

DePaul Biological Sciences THE NICHE

FROM THE DESK OF THE CHAIR



This has been another exciting year for the Biology Department as we have launched several new initiatives supporting student-centered education.

Highlights include new courses focused on the integration biology and art (STEAM – putting the A in STEM), CURE courses (course-based undergraduate research experiences), a certificate program (Cell Culture Techniques and Applications), an

Honors in Research Program, a course on the Science of Beekeeping, and five 3+ Programs with the Rosalind Franklin School of Medicine & Health (Allopathic Medicine (MD); Podiatric Medicine (DPM); Physical Therapy (DPT); Physician Assistant Practice (MS); Pathologists' Assistant (MS)). We also supported more than a hundred students in research, which included student presentations at conferences, publications, and grants. These experiences are invaluable for the success of our students and the generous financial support of our alumni has made much of this success possible. This year

also included the retirement of Dr. John Dean, who is one our most distinguished faculty members, after 35 years of service at DePaul. Dr. Dean has played a critical role in the success of the department by both supporting his colleagues and students and maintaining an active research program. His contributions have helped to shape our vision for the future and we will always be grateful to him. We wish him a wonderful retirement with both his family and his collection of bonsai trees.

TIMOTHY SPARKES
CHAIR OF BIOLOGICAL SCIENCES

THE FACES OF THE BIOLOGY DEPARTMENT

Meet the friendly faces of the Biology Department! The depth and breadth of our biology department spans teaching and research from many corners of biology. From plant defense chemicals to human breast cancer proliferation to the paleobiology of sharks, the biology department specializes in many critical areas of science.

BIOLOGICAL SCIENCES

James Roth Assistant

Sarah Connolly

Terry Fitzpatrick

Megan Schrementi

Ken Shimada

Jessica Pamment

Sarah Richardson

Tim Sparkes Chair

Phil Funk

Sarah Finck Advisor

Jingjing Kipp

Windsor Aguirre

Rima Barkauskas

Joanna Brooke

Jason Bystriansky

Claire Behrens

Dorothy Kozlowski

Stan Cohn (Emeritus)

Margaret Silliker (Emeritus)

Rick Hudson

John Dean

Bill Gilliland

Margaret Bell

Kate Soderstrom

Margaret Bell

Kate Soderstrom

Claire Behrens

Dorothy Kozlowski

Stan Cohn (Emeritus)

Margaret Silliker (Emeritus)

Rick Hudson

John Dean

Bill Gilliland

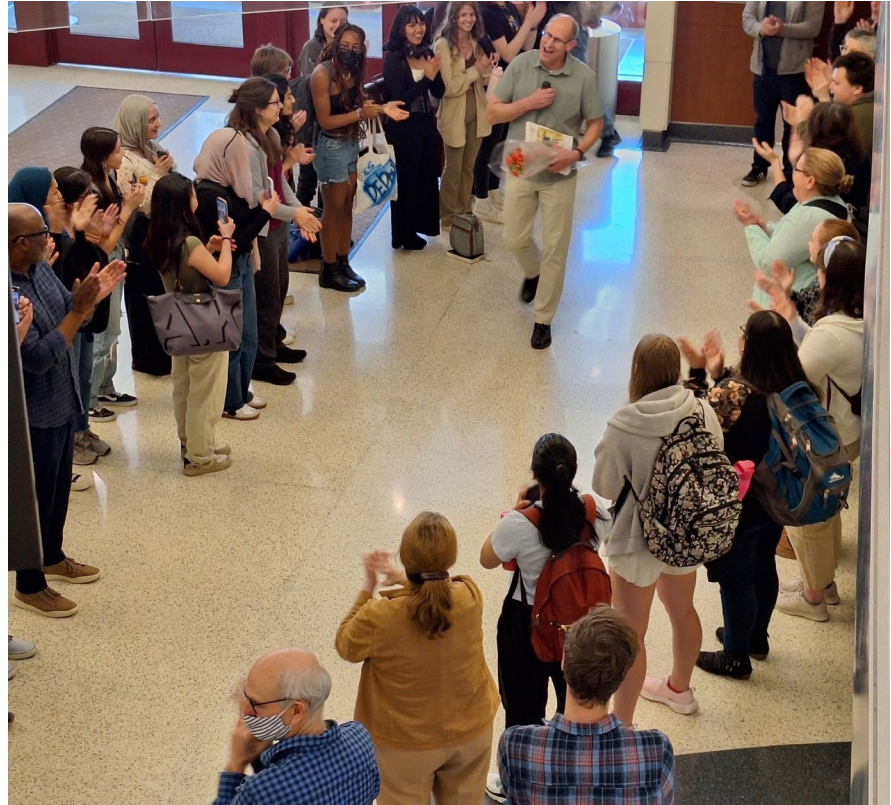
Jalene LaMontagne

Andrew Conith

FROM THE DESK OF A RETIRING FACULTY MEMBER, AND PAST CHAIR, JOHN DEAN

After 35 years of service here at DePaul University, I have decided to retire.

I started at DePaul in 1989 as an Assistant Professor. At the time of my hiring, the Department was facing a transition period where several tenured faculty members were retiring and were being replaced by Assistant Professors. I was one of four new Assistant Professors hired in the Department over a two-year period. It was an exciting time since it was clear that one of the strategic initiatives of the university was to strengthen the support for the sciences. This planning ultimately resulted in the construction of two new science facilities (McGowan North and McGowan South), updates to both teaching and research equipment, the addition of numerous new faculty lines, and the creation of the College of Science and Health. I was fortunate to be chair of the department when much of this growth occurred. I am delighted that the university remains committed to supporting the sciences and I will be anxious to see the changes that occur over the next decade.



I have a lot of good memories from my time here at DePaul, but the passing of time sometimes feels odd. I remember walking into the classroom to give my first lecture in 1989 and I remember walking out of my last lecture in 2024 to a line of students applauding and helping me celebrate my retirement. It seems as if very little time passed between those two events. However, a great deal happened over those years. I was on DePaul's campus when my daughter called me to tell me which college she would be attending (the same thing happened when my son was accepted to college), I was on campus preparing for a morning class when I heard about the events of 9/11, I was in my office when my sister called me to tell me about the passing of our parents, and I was in my office between classes writing my father-of-the-bride speech for my daughter's wedding. Even though I am retiring, I will never be able to completely separate myself from DePaul because we've been through so much together.

I have taught hundreds of students over the years and there are times when I will run into one of them years after they graduate. They are usually excited to see me and they can't wait to tell me how much they enjoyed their time at DePaul. It happens more often than you might think, and when it does, it is one of my favorite experiences. Since I teach plant biology, one of the most common comments I get from former students is usually something along the lines of, "I really didn't think I

would like studying plants, but you somehow made it interesting." Those types of interactions make me appreciate the impact that we, as faculty, have on our students. My time here at DePaul has been very special and I want to thank all of the wonderful faculty, staff and students that I have worked with over the years. This has been a very good place to me, and I will always be proud to say that I was a faculty member in the Department of Biological Sciences at DePaul University. ■

“My time here at DePaul has been very special and I want to thank all of the wonderful faculty, staff and students that I have worked with over the years.”

BUILDING COMMUNITY

INAUGURAL CSH FEST BIO TABLE SEPTEMBER 2023



A graduate student in the biology department, Antonio Armagno, talks to incoming Freshman students about the exciting research going on in the biology department.

SUPPORTING THE BIOLOGY DEPARTMENT: BIO T-SHIRTS FOR ALL BIO MAJORS!



Lexy Pawlak (M.S. graduate student) proudly wears her biology t-shirt.



Our peer mentors for Dipn' Sippin', Belle Lewis (left) and Riley Rosenfeld (right), pose in their biology t-shirts.



Patrycja Aksamit (M.S. graduate student) wears her biology t-shirt while she takes part in Dipn' Sippin'.

