

# DePaul Biological Sciences **THE NICHE**

## FROM THE DESK OF THE CHAIR



**This has been another exciting year for the Biology program** as we have fully transitioned back to campus life. As we have done so, we have continued to learn from our

collective experience and use this knowledge to create a more supportive, inclusive and connected program for all. This goal is being realized because of the dedication of our students, staff and faculty who have been working tirelessly to create an improved vision for the future. In addition, the generous financial support of our alumni has provided the opportunity to both broaden and diversify the experiences we are able to provide to our students.

A major goal of our program is to provide students with the necessary foundation in both science content and transferable skill development so that all students can navigate the diverse career paths that are available in both Biology and Health. Exposure to research plays a pivotal role in this development and one of our biggest strengths is that students can gain research experiences in a diverse array of sub-fields through our program (e.g., ecology, evolution, physiology, marine biology, neurobiology, molecular biology, genetics, endocrinology, microbiology). These experiences can occur both through courses focused on research (e.g., *Advanced Genetic Analysis*, *Advanced Microbiology*, *Field Studies in Marine and Estuarine Biology*, *Molecular Methods in Ecology and Evolution*) and through mentored research projects with faculty members.

In the last year, the faculty members in Biology once again distinguished themselves as exceptional scientists with productive research programs. The faculty and their students generated numerous publications in highly respected journals, presented their research at national and international conferences and were funded by federal agencies. In addition, one of the faculty members in Biology, Dr. Jalene LaMontagne, was selected for the Illinois Science and Technology Coalition's 5th annual list of Researchers to Know for her cutting edge research program. Dr. LaMontagne also mentors numerous students at both the undergraduate and graduate levels through her research program.

Another strength of our program is the high-quality of instruction that we provide to our students. We have had several award-winning teachers in the department over the years and in 2022–2023 Dr. John Dean became an *Excellence in Teaching Award* recipient. Dr. Dean has been a dedicated and committed teacher in an array of courses for over 30 years. During this time, Dr. Dean has served as a mentor to many of our students, as well as numerous faculty members, and his vision for education has elevated the experience for all those involved in the program. Dr. Dean truly embodies excellence in teaching and there could not have been a more deserving recipient of this award.

In the last year, we have increased outreach into the community through the creation of a service learning course and donations of technical equipment to local schools. Dr. Jessica Pamment has led the way in the department by modifying an existing course to incorporate

active engagement with students from Leo High School in the Auburn-Gresham neighborhood. We have also donated excess, high-quality microscopes to local schools to support student engagement in science across all age groups: Nixon Elementary School, Gale Community Academy, Lawndale Community Academy and Leo High School.

One of several new initiatives we have been developing that aligns with our vision of the future will launch in 2023–2024. In the last year, we formed a working group that included faculty, staff and current students to develop a new course for incoming students in Biology. The new course (Bio 101 – Navigating and Succeeding in Biology) emerged in response to several focus groups and surveys concerning the student experience. This experience, in combination with other new initiatives such as the *Journeys* seminar series, is expected to help students transition and succeed in Biology.

These new initiatives, high-quality courses, service and research experiences, productive scholars and an unparalleled level of support for our students, make the Biology program a great place to be moving forward. We are all excited to see what the future holds.

**TIMOTHY SPARKES**  
CHAIR OF BIOLOGICAL SCIENCES

# USING SERVICE LEARNING IN BIO155 PROVIDES UNEXPECTED BENEFITS

BY DR. JESSICA PAMMENT

DePaul's Vincentian Mission is based on a simple but profound moral question: "What must be done?" And while implementing this mission in the classroom is not always easy, using Academic Service Learning (ASL) can help. ASL is a teaching method that integrates academic learning with relevant and meaningful service within the community. It not only offers DePaul students a way to reach out to the community, but it also improves class material comprehension and attitudes towards science on both sides of the equation.

BIO155 is an introductory biology course for non-majors, and because it is a required course, it is not uncommon to meet students who are only taking this class to fulfill an obligation. Many students taking this class seem to have disinterested attitudes towards science based on past experiences in the classroom. Furthermore, biology is not an easy subject, fraught with abstract concepts, large amounts of information, and terms that are foreign to most people. Using ASL can help to change the attitudes students have toward science, as well as help students engage with the material in new ways, resulting in increased learning. Most of the students who completed a service-learning project as part of BIO155 expressed that it was rewarding being able to collaborate with a community partner, and they saw value in being able to use what was being taught in the classroom in their community.

