and wellness issues. Introduced by the Office of Health Promotion and Wellness in fall 2015, the team partners with departments and organizations on campus to promote positive health outcomes and behaviors. Ackerman discusses her involvement below.

What are some of the resources HEAT offers?

We set up tables at student events to help students understand more about various topics, and we also produce our own events, such as Collegiate Alcohol Awareness Week, where we provide resources and share facts about student drinking. Similarly, for Healthy Skin Month, we distribute face mask recipes and snacks with ingredients that benefit the skin. HEAT also assists with the quarterly Brain Fuel events designed to help students deal with stress before finals. Finally, we give presentations on health-related topics, including alcohol and other drugs, sexual and relationship violence, and stress, for classes and student organizations.



How has your participation in HEAT informed your health sciences major, and vice versa?

When students approach our tables at events with questions, as they often do, it's important that I'm providing correct and current information. The knowledge I've gained as a health sciences major has been very beneficial in that regard. On the flip side, being a member of HEAT has improved my verbal skills in discussing health topics, specifically in being able to hear and understand new and unique perspectives from students. I think everything I've learned and the empathy I've developed in this role will serve me well as I work toward my goal of becoming a physician assistant.

What makes HEAT unique?

College students are facing a variety of health concerns today. Many students are on their own, experiencing independence for the first time. Some students thrive in this environment and make healthy choices, but for others, it can be more difficult. As fellow students, we may have been in a similar situation. Using peer-to-peer dialogue, we are able to provide support and information to help students in need. There have been times when I've seen a student learn something new or read a fact that resonates, and it's immediately clear that he or she is going to use that information to make a healthy choice in the future. I love sharing my passion for healthy living with so many students.

Katie Ackerman (second from left in top photo, left in photo above) helps students—and occasionally, their furry friends—make healthy choices.

RESEARCH ROUNDUP

When CSH professors aren't busy grading lab reports, preparing for classes, mentoring students or submitting to journals, they can often be found conducting research on a wide range of interesting topics. Get a sneak peek into a few of these projects below.

HOW DO INFANTS LEARN SOCIAL BEHAVIOR?

A baby sits on his mother's lap, staring in fascination as a movie plays on the television before him. It may look like fun and games, but this child is actually participating in a study at the Children's Understanding and Behavior (CUB) Lab, where Assistant Professor of Psychology Sheila Krogh-Jespersen is research director. An eye-tracker, a nifty piece of technology attached to the screen, collects critical data that helps Krogh-Jespersen determine how infants observe and engage with the world around them.

"Humans are an intensely social species, and we have to figure out very quickly in life how to navigate our complex

social world," Krogh-Jespersen explains. "Given that we are interested in how infants perceive the actions, behaviors and interactions that occur in their daily lives, the movies we show typically feature people playing with toys or having conversations."

Krogh-Jespersen's recent CUB Lab study investigated whether 15-month-olds could predict an individual's future behavior based on her past actions. In the first scene of the movie, a woman reaches for one of two toys. In the second scene, the researchers change various elements, such as the location of the toys, to see how the children respond. "We found that infants do, in fact, have this critical ability to update their knowledge and rapidly predict the woman's future reaching actions,"



says Krogh-Jespersen, adding that this type of predictive knowledge may foster social competence. "If your daughter knows that you like to play with toy cars, she might think you will be more likely to play with her if she brings you a toy car."

WHAT CAUSED THE BIG FREEZE?

Professor of Chemistry Wendy Wolbach went way back in time for her most recent research project. "Approximately 12,800 years ago, near the end of the Pleistocene period, a time of cold climates and drought swept the earth," she says. "Scientists call this 'big freeze' the Younger Dryas, named for a flower, the *Dryas octopetala*." While this flower thrived in the near-glacial conditions of that time, other living creatures didn't fare nearly as well. Woolly mammoths, saber-toothed tigers, giant sloths and dozens of other large animals met their fate, doomed to the roll call of extinction.

As a geochemist who studies the connection between large meteorite impacts and extinctions, Wolbach wanted to know whether a meteorite might have caused this abrupt cooling.

Using an isolation and quantification technique she developed, Wolbach found an elevated presence of nanodiamonds, a sign of cosmic impact, in sedimentary rocks from the Younger Dryas boundary. However, Wolbach needed to ascertain whether the Younger Dryas rock layer was the same age globally to prove a causal connection between the cosmic impact event and the subsequent big freeze.