BIOLOGICAL SCIENCES: NEW PROGRAMS

3+ Programs with Rosalind Franklin University of Medicine and Science

1. Doctor in Allopathic Medicine
2. Doctor of Podiatric Medicine
3. Doctor of Physical Therapy
4. MS Pathologists' Assistant
5. MS Physician Assistant Practice

Certificate Programs

1. Cell Culture Techniques and Applications
2. Multidisciplinary Approaches to the Biology of Diseases

BIOLOGICAL SCIENCES: NEW COURSES AND INITIATIVES

Course-based Undergraduate Research Experiences (CURE Courses)

1. Bio 307: Animal Physiology
2. Bio 320: Advanced Microbiology
3. Bio 360: Molecular Biology
4. Bio 362: Advanced Genetic Analysis

STEAM Courses

1. LSP 112: Biology, Art, and Technology
2. Bio 119: From Music to Mind: The Neuroscience of Music

Additional New Courses

1. Bio 101: Navigating and Succeeding in Biology
2. Bio 140: Science of Beekeeping
3. Bio 299: Introduction to Research
4. Bio 313: Cell Culture Methods

NEW FACULTY MEMBER IN THE BIOLOGY DEPARTMENT Q & A with Dr. Andrew Conith



Dr. Andrew Conith is from Derby in the United Kingdom and attended the University of Leeds for his undergraduate degree as a Zoology major. He then went on to receive his Master's degree at the University of Bristol (UK) and PhD at the University of Massachusetts, Amherst, where he

received his degree in Organismic and Evolutionary Biology. The Niche team sat down with Dr. Conith this year to find out more about his background and his plans for research and teaching here at DePaul.

1. What is the focus of your current research at DePaul?

"Understanding interactions among different tissue types in the head of vertebrates."

2. Was there a certain experience in your childhood or undergraduate career that drew you to your current field of research?

"Growing up in the United Kingdom and watching natural history documentaries on BBC (the Life series narrated by David Attenborough) filled me with wonder at a young age. These documentaries highlighted the diversity of life, going through all the major clades of vertebrates. It was amazing to see the life that was on our planet. I also had two teachers in secondary school (high school) who were great. One was a biology teacher and the other taught geography. They really got me to understand evolution on a deeper level. I chose zoology as my major in university because I wanted to appreciate the organism itself as best I could. Research, for me, was so much fun and filled me with a complete sense of wonder. In research, you do not know what the answer to the question will be, and when the jigsaw pieces fit together, it is the most incredible feeling."

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Dr. Conith worked in a Paleontology lab at the University of Bristol. Here he is hunting for fossils in Glamorgan County, Wales.

3. Any specific direction that you hope to see your research go in the future?

"In general, I wish to research jaw development in cichlid fishes to better understand the evolutionary and genetic mechanisms that control morphological diversity in cichlid jaws across species. To that end, I hope that students who have an interest in genetics, development, and evolution consider joining the lab. Within the scope of my research program, I attempt to carve out a project(s) for students that is in-line with their future career plans. As the PI (Principal Investigator), my reason for splitting these research projects into bite-size pieces is that it permits each student to contribute toward the goal of understanding how genotype translates to phenotype, and it allows for a student to see a project through from beginning to end."

4. Are you currently looking for undergraduate students to help in your lab?

"Yes, I can take on more students. I have three undergraduate students starting in my lab winter quarter, 2023."

5. What drew you to DePaul? Why did you decide to join our faculty?

"It was a university that was able to straddle the boundary between solid teaching and research, but also able to use research as a teaching mechanism. The CURE courses we offer are such an effective way to deliver material that feels very new world. Also, the interpersonal conversations I had with people when I was visiting and interviewing really drew me in. I met with almost all of the faculty and they really came across as people who were interested in science as much as the well-being of their students."

6. What classes are you teaching at DePaul this year?

"Fall quarter I was an instructor in General Biology 191 labs. I'm the lecture instructor for General Biology 192 in winter quarter 2024, and I'm teaching Biostatistics in the spring."

7. Are there any courses you hope to teach in the future?

"I plan to teach Developmental Biology (Bio 330/430) next year and my goal is to develop a CURE course for this particular course in the future."

8. What do you like to do in your free time when you are not in the lab or teaching?

"My free time is spent with my two kids; I have a 5 year old and a 3 month old. My 5 year old and I like to go biking together. We discover playgrounds off the bike path. It's such a fun time."

9. Tell us a fun fact about yourself.

"I used to be in a rock band during undergrad called Blacktop and we toured Europe. I played the keyboards."

10. What advice do you have for undergraduate students?

"First, never be afraid to talk to any of your instructors. The faculty love talking about science. Secondly, do not be afraid to say 'I don't know'. It works well to say 'I don't know' because it allows us to reach the answer. There is no point in faking your way through stuff or sitting in silence struggling. A huge positive about DePaul is the openness of the faculty. They love to share advice, resources, and are super understanding." ■

DEPARTMENT AWARDS AND SELECTED PUBLICATIONS



DR. AGUIRRE

Dr. Windsor Aguirre publications (Bio): Fuentes-Montejo, C.E., Aguirre, W., Elias, D.J., Barrientos, C., and C.D. McMahon. 2023. Niche overlap between sympatric cichlid species of the genus *Rocio* (Cichliformes: Cichlidae) in Guatemala. *Ecology of Freshwater Fish*, 33:e12759. DOI: 10.1111/eff.12759.

Tonella LH *et al.* (2023) Neotropical freshwater fishes: a dataset of occurrence and abundance of freshwater fishes in the Neotropics. *Ecology* 104:e3713.



DR. BELL

Dr. Margaret Bell (Bio/Hlth) & Dr. Dorothy Kozlowski (Bio/Neu) publication: Wilson RJ *et al.* (2023) Repeat subconcession 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. KOZLOWSKI



DR. CONITH

Dr. Andrew Conith publications (Bio): Conith AJ *et al.* (2023). Covariation of brain and skull shapes as a model to understand the role of crosstalk in development and evolution. *Evolution & Development*. 25:85–102.

Kozol RA *et al.* (2023) A brain-wide analysis maps structural evolution to distinct anatomical module. *eLife* 12:e80777.



DR. CONNOLLY

Dr. Sarah Connolly publication (Hlth/Bio): Fan Q *et al.* (2023). Multiple sites on glycoprotein H (GH) functionally interact with the GB fusion protein to promote fusion during herpes simplex virus (HSV) entry. *mBio* 14:e03368-22



DR. GILLILAND

Dr. William Gilliland publication (Bio): Miller DE *et al.* (2023) Off-target piRNA gene silencing in *Drosophila melanogaster* rescued by a transposable element insertion. *PLoS Genetics* 19:e1010598.



DR. LAMONTAGNE

Dr. Jalene LaMontagne publications (Bio): Bogdziewicz M, *et al.* (2023). Linking seed size and number to trait syndromes in trees. *Global Ecology and Biogeography*. 32: 683–694.

Hohl D *et al.* (2023) Changes over time in tree cavity availability across urban habitats. *Urban Forestry & Urban Greening* 84: 127926.

Koenig WD *et al.* (2023) Periodical cicada emergences affect masting behavior of oaks. *American Naturalist* 201:755-762.

Ochoa-Hueso R *et al.* (2023). Bioavailability of macro and micronutrients across global topsoils: Main drivers and global change impacts. *Global Biogeochemical Cycles*, 37:e2022GB007680.

Qiu, T *et al.* (2023) Masting is uncommon in trees that depend on mutualist dispersers in the context of global climate and fertility gradients. *Nature Plants* 9:1044–1056.

Widick IV *et al.* (2023) Poleward shifts and altered periodicity in boreal bird irruptions over six decades. *Journal of Animal Ecology*. 92:1089-1101.

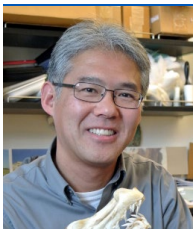
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DEPARTMENT AWARDS AND SELECTED PUBLICATIONS continued



DR. SCHREMENTI

Dr. Megan Schrementi publication (Bio):
Leonardo *et al.* (2023) Transcriptional changes in human palate and skin healing. *Wound Repair & Regeneration* 31:156-170.



