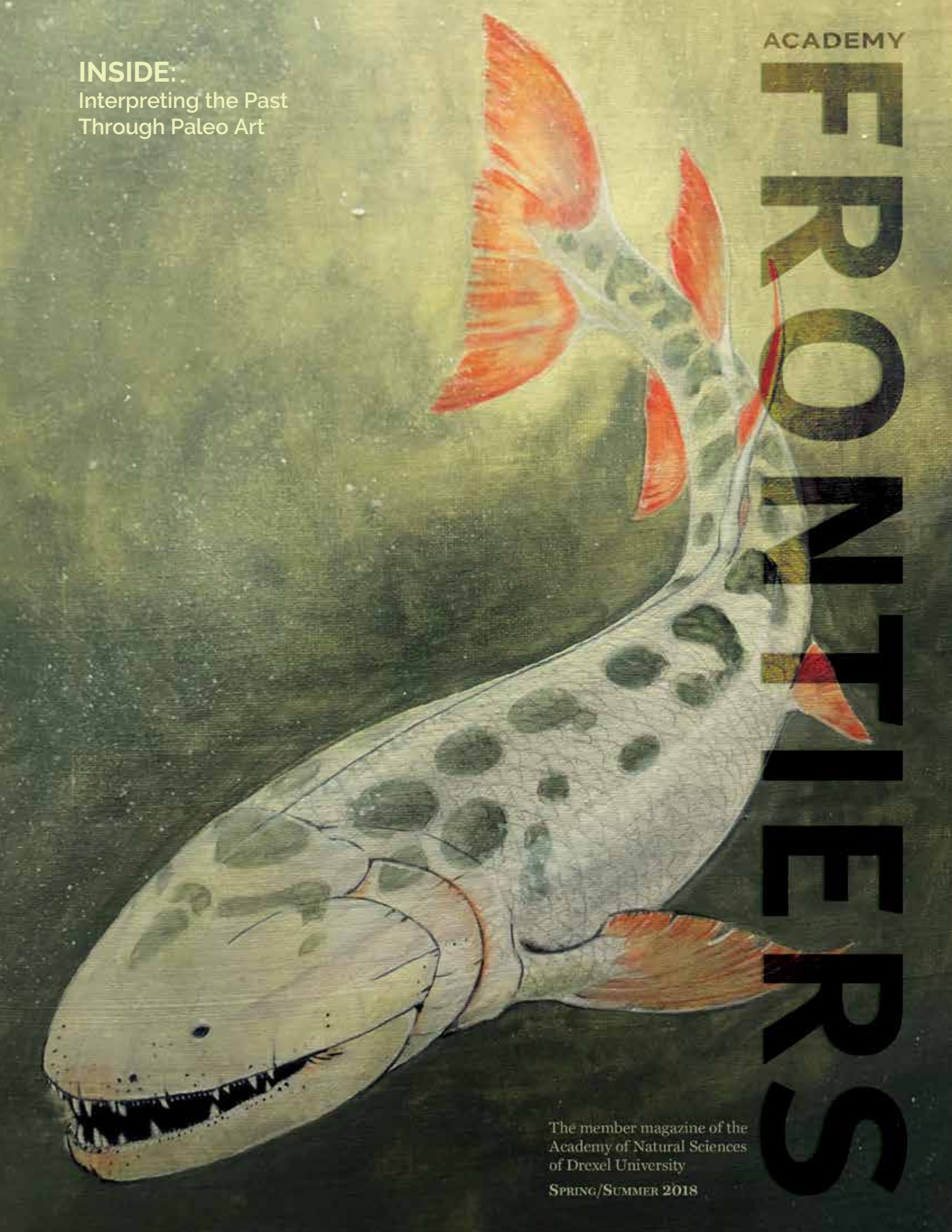

ACADEMY

FRONTIERS

INSIDE:
Interpreting the Past
Through Paleo Art

The member magazine of the
Academy of Natural Sciences
of Drexel University

Spring/Summer 2018

President and CEO: Scott Cooper, PhD
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Please send questions or comments about *Academy Frontiers* to ans_editor@drexel.edu.
Academy membership includes a subscription to *Academy Frontiers*, free general admission to the museum, discounts in the Academy Shop and Academy Café, invitations to special events and exhibit openings and much more. For information about Academy membership, call 215-299-1022 or visit ansp.org/membership.