With support from The Egan Office and The Steans Center, BIO155 was able to partner with Nixon Elementary School during Autumn Quarter 2022 and Winter Quarter 2023. Nixon is a CPS school that serves mainly Hispanic, low-income families in the Hermosa neighborhood. A discussion with the principal, Ms. Gomez, highlighted the need for biology activities at the school to spark interest in science. We planned a science fair at the school for the last day of classes as well as a class activity on the scientific method. For the science fair, DePaul students prepared presentation boards and hands-on activities on topics that were covered during the quarter, such as biotechnology,

genetics, and nutrition. Time was provided during class to work on the projects and for reflection exercises, an essential component of ASL which helps to reinforce the importance of community partnerships.

DePaul students reported high levels of satisfaction from interacting with Chicago public school students, as well as improved communication skills and knowledge of their presentation topic. Some students reported being surprised at how much they enjoyed teaching, and mentioned they would consider doing more community work in the future. The students at Nixon brought a level of enthusiasm and curiosity that really impressed our DePaul students. Sparking interest in science was one of the goals of this science fair, and according to Nixon's science teacher, Ms. Valentin, it achieved



Will Spencer Geist (wearing lab coat and mask) helps student Reena Louise Shenoy as his group presents on biotechnology. They used colored beads to show how genes could be transferred between organisms to create genetically modified organisms.

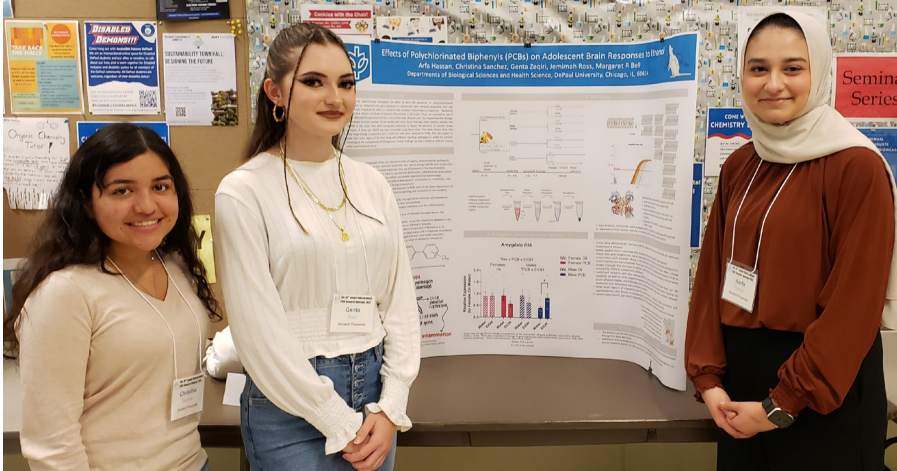


Fatima Ahmed Usman (left) and Karolina Jablonska's (right) group presented on evolution and natural selection. They used beans of different sizes in polystyrene cups with a small hole to simulate natural selection.

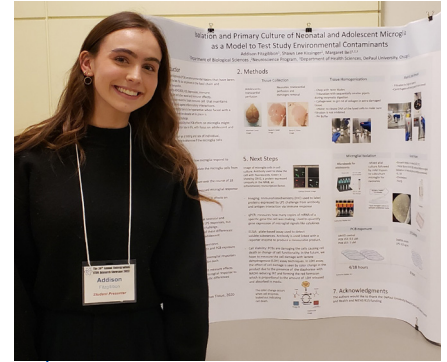
this goal. After the science fair, Nixon students wanted to talk about what they had learned at the science fair with their teacher. Ms. Valentin has asked DePaul students to come again so that more of her students can benefit from this experience, and I plan to take my BIO155 students there again in Autumn Quarter 2023.