DR. SHIMADA

Dr. Kenshu Shimada publications (Env/Bio):
Capretz Batista Da Silva JP *et al.* (2023). The importance of the appendicular skeleton for the phylogenetic reconstruction of lamniform sharks (Chondrichthyes: Elasmobranchii). *Journal of Morphology* 284:e21585.

Griffiths ML *et al.* (2023) Endothermic physiology of extinct megatooth sharks. *Proceedings of the National Academy of Sciences* 120:e2218153120.

Karnes ME, *et al.* (2023) Enigmatic carbonate isotope values in shark teeth: evidence for environmental and dietary controls. SSRN: 4402244.

Krak AM & Shimada K (2023) The dentition of the extinct megamouth shark, *Megachasma applegatei* (Lamniformes: Megachasmidae), from southern California, USA, based on geometric morphometrics. *PaleoBios* 40:1-10.

Shimada K, *et al.* (2023) Revisiting body size trends and nursery areas of the Neogene megatooth shark, *Otodus megalodon* (Lamniformes: Otodontidae), reveals Bergmann's rule possibly enhanced its gigantism in cooler waters. *Historical Biology* 35:208-217.

Shimada K *et al.* (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.org/10.1080/08912963.2023.2211597).

Sternes PC *et al.* (2023) Body forms of extant lamniform sharks (Elasmobranchii: Lamniformes), and comments on the morphology of the extinct megatooth shark, *Otodus megalodon*, and the evolution of lamniform thermophysiology. *Historical Biology* 35:139-151.

Tanoue K, & Shimada K (2023) Jaw mechanics in macrophagous lamniform sharks and their evolutionary and functional implications. *The Anatomical Record* 306:311-325.

Motani, R., & Shimada K (2023) Skeletal convergence in thunniform sharks, ichthyosaurs, whales, and tunas, and its possible ecological links through the marine ecosystem evolution. *Scientific Reports*, 13:16664. doi.org/10.1038/s41598-023-41812-z.

Kovalchuk, O. *et al.* (2023) Middle Eocene chondrichthyans of the Dnieper-Donets Basin, northern Ukraine. *Palaeontologia Electronica*, 26(2):a32. doi.org/10.26879/1283.

A recent publication on the extinct Megalodon's body form, which Dr. Shimada coauthored with his former graduate student, Phillip Sternes (doi.org/10.26879/1345), has received more attention than usual. His research was highlighted in CNN, ScienceNews, Forbes, EurekAlert, and even mentioned on The Late Show with Steven Colbert (palaeo-electronica.org/content/2024/5079-megalodon-body-form).



DR. SPARKES

Dr. Tim Sparkes publication (Bio):
Pfenning-Butterworth AC & Sparkes TC (2023) Evolutionary history and host ecology determine acanthocephalan egg shape. *Evolutionary Biology* 50:137-145.

QIC TEACHING AWARD WINNER 2022-2023: DR. JOHN DEAN'S TEACHING PHILOSOPHY

The Niche team had the honor of sitting down and interviewing a 2022-2023 Quality of Instruction Council (QIC) Excellence in Teaching award winning professor, Dr. John Dean, about his teaching experiences and philosophy.

Dr. Dean is one of DePaul's most sought-after biology professors who currently teaches two Introduction to General Biology courses (BIO 191 and 193) as well as Plant Physiology (BIO 309/409). Dr. Dean's contributions to the classroom will be missed as he has retired at the end of the academic year (read his farewell "From the Desk of a Retiring Faculty Member").

When Dr. Dean first began teaching 35 years ago, he told us he strived to emulate the teaching style of his favorite college genetics professor. He remembered how this professor would enter the room with nothing but a piece of chalk and then spend the whole class passionately drawing on the chalkboards. The young Dr. Dean was inspired. "When I started teaching, I memorized all of my lectures, the spellings, etc.; I never wanted to have to refer to my notes, just like my genetics professor."

When asked what qualities make an effective teacher, Dr. Dean's response was simple: "Enthusiasm and passion for your subject that comes through when you're teaching." He said he loves his discipline and finds every aspect of it intriguing. "I feel like I could teach anything [in biology] because I just find it all so fascinating." Dr. Dean thoroughly enjoys teaching all three of his current courses but admits that BIO 193 tends to be his favorite. He enjoys BIO 193's introduction to plant biology and how the course allows him to change students' opinions on plant biology from 'boring' to 'incredibly interesting.'

His main advice for current DePaul students is to attend class and stay engaged. In the introductory courses he teaches he likes to remind students that



Dr. John Dean receives his QIC teaching award at the September 2023 convocation ceremony.

they must first understand the fundamentals of a topic before they can grasp the more interesting applications. As an example, he explained the necessity of students fully understanding molecules before delving into genetics or gene expression. Additionally, he pointed out how important it is for students to make use of all the resources DePaul provides. "Go to your professor's office hours when you need to. Those one-on-one sessions can really make a concept click."

Dr. Dean shared one of his favorite teaching memories involving a group of student athletes from the women's soccer team. He said they were a very outgoing group that would often come to his office hours and ask him questions after class. At the end of the school year, they asked him to be their guest at their soccer awards banquet as a thank you for all his extra help. Dr. Dean said it is always very rewarding when students come to him after taking his course to tell him how they enjoyed his class or that they now have a desire to continue studying biology because of his influence.

Dr. Dean said a big challenge to teaching biology is overcoming students' preconceived notion that the subject is

overly complicated. "You do not have to be a genius to be a scientist. What matters is passion for a subject." He also works hard to make his teachings relevant and to convince students how important all aspects of biology are. "Making the subject interesting and accessible is very important. Everybody can use the scientific method. We all use it every day."

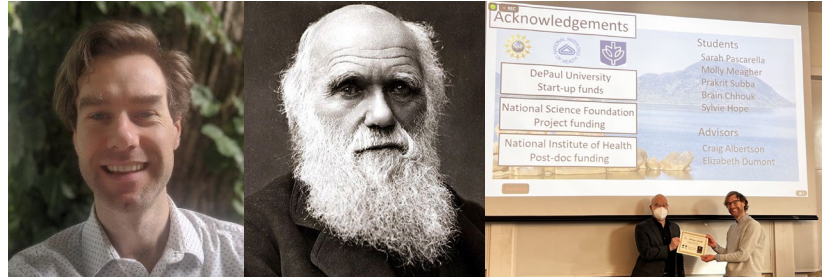
Dr. Dean shared his thoughts on some of the more important courses to take as a biology major: evolution, genetics, and molecular biology. "The beauty of biology is the breadth. When you become a medical doctor, you cannot forget about evolution. Organisms are always changing. We live in just a snapshot of evolutionary history."

Dr. Dean is forever grateful for his choice to teach at DePaul because unlike some universities, the DePaul biology program uniquely combines cutting-edge research with a teaching-focused department. "We must write grants to get funding, but we also get to teach undergrads, which can be some of the most rewarding experiences." ■

DARWIN DAY Extending Darwin's Theory - 'Tails' from Pigeons, Cichlids, and Other

“There is grandeur in this view of life, with its several powers, having been originally breathed into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved.”

— Charles Darwin



On Darwin Day, Dr. Andrew Conith presented his research on fish and mammals and used it to demonstrate how Darwin paved the way for modern advancements in the fields of evolutionary and developmental biology.

On February 16, 2024, we came together for our annual celebration to commemorate Charles Darwin's birth (2/12/1809).

To honor Darwin, for what would have been his 215th birthday, Dr. Andrew Conith presented his exciting evolutionary research with a Darwinian spin. Dr. Conith, an Assistant Professor of Biological Sciences here at DePaul University, focused his presentation on how natural selection has shaped the way animals look. He uses two different organisms to answer this question: the cichlid fishes of east Africa, and placental mammals. “When thinking of head form, you must think of how form follows function” Dr. Conith began, as he pointed out the varying essential functions for which a head is responsible: communicating, eating, breathing, and holding sexually selected ornaments like antlers or horns.