ON THE COVER: Academy scientists Ted Daeschler and Jason Downs worked closely with paleoillustrator Jason Poole to bring this Devonian predator, *Hyneria lindae*, to life on canvas. More on pages 8–11. Painting by Jason Poole/ANS

ACADEMY GREETINGS

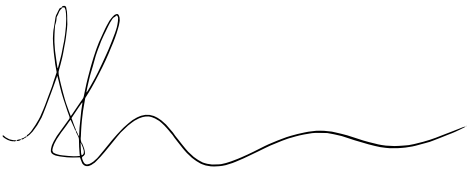
Dear Friends,

For more than 200 years, the Academy's collections have inspired research on evolution, biodiversity and environmental science, leading to groundbreaking discoveries on the history of life and the world in which we live today. I believe the act of building and maintaining our collections has made the Academy a world-class institution, unique to Philadelphia and invaluable to researchers throughout the world. With each specimen that our scientists collect, curate and catalog, the Academy gains more opportunities for innovation and for sharing tangible evidence of our discoveries with museum visitors. Just looking back upon years of publication and programming reminds me that we are constantly creating new knowledge from specimens living under our very roof.

One such example can be found in our Vertebrate Paleontology Collection. This spring, Academy paleontologists Ted Daeschler and Jason Downs published findings on a huge Devonian predator based on fossils collected from a highway roadcut in Clinton County, Pennsylvania. Daeschler and Downs identified a sensory network that helped the predator locate prey in a murky freshwater ecosystem. They worked with Academy Fossil Prep Lab Manager and paleoillustrator Jason Poole to bring the predator back to life through art, making it accessible to a wider audience. Poole's interpretation of this Devonian fish appears on the cover of this magazine, accompanying an exploration (pages 8–11) of the art of bringing a prehistoric predator to life. Without our scientists' concerted efforts to build our collections and their exceptional ability to communicate their discoveries with the public, many of us would have never set eyes upon this fantastic monster fish.

As you read this issue of *Academy Frontiers* and learn more about our latest work, please know that your encouragement motivates our scientists to build and examine our library of life, day after day. I extend a heartfelt thank-you to those who have backed the Academy through the 2018 Annual Fund and those who generously contributed to the Academy during Drexel University's Day of Giving. Help us begin fiscal year 2019 in a position of strength by visiting ansp.org/support or by using the enclosed postage-paid envelope. Whether you give financially, you contribute through your membership and visitation or you share your time and talents, we are extremely grateful for your support.

With thanks and best wishes,



Scott Cooper, PhD
President and CEO

FOUNDED IN 1812, the Academy of Natural Sciences of Drexel University is a leading natural history museum dedicated to advancing research, education and public engagement in biodiversity and environmental science.

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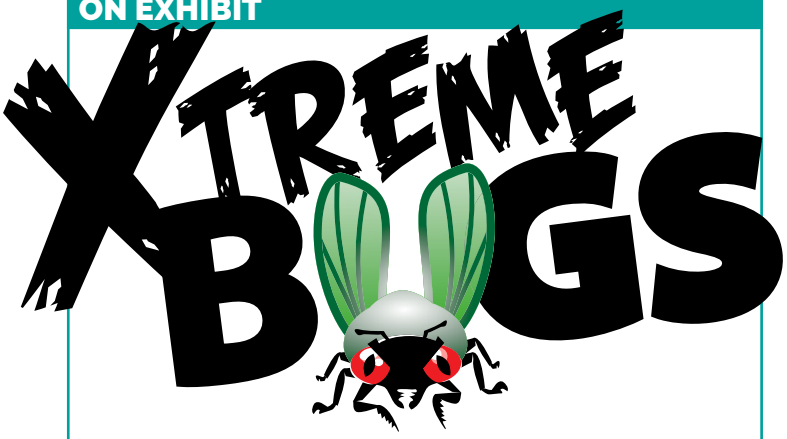
ACADEMY FRONTIERS | SPRING/SUMMER 2018

Mary Alice Hartsock/ANS

Fossils from the Devonian fish *Hyneria lindae* (pictured on cover) reveal an elaborate sensory canal system that enabled the fish to navigate murky waters. More on pages 8–11.