Taking BIO155 is no longer only about getting a passing grade, but also about the satisfaction students get when they have, at least in some way, fulfilled DePaul's Vincentian mission. ASL benefits both students and community partners, as they both learn and are shaped by this experience. ■

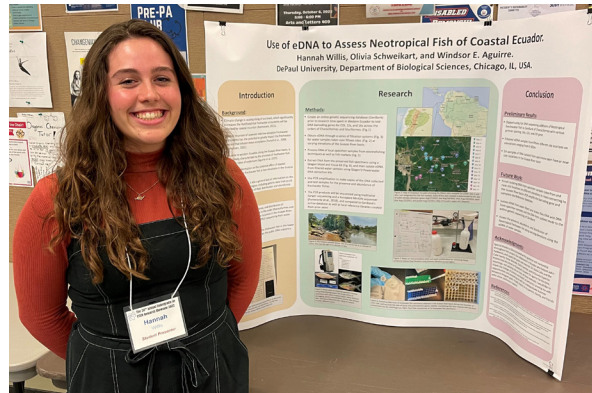
# 20TH ANNUAL UNDERGRADUATE STEM RESEARCH SHOWCASE



Arfa Hassan, Christina Sanchez, and Genta Zeqiri from the Bell Lab present their poster on the "Effects of Polychlorinated Biphenyls (PCBs) on Adolescent Brain Responses to Ethanol".

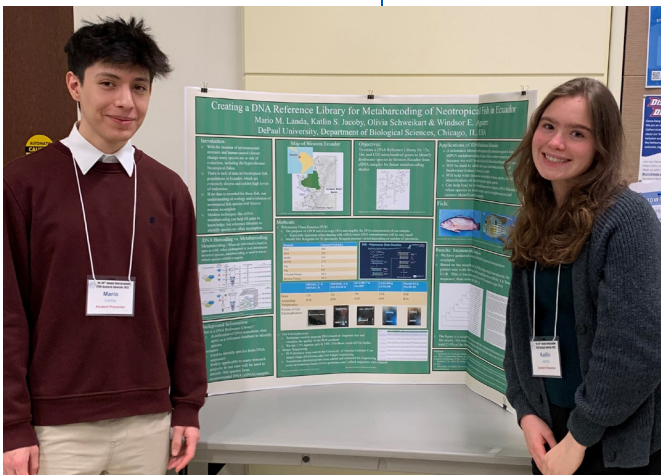


Addison Fitzgibbon from the Bell Lab presents her poster on "Isolation and Primary Culture of Neonatal and Adolescent Microglia".



Hannah Willis from the Aguirre Lab presents her poster on the "Use of eDNA to Assess Neotropical Fish of Coastal Ecuador".

Mario Landa and Katlin Jacoby from the Aguirre Lab present their poster on "Creating a DNA Library for Metabarcoding of Neotropical Fish in Ecuador".



Aaron Johnson from the Shimada Lab presents his poster on "Late Cretaceous Marine Vertebrates from the Tarrant Formation, Tarrant County, Texas U.S.A.".

# JOURNEYS SEMINAR

## The fishes of my father’s river: A journey across continents, biomes, & cultures to DePaul University

BY DR. WINDSOR AGUIRRE



My father began working as a camera repairman, saving along the way so he could open his own camera repair shop some years later. That shop eventually morphed into one of the small “everything” stores that used to be common in U.S. cities. I was the first one in my family born in the U.S., and oddly enough for a city kid with parents working in commerce, I developed a strong interest in animals and nature. I credit the Bronx Zoo. Living in Manhattan where wildlife consisted of pigeons and rats, I remember the Bronx Zoo as a magical place full of amazing animals from the far reaches of the Earth. My parents encouraged my interest in biology to the point that my dad used me as a party prop, challenging his friends to ask me anything they wanted to know about animals. You can imagine the effect that this had on a small child. Animals and nature became a fundamental part of my identity and would provide me with direction throughout my life, a gift I am very grateful for.

When I was 10, my parents were forced to close their store when the building was sold. Faced with the prospect of starting over, they decided to move back to Ecuador. Meeting my enormous extended family in Ecuador and experiencing Latinx culture was life-altering. I found my people, my place. I eventually attended

Our Journeys Seminar Series is intended to highlight the diversity of pathways taken by professionals working in biology and allied fields. My journey begins with my family who were immigrants. Both my parents are from rural Loja province in the Andes Mountains of southern Ecuador, where their families scraped out a living by farming. They first migrated to Guayaquil, Ecuador’s center of commerce, for better work. After a few years, it was clear that they were going nowhere, so they took a leap of faith, left behind everything they knew, and moved to New York in search of the American dream.