He began by explaining how these functional tradeoffs in the head arise due to certain developmental and evolutionary constraints. To better understand tradeoffs in the skull, Dr. Conith uses a species-rich group of colorful fish known as cichlids. The cichlids he studies are found in a variety of different habitats within Lake Malawi, Africa—from deep and sandy environments to shallow and rocky environments. Across environments, variation in the head/bone shape of cichlid fishes is directly related to the feeding strategy that each employ. Large, robust cichlids are often scraping algae from rocks, while small, gracile cichlids are often catching small invertebrates in the water. Dr. Conith and his student Sarah Pascarella have been studying the vomer bone, a bone at the front of the head that aids in dissipating forces that arise during feeding. Dr. Conith and Sarah found high variation in the angle of this bone that appears to be linked to how they feed. Darwin also understood the powerful role function plays in shaping form, stating: “So in the general economy of any land, the more widely and perfectly the animals and plants are diversified for different habits of life, so will a greater number of individuals be capable of there supporting themselves.”

Dr. Conith's research also focuses on how differences in the development of mammalian jaws likely stems from differences in reproductive strategy. While the environment can determine form

in cichlids, in mammals, differences in development appear to constrain form. Marsupials must be able to use their jaws almost the moment they are born and enter the pouch as a small embryo, while placental mammals, like us, are born at a relatively more developed stage. These constraints can be measured by examining the strength of association among sets of traits, otherwise known as developmental modularity. He looked at the jaw variation between marsupial and placental mammals to see how development can influence patterns of modularity and morphological diversity. Marsupial mammals have low morphological diversity and low modularity while placental mammals have high morphological variation and high modularity.

Dr. Conith took things a step further in his research investigating cichlid jaws. Cichlids have two jaws, the oral jaw for catching food, and the pharyngeal jaw for processing food. We previously thought that the two jaws were regulated independently, however, he discovered that a specific gene, *Smad7*, may be regulating the shape of both the oral and pharyngeal jaw simultaneously. Nevertheless, there appears to be some variation in the strength of this association. He found that a specific cichlid, *Tropheops*, has a much stronger association between oral jaw and pharyngeal jaw shape, while another cichlid species, *Labeotropheus*, does not share this association. Differences in how this gene, *Smad7*, is regulated may provide answers for how small genetic changes can have large impacts on the shape of certain traits. Even though Darwin died before we understood genetics, he still appreciated the power that development could have to shape the course of evolution for populations: “Changes of structure at an early age will generally affect parts subsequently developed; and there are very many other correlations of growth, the nature of which we are utterly unable to understand.” Dr. Conith hopes that we will be able to start to understand more of these developmental mysteries of form and function with his advancing research. ■

DR. WILLIAM GILLILAND: THE SCIENCE OF BEEKEEPING (SERVICE LEARNING COURSE)

A new Science as a Way of Knowing (SWK) course launched spring of 2024 led by Dr. Gilliland. Education is usually associated with classroom learning about knowledge of facts, concepts, and principles while training is learning by doing. This new course is a blend of both using honeybees as the focal topic.



The honeybee (*Apis mellifera*) is the most important insect species for agriculture. In addition to providing resources like honey and beeswax, bees also pollinate numerous flowers, trees and crops. However, bee populations in North America are under serious threat from climate change, Colony Collapse Disorder, pesticides, and the invasive mite *Varroa destructor*.



This Science as a Way of Knowing course presents the basics of bee biology, the best practices for managing an apiary, and gives students opportunities to get hands-on experience handling bees. In addition to classroom activities, the course provides a Service Learning opportunity partnering with a Chicago-area community garden that hosts a beehive. Students were responsible for helping install the hive after the conclusion of the class.

Sweet rewards from hard work seen here with honeycombs from the apiary. A portion of the first batch of DePaul University honey was gifted to Dr. John Dean to celebrate his retirement after 35 successful years of teaching, doing research, and being a DePaul community member.



PHOTOS INCLUDE DR. GILLILAND WORKING WITH THE BEES (ALL PHOTOS TAKEN BY KATJE SABIN).

RESEARCH OPPORTUNITIES WITHIN THE BIOLOGY DEPARTMENT

WINDSOR AGUIRRE

Windsor Aguirre's lab is broadly interested in the early stages of evolutionary diversification. Most of the research in his lab involves fishes, and ongoing projects include studying the evolutionary history of Neotropical fishes, how species adapt to human-mediated habitat transformation, and the integration of body form and the axial skeleton during evolution.

MARGARET BELL

The Bell lab studies how early life experiences affect brain development in ways that can impact health and wellbeing later in life. Currently, research is focused on the effects of two groups of 'forever chemicals' (PCBs and PFAS), on neuroimmune and dopamine cells using *in vivo* and *in vitro* models.

JOANNA BROOKE

Dr. Brooke's lab investigates infectious diseases. Currently, research in the lab examines the molecular mechanisms of an emerging worldwide opportunistic multi-drug-resistant bacterial pathogen, *Stenotrophomonas maltophilia*.

JASON BYSTRIANSKY

Dr. Bystriansky's lab investigates how animals are adapted to survive in harsh or changing environments. His research program is mainly focused on what limits most fish species to live in either fresh or salt water, while others can tolerate wide ranges of environmental salinity.

ANDREW CONITH

The Conith lab investigates the developmental and evolutionary processes that shape the vertebrate head. We currently use a variety of genetic, computational, and statistical approaches to better understand how different cranial traits coordinate growth at different stages of life (embryos to adults), and among different tissue types (bones, ligaments, muscles etc.).

SARAH CONNOLLY

Dr. Connolly's lab examines how herpesviruses achieve the first step of infection: entering a host cell. They study how proteins on the surface of the virus interact with each other and with cellular receptors to trigger fusion of the viral membrane with the cellular membrane, using virology, cell biology, and molecular biology approaches.

JOHN DEAN

Dr. Dean's research primarily involves the study of plant defense chemicals. Specifically, his lab is interested in the enzymes that metabolize these defense chemicals and the membrane transporters that move these chemicals into and out of plant cell organelles.

PHIL FUNK

Dr. Funk's research is interested in how cells decide what they will become in a multicellular organism, specifically the B-lymphocyte that produces antibody molecules. Dr. Funk's laboratory is currently studying the role of a molecule called chick B6 (chB6), present on B-lymphocytes in the chicken, which appears to cause a rapid form of cell death when bound by an antibody.

BILL GILLILAND

Dr. Gilliland's lab studies chromosome segregation during female meiosis in *Drosophila melanogaster* in order to find out how homologous chromosomes co-orient prior to the reductional first meiotic division. His research program uses genetic and cytological techniques to determine how often errors occur during meiosis, and to try to identify what events cause those errors.

JINGJING KIPP

The Kipp laboratory uses a broad spectrum of molecular, cellular, biochemical, genetic, morphological and physiological approaches to investigate hormonal signaling and gene expression in the regulation of ovary development.

JALENE LAMONTAGNE

Dr. LaMontagne's research program in population ecology investigates patterns and drivers of changes in plant and animal populations to study macrosystems biology and global change, including climate change and urban ecology. Her lab conducts field research in boreal conifer forests, studies impacts of land-use on urban tree-cavity availability, and uses large continental to global scale datasets to address these research questions.

TALITHA RAJAH

Dr. Rajah's research lab focuses on the cellular and molecular mechanistic effects of Gold(I) compounds as efficacious chemotherapeutic agents against human breast cancer cell proliferation, apoptosis, movement and invasion. In addition to cellular behavior, cell signaling proteins that might be affected in these processes will also be identified and quantified in human breast cancer cells.

KENSU SHIMADA

Dr. Shimada is interested in the evolution of marine ecosystems over geologic time, particularly by examining the paleobiology of sharks and other extinct marine vertebrates. While his lab studies a variety of organisms in the context of paleoecology, his research specialty is in a group of sharks called lamniforms that have been ecologically important in past and present oceans as they include top predators (e.g., great white sharks and 'Megalodon') and large plankton feeders (e.g., basking and megamouth sharks).