ON EXHIBIT



THROUGH JANUARY 21, 2019
Xtreme Bugs

Special Exhibits Gallery

Come face-to-feet with nearly 20 massive, colorful, moving bugs! From a fluttering oversized monarch butterfly and a fluffy tri-colored bumblebee to a gigantic Madagascar hissing cockroach and a blood-sucking bedbug, these towering animatronics tell a rarely seen story of the behaviors and intricacies of extreme bugs. Get a bug's-eye view of the world, explore critter calls, dig for ancient arthropods and play an extreme bug facts game. Each day, meet a live critter during bug encounters, and find out what makes these critters so incredible.

PRESENTING SPONSOR:

WESTERN PEST SERVICES

Xtreme Bugs is also supported by a generous donation from VWR Charitable Foundation.

JULY

*Xtreme Bugs**
Open through January 21, 2019 $

Dino-mite Summer
July 1–August 31 M

Academy Science Camp
Weekdays, July 9–August 31 $ 📞

Tiny Tot Explorers
Select Wednesdays, July 11–August 29, 11 a.m.–noon $ 📞

Dinos and Donuts
Saturday, July 14, 9–10 a.m. M 📞

Dinos After Dark
An Evening Featuring Ballet X
Tuesday, July 17, 5–8 p.m. M

Teen Beginner Animal Training and Husbandry Program
Weekdays, July 16–20 $ 📞

Scientist Saturday
Saturday, July 21, 1–4 p.m. M

Teen Advanced Animal Training and Husbandry Program
Weekdays, July 23–27 $ 📞

Teen Expedition Program
Weekdays, July 30–August 3 $ 📞

John Hutelmeyer/ANS

DIORAMA RENOVATIONS IN PROGRESS

Through summer's end, conservators and artists will clean and renovate every inch of the Academy's beautiful Takin and Gorilla dioramas. New lighting and labels will be installed; peels and cracks in the background paintings will be repaired; layers of dust will be removed; drooping tree branches will be propped; curled leaves will be replaced; and in a few instances errors will be corrected.

You can peer through large viewing windows into the temporary workspaces as the renovations progress. It will be a unique opportunity to see what the dioramas look like without glass and to examine the scientific and artistic elements as the experts take the habitat scenes apart and put them back together!

LEARN MORE AT ANSP.ORG/DIORAMAS

AUGUST

Bug Fest
Saturday and Sunday, August 11–12, 10 a.m.–5 p.m. (M)

Teen Invertebrate Husbandry Program
Weekdays, August 13–17 ($) (phone)

Dinos and Donuts
Saturday, August 18, 9–10 a.m. (M) (phone)

Scientist Saturday
Saturday, August 18, 1–4 p.m. (M)

Drexel InSites
Wednesday, August 22, 6–8 p.m. ($) (phone)

Dinos After Dark
Thursday, August 23, 4–8 p.m. (M)

SEPTEMBER

***Butterflies* Closed for Refresh**
Saturday, September 1–Friday, September 14

Scientist Saturday
Saturday, September 15, 1–4 p.m. (M)

Museum Open Early: Access to Science (M) (phone)
Saturday, September 23, 9 a.m.

Dinos After Dark
Friday, September 28, 4–8 p.m. (M)

OCTOBER

Trick or Treat
Saturday and Sunday, October 6–7, 10 a.m.–5 p.m. (M)

Halloween Night in the Boo-seum
Saturday, October 6, 6:30 p.m.–Sunday, October 7, 9 a.m. ($) (phone)

Members' Night
Friday, October 12, 5–9 p.m. (M) (phone)

Trick or Treat
Saturday and Sunday, October 13–14, 10 a.m.–5 p.m. (M)

Door 19: Skeletons in Our Closet
Thursday, October 18, 6–9 p.m. ($) (phone)

Museum Open Early: Access to Science (M) (phone)
Saturday, October 20, 9 a.m.