LEFT: My father and I in his store on 6th Ave. RIGHT: A view of the store. No wonder I am so into diversity!

Biology School at the University of Guayaquil. I enjoyed the classes, but my most meaningful experiences involved learning outside of the classroom. My friends and I started a university club called *Sociedad Ecológica*. I volunteered in the university museum. The only one in my class with a camera and decent zoom lens, I participated in many field research projects as the photographer. I worked with the Ecuadorian Foundation for the Study of Marine Mammals studying bottlenose dolphins and humpback whales. I also volunteered for *Niños y Medio Ambiente* (Children and the Environment), an organization dedicated to helping kids in need. Learning by doing, a DePaul motto emphasizing the value of working on meaningful real-world problems, was how I started in biology.

After college, I felt like I still needed to learn more, so I applied for graduate school in the U.S., and was accepted in the M.S. program at the Gulf Coast Research Laboratory (GCRL) in Ocean Springs, Mississippi. Like many U.S. graduate programs, they offered full tuition waivers and a stipend, something that made it possible for me to attend. For my thesis, I studied otolith (ear stone) morphology in the sciaenid fish genus *Cynoscion*. The M.S. program at GCRL built me up and made me competitive for strong Ph.D. programs in the U.S. I was also introduced to DNA sequencing and morphometrics, two tools that are used by my lab to this day.

*continued >*



My life as an undergraduate. LEFT: Me photographing bottlenose dolphins. CENTER: A photo of a howler monkey taken for a college project surveying forest mammals. RIGHT: One of our NyMA kids with a booby on his shoulder.

After completing my masters, I was admitted to the Ph.D. program in Ecology and Evolution at the SUNY Stony Brook, where I learned from prominent figures like Doug Futuyma, author of the popular college textbook *Evolution*, Jim Rohlf, co-founder of the field of geometric morphometrics, and my Ph.D. advisor, Mike Bell, who helped establish the threespine stickleback as a model system in evolution. I also received support from the Alliance for Graduate Education and the Professoriate, and the Turner Fellowship, programs dedicated to assisting students from underrepresented groups in science. For my dissertation, I studied the evolutionary biology of Alaskan threespine stickleback. While master's programs build you up, it is Ph.D. programs that establish your academic identity. Stony Brook was a dream come true. I stayed there for two years after completing my Ph.D. on a Turner Faculty Training Fellowship, where I developed a research program on the ecology and evolution of freshwater fishes in western Ecuador that continues today and learned the basics of being a professor. In July 2009, I was hired as an Assistant Professor in Evolutionary Biology at DePaul. The rest, as they say, is history.

We lost my father in December 2020. He had a great life, emerging from poverty to become a successful entrepreneur. He was also one of the most curious people I have known and was fascinated by nature. I like to imagine him as a child standing at the edge of the Catamayo River observing the fishes, wondering where they came from and how they lived. It comforts me that he lived long enough to see his son become a university professor in his adopted country and study the fishes of his childhood river. I am also grateful that my journey made me aware of the extraordinary level of privilege that I have relative to most people on Earth. With all he accomplished, college and a career in science were never possibilities for my father. I often think of my father and others limited not by their capacity but by the circumstances of their birth, and I get angry. In 2023, there are still over seven hundred million people living in extreme poverty, and hundreds of millions to billions more for whom pursuing a passion through higher education or a career in science is not imaginable. We must do better. I am hopeful that institutions like DePaul, with significant scientific infrastructure, and a commitment to academic excellence and social justice, will lead the way in expanding access to a brighter future for all people, regardless of their background. ■



In Manhattan, on my father's shoulders, Lady Liberty smiling down at me.

**“I am hopeful that institutions like DePaul, with significant scientific infrastructure, and a commitment to academic excellence and social justice, will lead the way...”**



Dr. Molly McDonough presented her research on the evolution of mammals and their pathogens at Darwin Day on February 10th, 2023.