Wolbach and her colleagues used Bayesian statistical analyses of 354 radiocarbon dates taken from 30 sites, ranging from northern Syria to California and from Venezuela to Canada, to determine a 95 percent probability that the dates are indeed consistent with a single cosmic impact. "There's been a long history of trying to figure out what caused this anomalous and enigmatic

cooling," she says. "Now that we know more, we'd like to perform similar statistical analyses on other events related to the period."



WHICH FACTORS COMPEL TREES TO SYNCHRONIZE SEED PRODUCTION?

For the past five years, Assistant Professor of Ecology Jalene LaMontagne has tracked the number of cones produced by the same 1,000 white spruce trees in three regions in Wisconsin, Michigan and Minnesota. "White spruce, along with many other species of perennial plants, does what is called 'mast seeding,' which is defined as the synchronous and intermittent production of large seed crops by a population of plants," LaMontagne says. "In other words, in some intermittent years, the cone (or seed) production is very high, while in most years, seed production is quite low."

During high-yield years, each white spruce may produce thousands of seeds. But what causes the trees to synchronize their seed production? How likely is synchronization within a given spatial area? To help answer these questions, LaMontagne looks at cone production synchrony on three levels: 1) by individual



tree, 2) across sites within a region and 3) between the three regions. She also collects additional information about each tree, such as trunk diameter, height and needle volume, and soon will collect soil nutrient data. Finally, LaMontagne employs data loggers to track temperatures every two hours for the entire year.

"One of the most striking findings so far is that there can be two trees that

are fairly close to one another and yet they are doing different things in terms of cone production," she says. "This suggests that it's more than just the weather controlling the patterns of synchrony." Since seeds form the base of the food chain, LaMontagne's research offers biologists greater insight not only into these Midwestern boreal forests, but also into the insects, birds and mammals who rely on seeds for survival.



NOTES FROM THE FIELD



It's one thing to read about plants and animals in a textbook, but it's another thing entirely to encounter living specimens in their natural habitats. Just ask the 10 biology and environmental science and studies students who voluntarily spent a week of their December break battling mosquitoes, sinking into sand and wrestling with flopping fish off the coast of South Carolina. "I wanted to get a feeling for what field biology was really like," says senior Jim Klososky. "My favorite part was implementing the skills I'd been taught in a real-world, unpredictable and often uncooperative setting."

From their bunkrooms in Bennett's Point, students roused themselves before the sun each morning and prepared for the work ahead. Itineraries varied, but days were inevitably "long and full of

activity," according to senior Daniel Kestin. Like many of his classmates, Kestin especially enjoyed shadowing South Carolina Department of Natural Resources employees. "We went out on the boats and took turns assisting with their daily jobs on the water," he recalls. "To survey the fish stocks, we helped them with trammel netting. Each time we cast the net, we got to see all sorts of different fish and organisms."

Professor Tim Sparkes created the course five years ago with Assistant Professors Jason Bystriansky and Jalene LaMontagne (see page 5), and he always knew that the student-scientist interaction would be key. "It's critical that students engage with professional scientists who live and breathe this field-based lifestyle," he says. After all, the work isn't for everyone;

it's tough, messy and strenuous. But for those who embrace the difficulties, the rewards can be exhilarating. "Most students grow during the course and take on more ambitious challenges in their professional careers after they return," he says. "Students often learn as much about themselves as they do about marine biology."

Senior Rachel Riccio found this assessment accurate. "Overall, I gained confidence in myself," she says. "I realized I could be a successful leader of a group, stay positive even when exhaustion is hitting, and overcome mental and physical challenges." Riccio enrolled in the class to determine whether this type of work would be a good fit for her or not, and she's happy to report that she can now definitely see herself pursuing a career in the field.

Research projects were a major component of the trip. "We were not told what to investigate," Klososky says. "It was up to us to find something worthwhile and significant to study, and to develop our own procedures." Senior Sejla Bajramovic and her team explored the relationship between mud fiddler crabs and burrow depth. "Marine invertebrates are some of the most complex organisms," she says. "Doing this research in the field gives you an appreciation of the diversity of interactions that occur in marine systems."

Admittedly, the crab-human interactions were sometimes fraught. Riccio remembers getting stuck in the mud as she struggled to hold the crabs still so that their body size and claws could be measured. "In a lab setting, there is much more predictability and accuracy in

procedures," she says wryly. "But when I was actually able to view the fiddler crab habitat, I saw more clearly how the crabs look and move in real life. It helped me better understand these organisms."