Trick or Treat
Saturday and Sunday, October 20–21, 10 a.m.–5 p.m. (M)

Scientist Saturday
Saturday, October 20, 1–4 p.m. (M)

Dinos After Dark and Parkway 100 Closing Event
Friday, October 26, 4–8 p.m. (M)

Philadelphia Shell Show
Saturday and Sunday, October 27–28, 10 a.m.–5 p.m. (M)

Trick or Treat
Saturday and Sunday, October 27–28, 10 a.m.–5 p.m. (M)

Trick or Treat, Story Times and Live Animals!
Wednesday, October 31, 10 a.m.–4:30 p.m. (M)

ON EXHIBIT

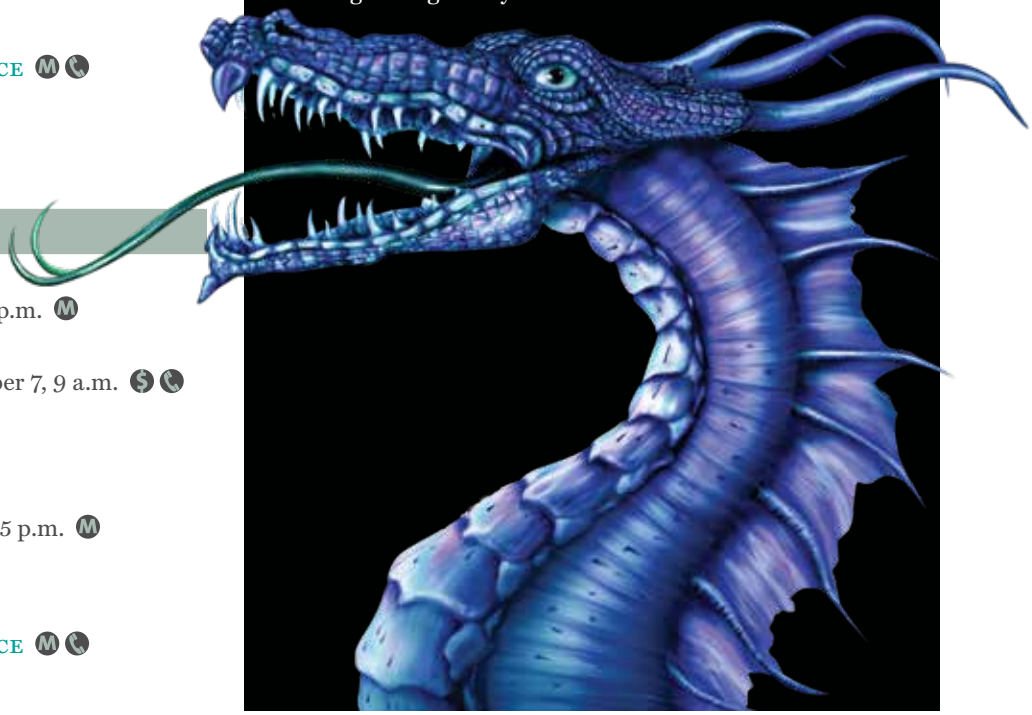
MYTHIC CREATURES

Dragons, Unicorns, & Mermaids

FEBRUARY 16–JUNE 9, 2019

Special Exhibits Gallery

For thousands of years, people have brought mythic creatures to life through art, stories and songs. Even as scientific discoveries have drawn distinctions between myth and reality, these beasts of the land, air and water have maintained an enduring hold on the human imagination. Discover how real animals such as dinosaurs, mammoths and narwhals may have stirred tales of griffins, giants and unicorns. Learn why so many legendary water spirits look like mermaids. Touch fossils, explore winged mythological creatures, build your own dragon and come face-to-face with a giant legendary sea monster.



Unless otherwise noted, all events held at the Academy are free with museum admission.

Visit ansp.org for more information or to register.

* Fee for *Xtreme Bugs*. Family Plus level members and above see this exhibit for free.

Purchase, upgrade or renew your membership today at **ansp.org/membership**.

(M) Free for members | ($) Fee | (phone) Registration required

WINS CELEBRATES 35 YEARS

Women In Natural Sciences (WINS) is the Academy of Natural Sciences' free summer and after-school mentoring and science enrichment program for high school women, particularly from economically disadvantaged families and schools in Philadelphia. Founded 35 years ago in response to the growing interest in science education programs for female high school students, WINS encourages young women to pursue science, technology, engineering and math (STEM) in college and as a career. WINS is the only program of its kind in Philadelphia.

To date, more than 800 young women have been exposed to the fascinating world of experiential science through the WINS program. The program's mentoring and support have resulted in 100 percent of students graduating high school and more than 97 percent attending college.

On Wednesday, May 9, WINS students gathered with Academy supporters and friends for a special event to commemorate 35 years of the program's success. During this special evening, Lisa Dyson, PhD, Founder and CEO of Kiverdi, received the first-ever WINS award to recognize an "outstanding female innovator in science, technology, engineering and math whose visionary contributions in science have made a positive impact on the world."