## DARWIN DAY

This February, we celebrated what would have been Charles Darwin’s 214th birthday. To honor Charles Darwin, we hosted a remarkable speaker, **Dr. Molly McDonough**, Assistant Professor at Chicago State University. Dr. McDonough earned her M.S. from Angelo State University and a Ph.D. from Texas Tech University. Her talk was titled “Using Natural History specimen collections to explore evolution of mammals and their pathogens” and focused on how to use natural history collections to study the evolution of mammals. Her research utilizes DNA from museum specimens to discover cryptic species, resolve phylogenies, screen for pathogens, and to study how populations change over time. ■

## MIDWEST ECOLOGY AND EVOLUTION CONFERENCE Louisville, Kentucky (March 31–April 2, 2023)

### POSTER PRESENTATIONS

**Chernicky, Kiley** [BIO M.S.], and Jalene LaMontagne. 2023. Forest recruitment dynamics within the southern boreal-temperate ecotone.

**Johnson, Aaron** [BIO major], and Kenshu Shimada. 2023. Late Cretaceous marine vertebrates from the Tarrant Formation, Tarrant County, Texas U.S.A.

**Mieczkowski, Aly** [BIO major], and Kenshu Shimada. 2023. Preliminary report on fossil marine vertebrates from the mid-Pfeifer Shale (Upper Cretaceous) from central Kansas. —*Note: Aly could not physically attend the conference at the last minute, but her poster was presented at the conference.*

**Ortiz, Brianna E.** [ENV Studies major], and Kenshu Shimada. 2023. Fossil marine vertebrates from the Hartland Shale Member of the Upper Cretaceous Greenhorn Limestone, north central Kansas, USA.

**Rivera, Sofia A.** [BIO M.S.], and Jalene LaMontagne. 2023. Spatiotemporal dynamics of ticks and tick-borne disease at NEON sites across a sub-continental scale.

**Salas, Gavin D.** [ENV Science major], and Mark J. Potosnak. 2023. Monitoring personal exposure to air quality gradients while biking on an elevated urban trail.



BACK ROW: Gavin Salas, Aaron Johnson, Austin Salvino, Jake Wood  
FRONT ROW: Riley Adams, Kiley Chernicky, Adrianna Yoder, Sophia Rivera, Marcelina Skowronski, Briana Ortiz

**Salvino, Austin M.** [ENV Studies major], and Kenshu Shimada. 2023. Fossil marine vertebrates from the mid-Graneros Shale (Upper Cretaceous: mid-Cenomanian), Russell County, Kansas, USA.

**Skowronski, Marcelina** [BIO M.S.], and Kenshu Shimada. 2023. A preliminary observation of a new skeletal specimen of a plethodid bony fish (Actinopterygii: Tselfatiiformes) from the Upper Cretaceous Eagle Ford Shale, Texas, U.S.A.

**Wood, Jake J.** [BIO M.S.], and Kenshu Shimada. 2023. Functional implications reflected in neurocranial morphology of lamniform sharks (Elasmobranchii: Lamniformes).

# DEPARTMENT NEWS, AWARDS, AND SELECTED PUBLICATIONS



DR. LAMONTAGNE

Congratulations to **Dr. Jalene LaMontagne** for being selected for the Illinois Science and Technology Coalition’s 5th annual list of **Researchers to Know**. This list acknowledges cutting edge research innovation across the state.



DR. DEAN

Congratulations to **Dr. John Dean** for winning the **CSH 2023 QIC Excellence in Teaching Award**.

Dr. John Dean’s Lab published an article on the transport of anthocyanins by Arabidopsis ATP-binding cassette transporters in November 2022 in the *Physiologia Plantarum* journal with Morgan Willis and Laith Shaban, who are both DePaul undergraduate students.

– John V. Dean, J.V. Willis, M., and Shaban, L. (2022) Transport of acylated anthocyanins by the Arabidopsis ATP-binding cassette transporters AtABCC1, AtABCC2, and AtABCC14. *Physiologia Plantarum*. 2022;174:e13780.