Kestin's team gathered plankton samples from the estuary adjacent to the South Carolina Department of Natural Resources field station where the students stayed. The mixing of fresh and sea water infuses estuaries with nutrients, creating a rich, semi-enclosed ecosystem. "We compared the diversity of plankton samples, which we took every hour from low to high tide, with the salinity of the water at each collection time," Kestin says.

While the team didn't discover a strong correlation between the two variables, Kestin attributes at least some of their

results to an unforeseen complication. "The actual identification of plankton species was a fundamental problem with our research," he affirms. "My partners saw some that I didn't see in the samples, and vice versa." Nonetheless, the experiment gave Kestin an opportunity to practice regression analysis and bio-sampling.

Back in Chicago, the students continued to work on assignments, including an oral presentation, a scientific report and a formal grant proposal. Whether or not fieldwork beckons in their future, the students uniformly agreed that the experience was transformative. "I had a research internship in a zoo last summer, but I wasn't able to interact with the animals, so I loved that aspect of this trip," Riccio says. "Plus, I made a new group of friends with similar interests."

Program Accelerates Health Care Careers

Monika Cieszynski is only a junior, but she already knows where she's spending next year—and it's not at DePaul. As a student in the Pathways Honors Early Opportunity Program, Cieszynski opted for an accelerated course of study and early admission to Rosalind Franklin University of Medicine and Science (RFUMS) in North Chicago, the program's academic partner. "I knew what I wanted, and I wanted it as fast as possible without cutting corners," she explains.

For students like Cieszynski, who will pursue a physician assistant degree at RFUMS this fall, the Pathways Honors Early Opportunity Program offers a sense of stability and assurance. While other college students scramble to study for entrance exams such as the MCAT, those tests are waived for Early Opportunity students. Nor must these students tackle multiple applications, expensive

application fees, cross-country interviews or the anxiety of waiting for admission decisions from numerous universities.

Conditional acceptance into one of six RFUMS programs—including medicine, pathologists' assistant, pharmacy, physical therapy, physician assistant and podiatry—can be offered as early as the end of freshman year. Acceptances are also extended at the end of sophomore and junior year, which gives students ample time to explore different courses and determine the best health care program for their interests, passion and ability. Once admitted, Early Opportunity students can opt for the 3+ Accelerated Program, as Cieszynski did, or stay at DePaul for their final year of undergraduate study.

The Early Opportunity track is part of the overall Pathways Honors Program, a cohort initiative for highly motivated students

interested in pursuing health care careers. Incoming CSH freshmen who meet certain academic standards are invited to join the program; they must maintain a 3.00 cumulative GPA and declare a primary major in CSH to stay eligible.

All students in Pathways Honors, including those in the Early Opportunity group, benefit from specialized resources and experiences, including preprofessional advising from a RFUMS faculty mentor, summer research opportunities at RFUMS, small learning communities in targeted areas and courses co-taught by DePaul and RFUMS faculty. This academic scaffolding made a difference to Cieszynski. "Everyone helped me succeed from the first day," she asserts. "Being in Pathways Honors made me more competitive, and being in the 3+ program pushed me to work hard to get to the top of the class and stay there."

Deep Dive: Alumnus Researches Underwater Volcanoes

Far out in the Pacific Ocean, Joseph Resing (CSH '86) stands on the deck of the R/V Falkor, a research ship sponsored by the Schmidt Ocean Institute. "It's very beautiful in these remote parts of the world, but I'm often so focused that I could almost be anywhere," Resing says. As an affiliate associate professor at the University of Washington's School of Oceanography and a research scientist at the National Oceanic and Atmospheric Administration, Resing heads out to sea for a few weeks of research each year. "One thing about studying anything in the ocean is that if it's not completely novel, it's at least new and interesting," he says.

Resing studies underwater volcanoes, hydrothermal vents, the chemical composition of seawater and related topics. Most recently, Resing served as chief scientist on the R/V Falkor, overseeing several different projects in the Mariana Back-Arc, a geologically diverse region between Guam and Japan. The team used advanced technology to gather location data on hydrothermal vents, which are created as tectonic plates move away from each other, allowing seawater and hot magma to meet.