Dyson developed a bio-process that uses natural microbes to convert carbon dioxide into the proteins and oils that we use today for sustenance and to power industry. Prior to the main program, she sat down with the WINS students for a conversation.

"I was talking to Lisa Dyson in the library and decided to ask what she does after she asked so many questions about me," says Habiba Sylla, a WINS student and sophomore at George Washington Carver High School. "She mentioned that she runs an environmental biotech company called Kiverdi and that they use microbes to recycle CO2 and make products. I told her I take a biotech class that is focused on pharmaceuticals and I had no idea that biotechnology branches out to environmental science. As a result of this experience, I was exposed to another field of science that interests me!"

During a reception and silent auction, many of the students presented their work to Academy supporters and shared photos of their travels with WINS. Following introductory speeches by Drexel University President John Fry and Academy President and CEO Scott Cooper, we were pleased to have Academy Trustee and WINS alumna Latasha Harling present the inaugural WINS award to Dyson (both pictured below at far right).

More than 70 current and former WINS students attended the reception and presentation, helping pay tribute to Dyson and the 35 years of success that the WINS program has had in creating a pipeline of women in STEM fields. These young women are the present and future of science, technology, engineering and math, and the Academy could not be more proud to help them achieve their goals.

"WINS has been such an integral and influential part of my life. The program exposed me to many different fields of science and aided me in the college application/selection process. I was able to participate in an internship and have a job at the Academy all while still in high school. WINS impacted me in the best way possible and I'm forever grateful for that."