TIM SPARKES

Dr. Sparkes' lab works on aquatic behavioral ecology with a local focus on behavior in the parasite-host relationship that occurs between the acanthocephalan parasite (*Acanthocephalus dirus*) and the intermediate host (*Caecidotea intermedius*). His lab also has ongoing projects examining factors that influence the dynamics of mating patterns in both freshwater and marine systems of North America and Europe.

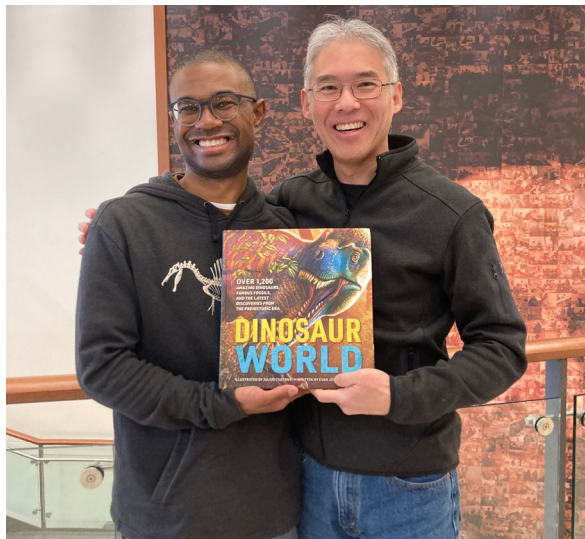
In addition to research opportunities in biology, students in biology also work in research labs in neuroscience, health sciences, chemistry, and environmental science & studies. ■

ALUMNI SPOTLIGHT: EVAN JOHNSON RAMSON 'CLASS OF 2018

I graduated from DePaul in June 2018 with a Bachelor's in Biological Sciences and a concentration in Evolution and Ecology. While at DePaul, my studies were focused on vertebrate paleontology, the study of ancient vertebrate life (e.g., dinosaurs). I studied under Dr. Kenshu Shimada, who is prominently recognized for his work on fossil fish. While I was interested in studying dinosaurs, I was more focused on being acclimated with paleontology such as learning research techniques. I gained knowledge in studying the anatomy and comparative morphology of fossil fish teeth. I've had the privilege of having my research on fossil fish published and presenting it at professional conferences such as the Society of Vertebrate Paleontology.

After graduating from DePaul, I attended Oklahoma State University Center for Health Sciences for my Master's. At OSU-CHS, I studied under Dr. Eric Snively. My Master's thesis work focused on the evolution of feeding function in tyrannosauroids, a group of meat-eating theropod dinosaurs that include *Tyrannosaurus*. I graduated from OSU-CHS in December 2021. Following my Master's, I accepted a summer fellowship at the Smithsonian National Museum of Natural History. Under the supervision of Drs. Matthew T. Carrano and Hans Sues, I focused on scanning the skulls of the museum's theropod dinosaurs for future comparative theropod feeding.

I am currently attending the University of Chicago for my PhD. My proposed research focuses on the morphology and biomechanical performance in the cervical or neck vertebrae of theropods. Specifically, my research focuses on the anatomy and functional morphology of theropods (e.g., musculoskeletal system). I intend to pursue a career in anatomy, where I teach human anatomy to the medical students, in addition to doing research in vertebrate paleontology.



Evan Johnson-Ransom (class of 2018) published an exciting new children's book *Dinosaur World*.

During my time as an undergraduate, I had my research in fossil fish published in *Paleontological Research and Transactions* from the Kansas Academy of Science. After my Master's, I had my research on tyrannosaur feeding published in *The Anatomical Record*. In 2023, I published a dinosaur book called *Dinosaur World*. *Dinosaur World* is an encyclopedia that features over 1200 named dinosaurs illustrated by Julius Csotonyi, as well as including natural history museums that house dinosaur fossils and paleontologists that study dinosaurs. Since my Junior year at DePaul, I have been an active member of the Society of Vertebrate Paleontology.

I think DePaul greatly prepared me for my professional field of study, vertebrate paleontology. This can be attributed to the excellent mentoring and advice from Dr. Shimada. Dr. Shimada helped me to comprehend the research process with vertebrate paleontology. While Dr. Shimada studied fossil fish and I was interested in dinosaurs, I was able to process the techniques that Dr. Shimada used for his fossil fish research and applied it to my graduate research with dinosaurs. This has resulted in me having

three publications in fossil fish paleontology, during my bachelor's at DePaul. Recently, I was able to publish my master's research in tyrannosaur feeding in *The Anatomical Record*. I owe this success to the teachings of Dr. Shimada at DePaul. I am also grateful for the student resources at DePaul such as the Trio Student Support Services and the McNair Scholars Program. With Trio Student Support Services, I was able to receive tutoring support that allowed me to pass classes such as General Chemistry, Physics, Calculus, and Organic Chemistry. DePaul's McNair Scholars program provided me the professional development and training courses in preparation for pursuing a graduate degree. The experiences at DePaul that I most enjoyed were the social aspect of DePaul ranging from the DePaul Comic/Manga Club, being able to mentor others from under-represented backgrounds through Jumpstart and the McNair Scholar program, as well as the supportive staff and students. ■

FUNDED STUDENT RESEARCH (2023-2024)

A. National Science Foundation: Louis-Stokes Alliance for Minority Participation (NSF: LS-AMP)

Christina Sanchez: Polychlorinated biphenyls and their effects on adolescent brain responses to ethanol (Dr. Margaret Bell)

Jemimah Ross: Polychlorinated biphenyls and their effects on adolescent brain responses to ethanol (Dr. Margaret Bell)

Jessica Martinez: The role of estrogen signaling in the brain on sex differences following subconcussion (Dr. Kozlowski)

B. Undergraduate Research Assistantship Program (URAP)

Arfa Hassan: PFAS exposure on microglial reactivity (Dr. Margaret Bell)

Audrey Urbanowski: Effect of neonatal exposure of retinoic acid on ovarian follicle development in mice (Dr. Jingjing Kipp)

Giulia Di Bella: PCBs and brain responses to ethanol (Dr. Margaret Bell)

Humdia Ahmad: Effects of Retinoic Acid Receptor Alpha Conditional Knockout During Puberty on the Development of Ovaries in Mice (Dr. Jinjing Kipp)

Laila Quad: Investigating the activity of phage Bfi2 under febrile conditions (Dr. Joanna Brooke)

Matt Villalta: Winter habitat use by red-headed woodpeckers (Dr. Jalene LaMontagne)

MJ Fitzpatrick: Late Cretaceous marine vertebrate fossils from the mid-upper Pfeifer Shale, Kansas (Dr. Kenshu Shimada)

Nicholas Poidomani: Examining the effect of fragment size on Nanopore eDNA metabarcoding (Dr. Windsor Aguirre)

Raneem Qassem: Assessing the effect of *Stenotrophomonas maltophilia* biofilm age on phage Bfi2 activity (Dr. Joanna Brooke)

C. Undergraduate Summer Research Program (USRP)

Abby Keisker: The Impact of R115866 treatment on Mouse Ovulation (Dr. Jingjing Kipp)

Aliza Moffat: Effects of perfluoroalkyl substances on developing microglia (Dr. Margaret Bell)

Christina Sanchez: Polychlorinated Biphenyls and their effects on adolescent brain responses to ethanol (Dr. Margaret Bell)

D. CSH Dean's Fellowship Program

Alison Ritter: Feeding's influence on reptilian behavior. Lincoln Park Zoo, Animal Welfare Science Program (Animal Care & Horticulture). (Natasha Wierzal)

Cassie Dedo: Capturing data on the distribution and biology of fossil and modern ferns and their relatives. Field Museum, Botanical collections (Dr. Matt von Konrat)