"The technology is truly incredible," Resing says. "We have equipment that can go down to some of the deepest underwater volcanoes." In addition to the Sentry autonomous underwater vehicle, which Resing calls an "underwater drone," the ship also deployed two instrument sampling packages, which use sensors to locate and sample plumes of chemically altered water released from underwater volcanoes. One was towed in a yo-yo pattern in the deep ocean to explore the Back-Arc for new sites of hydrothermal



Joseph Resing (CSH '86), in the yellow hard hat, says research trips are "kind of like a summer camp experience." Photo credit: Thom Hoffman

activity, while the other examined the transport of iron from vents located along the much shallower Mariana Arc.

During this expedition in late 2015, the R/V Falkor team found four new hydrothermal vent sites, including one associated with a recent eruption nearly 2 1/2 miles below the sea surface. These discoveries are only the beginning. "We'd like to understand how the vents impact ocean chemistry and sea floor biology, how they nurture unique ecosystems and how they generate mineral ore deposits," Resing says. He's particularly interested in the distribution of iron throughout the ocean, including how and why iron reaches the surface of the ocean from hydrothermal vents and undersea eruptions.

Prep work for the scientific research is intensive and extensive. Resing's team filled a 20-foot shipping container from top to bottom with equipment, including thousands of collection bottles that one of his students acid-washed in the spring. The perpetually rocking ship makes running experiments—not to mention walking, showering and eating—difficult, but Resing takes it in stride. In fact, he often befriends the cooks and joins them in whipping up cookies, bread or pizza dough.

Back home in Seattle, Resing spends time with his wife and two children, tends to his orchids and chickens, and referees adult soccer games. "There's some debate

between me and another person, but I'm pretty sure I was DePaul's first four-year letterman in soccer," Resing says with a smile. Resing's parents met at DePaul, and he followed his father into chemistry. "I didn't always get the best grades, but working hard and having a passion gets you a long way in life," he asserts.

Worldwide, only a few dozen oceanographic research vessels set out each year, moving at 12 miles per hour across endless expanses of blue and green. It's no wonder Resing counts himself lucky to be part of this elite club. "On a very basic level, I do this work because it's interesting," he says. "I think there's an awful lot to be said for doing the research and then grappling with the implications."

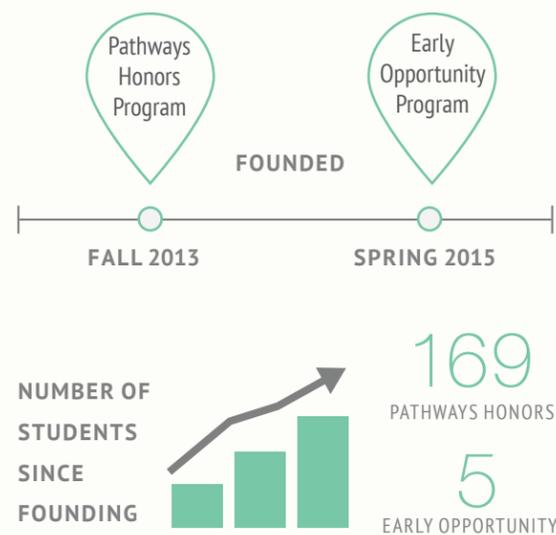
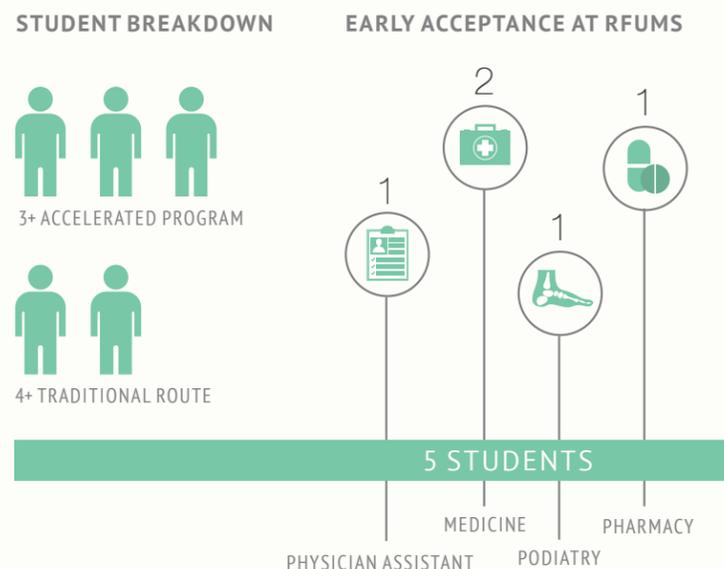
Fast Facts with Joe Resing

Number of research cruises: **30**

Longest cruise: **55 days**

Total lifetime days at sea: **~600**

Farthest distance traveled on a cruise: **Ecuador to Tahiti, nearly 5,000 miles**



LAB NOTES



1 COLOR ME HAPPY
Chemistry students conducted mini experiments, manned information booths and answered questions on color, the designated theme of the American Chemical Society's Oct. 17 Chemistry Day. Earlier in the year, students led chemistry demonstrations in the society's tent at the Illinois State Fair, pictured above.