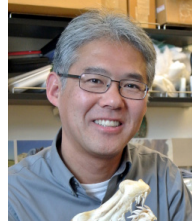
DR. KOZLOWSKI

**Dr. Dorothy Kozlowski’s** lab published an article on the **behavioral effects of single versus repeated concussions in rats** in regards to gender in the *Behavioral Brain Research* journal. This article was written in collaboration with **Dr. Margaret Bell’s** lab and Rebecca Wilson, a graduate student in the Kozlowski Lab.

– Wilson, R.J., Bell, M.R., Seyburn, S., & Kozlowski D.A. (2023) Repeat subconcussion in the adult rat gives rise to behavioral deficits similar to a single concussion but different depending upon sex. *Behavioral Brain Research* 438:114206.



DR. BELL



DR. SHIMADA

**Dr. Kenshu Shimada** published an article in *PaleoBios* on the **dentition of an extinct megamouth shark** in collaboration with Alex Krak, a graduate student in the Bystriansky Lab.

– Krak, A. M., and K. Shimada. 2023. The dentition of the extinct megamouth shark, *Megachasma applegatei* (Lamniformes: Megachasmidae), from southern California, USA, based on geometric morphometrics. *PaleoBios* 40(1):1–10. DOI: 10.5070/P940160139.

Dr. Shimada also recently published two exciting articles on the **biology, lifestyle, and evolution** of the extinct Megalodon shark:

– Shimada, K., Yamaoka, Y., Kurihara, Y., Takakuwa, Y., Maisch IV, H.M., Becker, M., Eagle, R.A., and M.L. Griffiths. 2023. Tessellated calcified cartilage and placoid scales of the Neogene megatooth shark *Otodus megalodon* (Lamniformes: Otodontidae), offer new insights into its biology and the evolution of regional endothermy and gigantism in the otodontid clade. *Historical Biology*, DOI: 10.1080/08912963.2023.2211597.

[CLICK HERE](#) for more information.

– Griffiths, L. M., R. A. Eagle, S. L. Kim, R. Flores, M. A. Becker, H. M. Maisch IV, R. B. Trayler, R. L. Chan, J. McCormack, A. A. Akhtara, A. K. Tripatib, and K. Shimada. 2023. Endothermic physiology of extinct megatooth sharks. *Proceedings of the National Academy of Sciences*. DOI: 10.1073/pnas.2218153120.

[CLICK HERE](#) for more information.



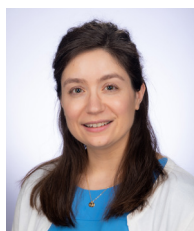
DR. SPARKES

**Dr. Timothy Sparkes’** lab published an exciting article this year on the **egg shape of parasitic worms** in the journal *Evolutionary Biology*.

– Pfenning-Butterworth, A.C., Sparkes, T.C. (2023) Evolutionary history and host ecology determine acanthocephalan egg shape. *Evolutionary Biology* 50: 137–145.



DR. RICK HUDSON



CLAIRE BEHRENS

## Developing a New CURE Module for the Introductory Biology Sequence

A departmental proposal was funded to develop a new CURE module for General Biology II by the CSSRI Program through the College of Science and Health. The team, consisting of **Rick Hudson**, **Claire Behrens**, and **Tim Sparkes**, is designing this new module in summer 2023. CURE modules provide Course-based Undergraduate Research Experiences in existing courses and this new experience will contribute to the development of a more advanced and complete understanding of the scientific approach for our students.

## Student Success

Students from **Dr. Margaret Bell's lab** presented their research at the **Chicago Society of Neuroscience conference** in March at Loyola University.



FROM LEFT TO RIGHT:

- Catalina Torres Reyes (health sciences major, senior undergraduate)
- Carissa Dressel (biology major, second year master's student)
- Dr. Margaret Bell (DePaul University Assistant Professor)
- Shawn Kissinger (neuroscience/biology major, junior undergraduate)
- Addison Fitzgibbon (biology major, sophomore undergraduate)
- Rafael Meija (health sciences major, senior undergraduate)

This past March, **Carissa Dressel** (biology major, second year master's student) attended the **Society of Toxicology meeting** in Nashville, TN. She presented her poster "Effects of Early Life Exposure to Polychlorinated Biphenyls (PCBs) on Immediate Early Gene Expression Responses to Acute Alcohol Intake in Adolescent Rat Central Amygdala". This paper is coauthored by Gia M Valdez and Margaret R Bell.