Owen Laser: Interactions between *Asclepias syriaca* (Common Milkweed) and its primary pollinators Organization: Lincoln Park Zoo, Urban Wildlife Institute (Dr. Henry Adams)

E. Master's-Undergraduate Scholarly Engagement (MUSE)

Emma Blair & Kiley Chernicky: Determining filled versus empty seeds in coniferous trees (Dr. Jalene LaMontagne)

Jemimah Ross & Gia Valdez: Effects of early life PCB exposure on neural and stress responses after an inflammatory challenge (Dr. Margaret Bell)

Matt Villalta & Addy Yoder: Red-headed woodpecker nest site proximity to landscape features. (Dr. Jalene LaMontagne)

Mikko Frederick & Antonio Armagno:

Describing a new fossiliferous horizon from the Late Cretaceous Smoky Hill Chalk, Western Kansas, U.S.A. (Dr. Kenshu Shimada)

Sam Patton & Owen Howard: Exploring the impacts of temperature-induced spinal anomalies on body shape in *Astyanax mexicanus* (Dr. Windsor Aguirre)

F. Biology Graduate Summer Stipend (BIO-GSS)

Armando Armagno: Fossil vertebrate diversity and palaeoecological implications of a newly excavated fossiliferous horizon from the Upper Cretaceous Smoky Hill Chalk, Western Kansas, U.S.A. (Dr. Kenshu Shimada)

Cary Brandolino: Characterizing the impact of vitamin A enrichment on the ovary in an MTa mouse model. (Dr. Jingjing Kipp)

Gia Valdez: Neuroimmune modulation by PFAS: exploring hyper-responsiveness to stressors in adolescent brain function (Dr. Margaret Bell)

Jim Camilleri: The influence of APOE allele status on herpes simplex virus entry (Dr. Sarah Connolly)

Owen Howard: Impacts of select temperature-induced vertebral anomalies and body shape on sustained swimming capacity in *Astyanax mexicanus* (Characidae: Teleostei). (Dr. Windsor Aguirre)

continued >

G. Graduate Research Fund (GRF)

Armando Armagno: Stratigraphic occurrences of the Cretaceous shark genus *Cretodus* (Lamniformes: Pseudoscapanorhynchidae) in Kansas, USA, and their ecological implications. (Dr. Kenshu Shimada)

Christian Graca: Impacts of preservation method on nanopore diet metabarcoding in the round goby. (Dr. Windsor Aguirre)

Gia Valdez: Effects of early life exposure to polychlorinated biphenyls (PCBs) on neural responses to acute alcohol intake in adolescent rat hypothalamus. (Dr. Margaret Bell)

Jennifer Dinh: Effects of early life exposure to polychlorinated biphenyls (PCBs) on neuroimmune responses to ethanol in adolescent rats (Dr. Margaret Bell)

Kiley Chernicky: Shifts in recruitment dynamics of a mixedwood forest within the southern boreal-temperate ecotone. (Dr. Jalene LaMontagne)

Marcelina Skowronski: A New Skeletal Specimen of an enigmatic Plethodid bony fish (Actinopterygii: Tselfatiiformes) from the Upper Cretaceous Eagle Ford Shale, Texas, USA. (Dr. Kenshu Shimada)

Sophia Zygowski: Activity of ciprofloxacin against *Stenotrophomonas maltophilia* and its biofilms (Dr. Joanna Brooke)

H. External Funding

Dominic-Radcliffe-Hines: A seasonal model for the transmission of scrub typhus. National Science Foundation (NSF): Research Experience for Undergraduates (REU). (Dr. Xiunan Wang - University of Tennessee, Chattanooga)

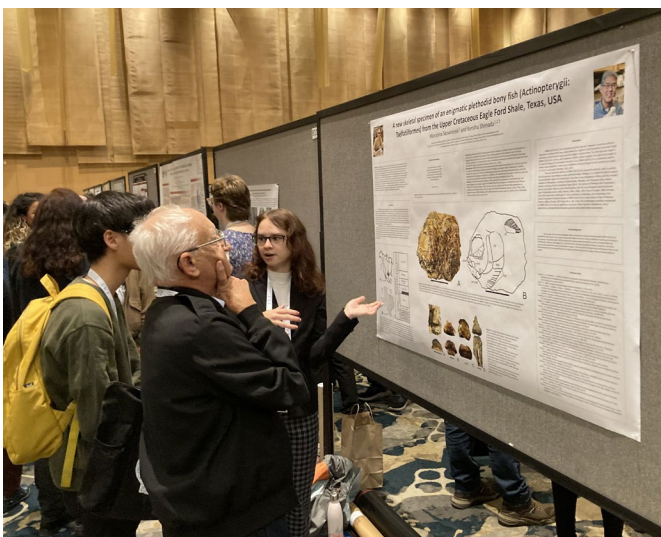
Gia Valdez: Perry J. Gehring Diversity Student Travel Award, Society of Toxicology Annual Meeting, Salt Lake City UT March 2024. Presented poster: The Effects of Early Life Exposure to Polychlorinated Biphenyls (PCBs) on Neural Responses to Acute Alcohol Intake in Adolescent Rat Prefrontal Cortex. (Dr. Margaret Bell)

Jemimah Ross: Undergraduate Diversity Program Student Travel Award, attended professional development and Society of Toxicology Annual Meeting, Salt Lake City UT March 2024. (Dr. Margaret Bell)

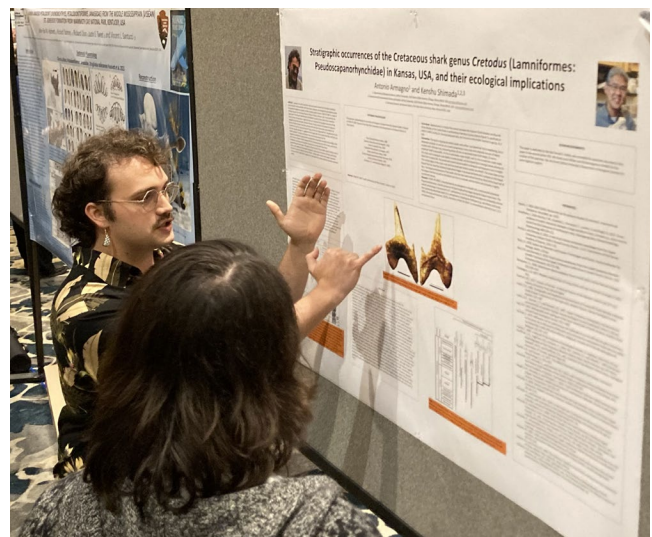
Kiley Chernicky: Shifts in recruitment dynamics of a mixedwood forest within the southern boreal-temperate ecotone. Torrey Botanical Society, Graduate Student Research Fellowship, Torrey Botanical Society & ILSCG Graduate Fellowship, NASA via the Illinois Space Grant Consortium (Dr. Jalene LaMontagne)

2023 ANNUAL MEETING OF THE SOCIETY OF VERTEBRATE PALEONTOLOGY

Marcelina Skowronski and Antonio Armagno presented their research in Cincinnati, Ohio on October 18-21, 2023 at the Annual Meeting of the Society of Vertebrate Paleontology.



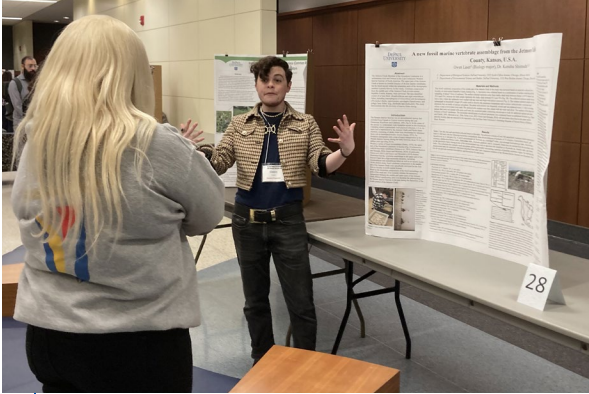
Skowronski, M., and K. Shimada. A new skeletal specimen of an enigmatic plethodid bony fish (Actinopterygii: Tselfatiiformes) from the Upper Cretaceous Eagle Ford Shale, Texas, USA.