2 POSTER PARADE
Students proudly shared their research posters during the 13th Annual Natural Sciences, Mathematics and Technology Undergraduate Research Showcase in November. Several students gave oral presentations on their research projects, and Ramiah Jacks (CSH '13), a PhD candidate at Loyola University Chicago's Stritch School of Medicine, delivered a keynote address, "Preparing for a Career in Biomedical Research—A Roadmap and Tips From a Recent DePaul Graduate."

3 NURSING TEXTBOOK
The second edition of "Multiple Myeloma: A Textbook for Nurses," edited by Assistant Professor Joseph Tariman and Beth Faiman, nurse practitioner at the Cleveland Clinic, was published in July 2015. This new edition provides information on the administration of three newly approved drugs for multiple myeloma, a form of cancer that begins in the bone marrow and affects plasma cells.

4 SOLAR STATION
When sunshine beckons students outside for study sessions on the quad, there's no longer any need to leave barely charged cellphones and laptops behind. A new solar-panel table on the Lincoln Park Campus facilitates eco-friendly charging of electronics among the trees.

5 FOSSIL FISHES
In October, biology student and TRIO McNair Scholar Evan Johnson-Ransom presented his research poster on fossil fishes, co-authored by Professor Kenshu Shimada, at the 75th Annual Meeting of the Society of Vertebrate Paleontology in Dallas.

6 ETHICAL PSYCHOLOGY
The fourth edition of "Ethics in Psychology and the Mental Health Professions: Standards and Cases," by Dean Gerry Koocher and Patricia Keith-Spiegel, professor emerita at Ball State University, was recently published. A best-seller since its initial publication in 1985, the fourth edition includes expanded coverage on counseling, marriage and family therapy, social work, psychiatry and other topics.

7 AWARD-WINNING BOOK
The American Journal of Nursing named "Philosophies and Practices of Emancipatory Nursing: Social Justice as Praxis," by Associate Professor Paula Kagan (CSH MS '00) and co-authors Marlaime C. Smith and Peggy L. Chinn as the 2015 Book of the Year in both the Professional Issues and the History and Public Policy categories.

8 BY THE NUMBERS
Associate Professor T. Kyle Petersen's book, "Eulerian Numbers," was published in October. "My hope is that this book can serve both graduate students and researchers," Petersen says, noting that the first six chapters form a natural foundation for a one-term topics course, while the later chapters dive into recent developments in the field.

PAVING A PATH FOR TOMORROW



It's not hard for Darcy Velazquez to see herself in the eager young students presenting their projects at local science fairs. In her capacity as a volunteer judge, Velazquez evaluates and scores the projects, but her role extends beyond basic metrics and rankings. "This experience has allowed me to become a mentor, advocate and inspiration to the next generation of scientists," Velazquez explains. "I really cherish the opportunity."

For students seeking a role model, Velazquez is a smart pick. The chemistry major and psychology minor exudes work ethic and ambition. She decided on a promising career path years ago and has spent her college career laying the groundwork for that plan. "I ultimately want to become a food scientist, with a specialization in research," she says. "I hope to conduct studies on different food storage methods and food additives."

Velazquez chose to major in chemistry so that she could better understand the chemical reactions and drug development processes that affect the food science industry. In a course on medicinal chemistry, Velazquez particularly enjoyed the interactive case study discussions, which brought real-world examples into the classroom. "It was fascinating to discuss the development of specific drugs, including their design, structure-activity relationships, mechanism and optimization," she recalls.

Key technical skills aside, Velazquez has also grown in other ways. She describes her position as a Department of Chemistry research assistant for an inorganic research lab as life-changing. "I've become a more confident scientist," she says. "Working in this lab was important to my development as a chemist and as a conference presenter." Velazquez feels certain this inner drive will carry her through graduate school and beyond. "I will continue to work hard and reach for my career goals," she affirms. "I get one step closer every day."

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