Biology major and second year master's student Carissa Dressel.



# BIOLOGY SENIOR SYMPOSIUM

## Amanda Mirczuk STUDENT OF THE YEAR



Graduating Student of the Year, Amanda Mirczuk, with nominator Dr. Joanna Brooke.

**Amanda has made substantial contributions to curricular development in the Biology program.** In summer 2022 she worked with a committee of faculty and staff to develop the new course, BIO 101: Navigating and Succeeding in Biology, which will launch in autumn quarter 2023. This course aims to provide new DePaul Biology students with the information and skills they need to succeed in the program. Amanda willingly shared her own experiences as a DePaul student, interviewed several CSH students about their experiences, and participated in discussions to shape the curriculum. She clearly articulated the needs of biology students and provided valuable feedback as faculty worked to create BIO 101. As a student, she consistently demonstrated outstanding interpersonal communication skills both as a team player and a highly capable leader. Amanda is a friendly, mature student who is serious about succeeding as a young scientist. ■

## Kristin Staub SENIOR APPRECIATION AWARD



Senior Appreciation Award winner, Kristin Staub, with nominator Dr. Jessica Pamment.

After taking genetics with Dr. Pamment, Kris was a TA for three of her Bio 155 sections. **“Out of all the TAs I have had during my 13 years at DePaul, Kris has been the best at listening and communicating. This made it easy for me to work with her and made her very approachable to students.”** Kris is a quick learner. After her first quarter as a TA she became more of a teaching partner than an assistant. As a student she offered a valuable perspective on new activities being designed. She was extremely reliable and responsive to emails and always graded labs and assignments in a timely manner. Kris went beyond her official TA duties by offering to meet with students who needed extra help. She clearly wanted to see students succeed and will definitely be missed here at DePaul. ■

## Sarah Keaton SENIOR APPRECIATION AWARD



Senior Appreciation Award winner, Sarah Keaton, with department chair Dr. Timothy Sparkes.

**Sarah has a very impressive transcript and her application to TA for Bio 155 was close to perfect.** She helps students during labs, grades assignments, and helps prep and clean up the labs. She excels at all of these tasks. The students find her very helpful and she knows the material well. She grasped new concepts quickly and required very little training due to her great breadth of knowledge. She is acutely aware of what she does know and what she doesn't. She was also friendly with her students and enthusiastic about lab activities. ■

## ALUMNI SPOTLIGHT: THE VOICE OF SARAH RICHARDS

**I received a B.S. in secondary education biology in 2016 from the College of Education at DePaul University.** I then became a double demon obtaining my M.S. in biological sciences in 2019 from the College of Science and Health. While in the biology program, my primary research focus was in ecology, animal behavior, and parasitology in Dr. Sparkes' lab. I have always been interested in (and amused by) the "gross" parts of ecology, which fortunately exists in every biome!

After successfully completing my master's with the biology department at DePaul, I moved to Virginia to pursue my PhD at Virginia Tech. Currently, I am a 4th year Ph.D. Candidate in Biological Sciences at Virginia Tech with a focus in disease ecology and animal behavior. I am an Interfaces of Global Change Fellow (an interdisciplinary graduate fellowship program) as well as the president of the Communicating Science Club. I am also a professional member of Sigma Xi: The Scientific Research Honor Society, the Society for Integrative and Comparative Biology, and the American Ornithological Society. My current research interests investigate how the environment can shape disease transmission—from host behavior, to pathogen survival, and the interactions between these factors—in house finches, a common songbird. Eventually, I plan to use my research, outreach, and teaching experience to work in the science communication sector and be a communicator to people inside and outside of the scientific community.



Through my education at DePaul, I was given frequent and meaningful opportunities to develop my skills as a scientist. I was given a safe space to experience many of the frustrating and rewarding parts of science, including the daunting task of making sense of data from my own experiment to feeling proud after presenting my research at conferences. Additionally, my experience at DePaul helped me become a better educator. I had numerous examples of effective teaching from professors in my own courses and was given the flexibility and freedom to develop my own teaching style within the labs that I taught. My experience at DePaul has been instrumental in shaping me into the well-rounded and well-communicated scientist I want to be.