Armagno, A., and K. Shimada. Stratigraphic occurrences of the Cretaceous shark genus *Cretodus* (Lamniformes: Pseudoscapanorhynchidae) in Kansas, USA, and their ecological implications.

21ST ANNUAL UNDERGRADUATE STEM RESEARCH SHOWCASE (CSH)

The following biology students presented their research at the annual STEM research showcase in the McGowan South atrium on November 3rd, 2023. This showcase gives DePaul students the invaluable experience of communicating their findings with fellow students, DePaul faculty, and visiting scientists through poster presentations.



OWEN LASER

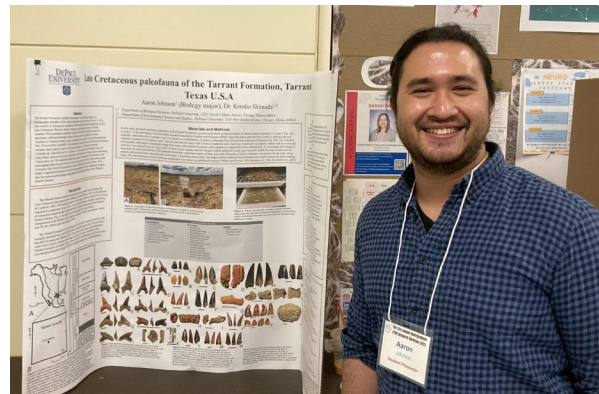
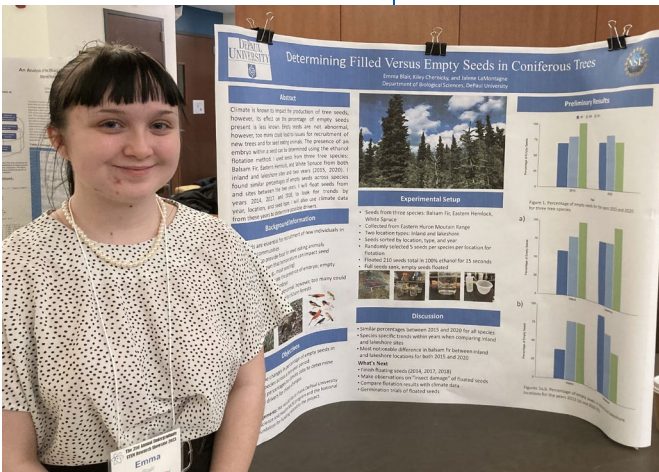


MJ FITZPATRICK



MATT VILLALTA

EMMA BLAIR



AARON JOHNSON

2024 CHICAGO SOCIETY FOR NEUROSCIENCE

The 2024 Chicago Society for Neuroscience was held at Loyola University in Chicago on March 1, 2024.



FROM LEFT TO RIGHT: Rafael Mejia (HLTH), Christina Sanchez (HLTH), Gia Valdez (BIO MS), Jemimah Ross (HLTH), Jennifer Dinh (BIO MS), Shawn Kissinger (NEU, BIO), and Giulia di Bella (HLTH).

2024 SOCIETY OF TOXICOLOGY

The 2024 Society of Toxicology was held in Salt Lake City in Utah on March 10-14, 2024.



FROM LEFT TO RIGHT: Carissa Dressel (BIO MS), Gia Valdez (BIO MS), and Jemimah Ross (HLTH).

2024 MIDWEST ECOLOGY & EVOLUTION CONFERENCE (MEEC)

The 2024 Midwest Ecology and Evolution Conference (MEEC) was held at Southern Illinois University at Edwardsville on April 6-7, 2024.



FROM LEFT TO RIGHT: Sofia Cortez (BS BIO), Joe Sharon (BS BIO), John de Abreu (MS BIO), Mikko Fredrick (BS BIO), Antonio Armagno (MS BIO), Sarah Pascarella (MS BIO), MJ Fitzpatrick (BA BIO), Owen Laser (BS BIO), Kiley Chernicky (MS BIO), Christian Graca (MS BIO), Adrianna Yoder (MS BIO), Emma Blair (BS BIO), Matt Villalta (BS BIO), Dominic Radcliffe-Hines (BS BIO), Jesse Grooms (MS BIO), and Riley Adams (BS BIO).

MEEC 2024: BIO STUDENT POSTER PRESENTATIONS

John de Abreu (MS BIO; Drs. Grewe/Dean): Global patterns of genetic diversity and species delimitation in *Cladia aggregata*: a restriction site associated DNA sequencing analysis (RADseq) across neotropical, Australasian, and Asian populations

Riley Adams (BS BIO; Dr. LaMontagne): Relationships Between Alternative Visual Methods To Quantify Tree Reproduction

Antonio Armagno (MS BIO; Dr. Shimada): Fossil vertebrate diversity and paleoecological implications of a new fossiliferous horizon from the Upper Cretaceous Smoky Hill Chalk, western Kansas

Emma Blair (BS BIO; Dr. LaMontagne): Determining Filled Versus Empty Seeds in Coniferous Trees

Kiley Chernicky (MS BIO; Dr. LaMontagne): New Kids on the Block: Tree recruitment dynamics in the boreal-temperate ecotone

Sofia Cortez (BS BIO; Dr. de la Sancha): Application of CT scans for teaching in STEM-based-ologies: mammals of the Great Lakes region

MJ Fitzpatrick (BA BIO; Dr. Shimada): Late Cretaceous sharks from the middle-upper part of the Pfeifer Shale Member of the Greenhorn Limestone in Russell County, Kansas

Mikko Fredrick (BS BIO; Dr. Shimada): The first occurrence of the Late Cretaceous bony fish, *Pachyrhizodus caninus*, from the Fairport Chalk of the Carlile Shale, Kansas

Christian Graca (MS BIO; Dr. Aguirre): The Effects of Preservation Method on the Stomach Contents of Round Goby on DNA Nanopore Metabarcoding

Jesse Grooms (MS BIO; Dr. LaMontagne): Testing for ecological dipoles in mast-seeding, small mammals & bird populations

Owen Laser (BS BIO; Dr. Shimada): Fossil marine fish assemblage from the Jetmore Chalk (Upper Cretaceous) in Republic County, Kansas, USA

Sarah Pascarella (MS BIO; Dr. Conith): Investigating neurocranial diversity in the cichlids of Lake Malawi: a rapidly evolving clade of fish

Dominic Radcliffe-Hines (BS BIO; Dr. LaMontagne): Evaluating the Timing of White Spruce and Balsam Fir Reproductive Output

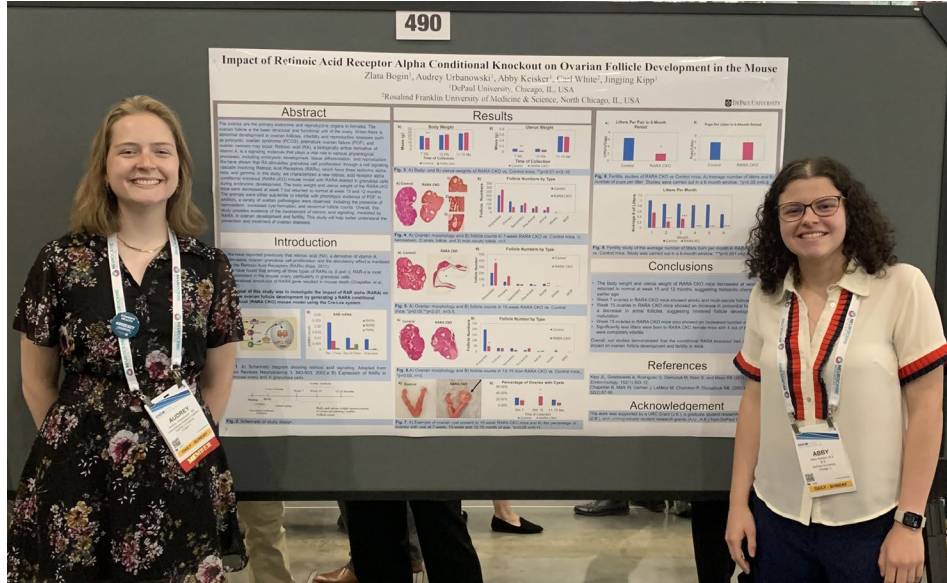
Joe Sharon (BS BIO; Dr. Shimada): The first report of the shark genus, *Squalicorax* (Lamniformes: Anacoracidae), from the Upper Cretaceous Hartland Shale in northcentral Kansas