My favorite part of my time at DePaul was the community. My cohort, other fellow graduate students, and the faculty members in the Biology Department were people that offered support, guidance, and laughter when I really needed it. I would not be where I am today without this community and I will always be thankful to them. ■

**“Through my education at DePaul, I was given frequent and meaningful opportunities to develop my skills as a scientist.”**

## RESEARCH IN ACTION: DR. JOANNA BROOKE



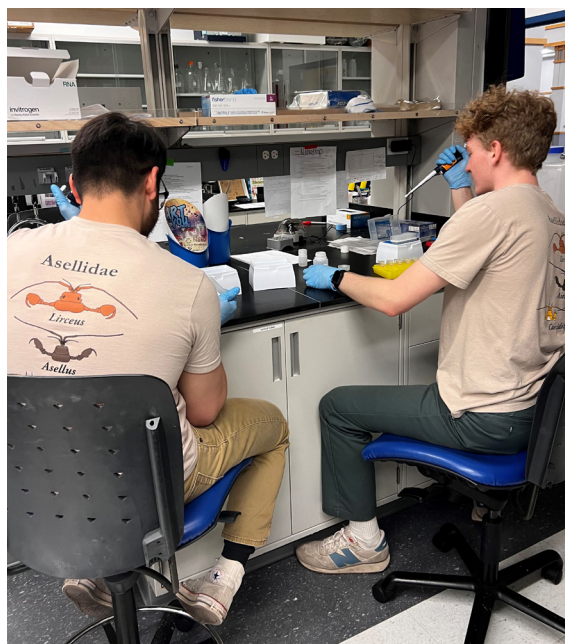
In Dr. Joanna Brooke's microbiology laboratory at DePaul, research is centered on a multidrug-resistant bacterium, *Stenotrophomonas maltophilia*, which causes various human infections (the most common ones being respiratory and blood-stream). This organism is of significant concern in immunocompromised patient

populations. A major goal of the research is to examine how this microbe, found worldwide in water, soils, animals and washed food, forms films (biofilms) on moist surfaces. *S. maltophilia* has been recovered from the surface of contaminated medical devices used with humans.

In Dr. Brooke's laboratory, creating and characterizing genetically engineered mutants of this bacterium has resulted in the identification of genes associated with biofilm formation. Biofilm infections in patients are challenging for physicians to treat due to the frequent presence of drug-resistant cells within the biofilms. The slow development of new drugs to treat infections of *S. maltophilia* has resulted in an urgent need to look for different strategies to combat this microbe and its biofilms. In the Brooke lab, two tracks of research are ongoing: 1) testing new combinations of antimicrobials against *S. maltophilia* and 2) finding and testing novel bacterial viruses (phages) which specifically target and kill *S. maltophilia* without harming the infected human.

A diverse array of DePaul undergraduate and graduate students are engaged in research in the Brooke laboratory. They are involved in all stages of research from biosafety training, reviewing research literature, experimental design, carrying out the experiments, analyzing the data, and communicating the research findings at local, national, and international science conferences. Several students are co-authors on peer review publications in microbiology journals. These students gain experience in techniques and approaches used in microbiology, biochemistry, and molecular biology. Dr. Brooke's students often enter into M.S. and Ph.D. programs, work in professional healthcare, or work as research scientists in academic research labs and industry.

Dr. Brooke thoroughly enjoys working with her students and knows the importance of them having an authentic research experience. She is open to accepting new research students and looks forward to seeing them learn about science in microbiology through this invaluable research experience her lab provides. ■



Rafael Meija and Shawn Kissinger conduct research in Dr. Margaret Bell's lab wearing their biology department t-shirts.

## GIVING BACK TO STUDENT RESEARCH

Please donate to help support undergraduate research in biological sciences.

### DONATE NOW

- > [SELECT DESIGNATION](#) 'View all College of Science and Health Giving Opportunities'
- > [SEARCH FOR](#) 'Fund for Biology'

## THANK YOU TO OUR SUPPORTERS!

### ACKNOWLEDGMENTS

The Niche Team

**Editors:** Claire Behrens, Rima Barkauskas, and Sarah Mashburn

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