Matt Villalta (BS BIO; Dr. LaMontagne): Woodpecker Detector: Using Computer Vision to Analyze Camera Trap Data

Adrianna Yoder (MS BIO; Dr. LaMontagne): Habitat Characteristics and Seasonality of RedHeaded Woodpecker Cavity-Use ■

2024 ENDOCRINE SOCIETY CONFERENCE

The 2024 Endocrine Society Conference was held at the Boston Convention and Exhibition Center in Massachusetts from June 1-4, 2024.



FROM LEFT TO RIGHT: Audrey Urbanowski (BS BIO) and Abby Keisker (HLTH).

Abby Keisker and Audrey Urbanowski (Advisor: Dr. Jingjing Kipp [BIO]) presented their poster titled the "Impact of Retinoic Acid Receptor Alpha Conditional Knockout on Ovarian Follicle Development in the Mouse".

A MOMENTOUS MOMENT IN HISTORY - APRIL 8, 2024 SOLAR ECLIPSE

Faculty in the biology department enjoy the view from the DePaul Quad as the moon passes between Earth and the Sun.



FROM LEFT TO RIGHT: Dr. Rick Hudson, Dr. Margaret Bell, Dr. Jessica Pamment, Dr. Sarah Connolly, Dr. Sarah Richardson, and Dr. Andrew Conith.

2024 SENIOR SYMPOSIUM PHOTOS

Matt Villalta
SENIOR OF THE YEAR



Matt Villalta was nominated by Dr. LaMontagne and Dr. Gilliland and is our 2024 Senior of the Year award winner!

NOMINEES

Jessica Martinez
SENIOR APPRECIATION AWARD



Dr. Kozlowski nominated Jessica Martinez for Senior of the Year.

Alison Ritter
SENIOR APPRECIATION AWARD



Dr. Aquirre nominated Alison Ritter for Senior of the Year.

He also nominated [Gemma Landa](#) for Senior of the Year who was not able to attend.

Dominic Radcliffe-Hines
SENIOR APPRECIATION AWARD

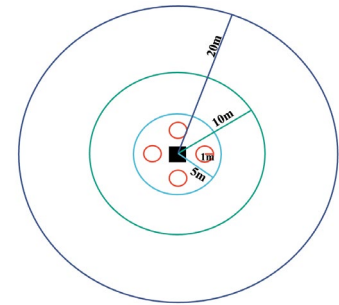


Dr. LaMontagne nominated Dominic Radcliffe-Hines for Senior of the Year.

RESEARCH IN ACTION: DePaul Graduate Student Kiley Chernicky



Kiley poses with her drone that she flies to create an aerial map of her sites in the Upper Peninsula in Michigan.



Sample design consisting of nested plots at 6 seed traps/site (black square), four 1 meter radius plots for seedlings (red circles), 5 meter radius plot for saplings (blue circle), and 10 meter and 20 meter radius plots for mature trees (green and purple circles).

Kiley Chernicky is a second-year graduate student in Dr. Jalene LaMontagne's lab. Kiley is an ecologist, and her research focuses on understanding changes in tree communities in the Upper Peninsula, Michigan, which is part of the boreal-temperate ecotone, and is an area predicted to be greatly affected by climate change. She is interested in identifying which tree species are doing well and which tree species are not doing well, which may cause changes to forest composition in the not so far future. Kiley's project focuses on four tree species commonly found at her study site: two species near their southern range limit (white spruce and balsam fir), and two species near their northern range limit (sugar maple and white pine). In summer 2023, Kiley collected new data both on the ground and in the air using drone aerial photography. She has combined her 2023 forest composition data with seed fall and seedling growth data collected by the lab since 2013 to analyze differences in each species' recruitment success, as well as changes in species composition across three life stages: new seedlings, small saplings, and mature trees. Kiley's research will provide insight into how recruitment success for vulnerable boreal species may be declining and how this affects mixedwood forest community structure and function. Additionally, her research will provide data that can be



This is an example of how Kiley's seedling plots are laid out around each seed trap. She used flags to mark the center of the plot and then PVC pipes to measure the 1 meter radius where the samples are taken.

used for predicting forest community composition in years to come. As global temperatures continue to rise, it is important to understand how our forest communities may be changing and what that could mean for our future and theirs. Kiley has received several grants to pursue her research, including a Graduate Research Fund award via DePaul's College of Science and Health, a Torrey Botanical Society Grant, and a fellowship from the Illinois Space Grant Consortium. ■



This seed trap sits in an open area at one of Kiley's sites. She used these to capture seeds falling from the trees she studies, which are mostly white spruce, balsam fir, sugar maple, and white pine. These traps allow seed production and dispersal to be quantified.



Here Kiley is using a measuring tape at the center of a seed trap to measure out the radius for sapling plots and adult tree plots. Sapling plots covered a 5 meter radius around the seed trap and adult tree plots covered a 10 meter and 20 meter radius around the seed trap. Saplings are anything greater than 1 meter tall but less than 10 centimeters diameter at breast height (DBH) and adult trees are anything greater than 10 centimeters DBH.

RESEARCH IN ACTION:

DEPAUL UNDERGRADUATE STUDENT MCKAYLA ('MJ') FITZPATRICK



MJ collects and identifies microscopic fossil remains from the mid-upper Pfeifer Shale member from Russell County, Kansas.

McKayla ('MJ') Fitzpatrick is a third year undergraduate student in Dr. Kenshu Shimada's lab. Her research project entails the examination of vertebrate remains from the upper half of the Pfeifer Shale based on samples collected by her research advisor, Dr. Shimada, in Russell County, Kansas. She has also been studying microscopic remains from disaggregated rock samples collected from this same fossil site. The Pfeifer Shale is a sedimentary rock unit exposed in Kansas that was deposited during the late Cretaceous (the final period of the 'Age of Dinosaurs') approximately 94-90 million years ago in a prehistoric ocean called the Western Interior Seaway. It is known that this seaway was home to diverse forms of life, including fishes, marine reptiles, and birds, but very little is known about the fossil record of vertebrates when the Pfeifer Shale formed. The goal of this study is to decipher the taxonomic composition of vertebrate taxa to elucidate the paleoecology of the seaway when the Pfeifer Shale formed. So far, identified taxa include teeth of the genera *Ptychodus*, *Cretoxyrhina*, and *Squalicorax*, which are known as durophagous ('shellfish' eating), predatory, and scavenging sharks, respectively. For MJ, the experience of working with such important ecological and evolutionary remains has been an experience she will always remember. She presented a poster at DePaul's Undergraduate STEM Research Showcase last November and was awarded the URAP (Undergraduate Research Assistant Program) grant for Winter Quarter 2024. ■



Aaron Johnson (BA BIO) is organizing a set of vertebrate fossils that he extracted from a Late Cretaceous marine rock deposit in Texas. After extraction, he taxonomically identified these fossils.

GIVING BACK TO STUDENT RESEARCH

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THANK YOU TO OUR SUPPORTERS!

ACKNOWLEDGMENTS

The Niche Team

Editors: Claire Behrens, Rima Barkauskas, Timothy Sparkes, and Dorothy Kozlowski.

Special thanks to: Kiley Chernicky, John Dean, McKayla Fitzpatrick, and Evan Johnson-Ransom for their contributing articles.