Zania Jones, WINS Student

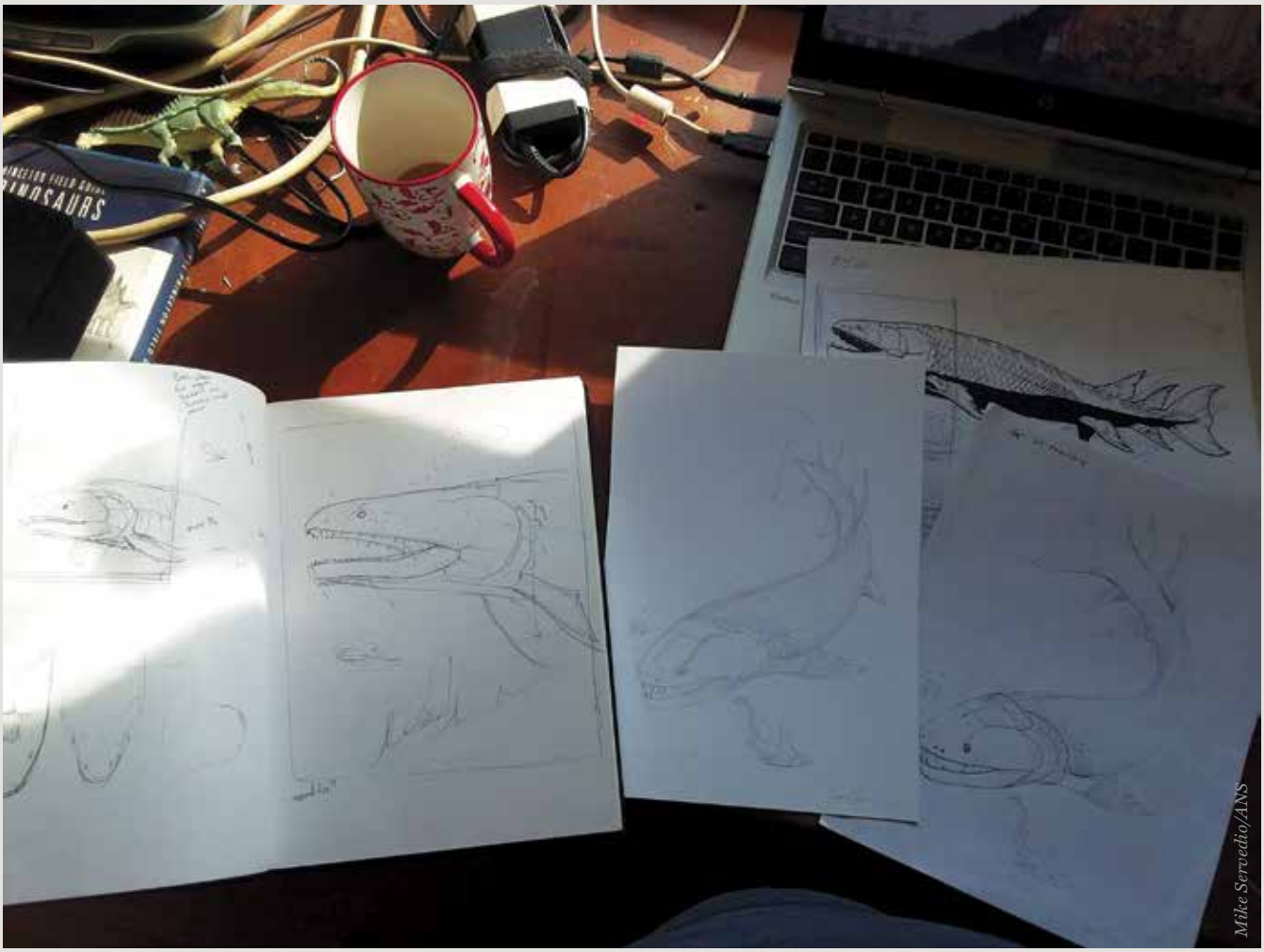
VINS

hen In Natural Sciences

Dan Leung for ANS

HYNERIA LINDAE
Illustrating a Devonian Predator

By Mary Alice Hartsock



Mike Servedio/ANS

A 10-foot-long, torpedo-shaped fish lurks through murky freshwater, its body casting a shadow on the creatures below. The opened mouth reveals dagger-like fangs, some two inches long, perfect for lacerating the flesh of fellow stream-dwellers.

Paleoillustrator Jason Poole dips the tip of his brush into a circle of white paint. Slowly and delicately, he dots the thickly painted canvas just beyond the predator's gaze. From the shadowy background, particles emerge, gleaming as if reflecting the sun. Complete with vicious grin, his predator swims down for the kill.

Poole was charged with depicting *Hyneria lindae*, the largest creature living in an ancient stream ecosystem in Devonian-age Pennsylvania, about 365 million years ago. This lobe-finned fish, belonging to a group of back-boned animals called sarcopterygians, was at least twice the size of the largest of the other animals with which it shared the waters. When he received the *Hyneria lindae* assignment, Poole wasn't concerned about the fish's size. As manager of the Academy's Fossil Prep Lab and Dinosaur Hall, he is used to depicting dinosaurs and other massive terrestrial animals. Tackling an aquatic monster—one without legs at that—was a challenge he eagerly accepted.

Paleoillustrator Jason Poole, whose work appears on the cover of this magazine, inspects a fossil of the Devonian fish *Hyneria lindae*. Real fossils and information contained within them played a significant role in Poole's depiction of the prehistoric predator.

CLOCKWISE FROM LEFT: Ted Daeschler, Jason Downs and Jason Poole inspect fossils from *Hyneria lindae*, collected from roadcuts in Clinton County, PA.

Rethinking a Prehistoric Fish

The request came from Academy Vertebrate Paleontologist and Drexel Professor Ted Daeschler and Academy Research Associate Jason Downs, an assistant professor at Delaware Valley University. The scientists have been using fossils to trace the evolution of life in the Devonian Period for decades. One of their most productive research sites is located just a three-and-a-half-hour drive northwest of Philadelphia, at a highway roadcut in Clinton County, Pennsylvania.

During the Devonian, subtropical streams flowed west through Pennsylvania toward a seaway in Ohio. These streams provided the ecological setting for plants, small invertebrates, armored fish, shark relatives and lobe-finned fish.

"The freshwater ecosystem in which *Hyneria lindae* lived was a hotbed of evolutionary change during the Late Devonian," says Daeschler. "It was during this time frame that a closely-related branch of lobe-finned fish developed the earliest limb-like appendages."

Eager to fit more pieces into the evolutionary puzzle, Daeschler and Downs studied fossils from the Academy's collection that were brought here from the Clinton County site by Academy teams during the past twenty-five years. They compared fossils of *Hyneria lindae* to closely related species to delineate the unique qualities of this predatory fish. They built upon the work of Keith S. Thompson, PhD (Academy President 1987–1995), who described and named *Hyneria lindae* in 1968 based on limited fossil material collected at the same site in the 1950s.

Through the new fossils, scientists discovered that *Hyneria lindae* had a wider, more flattened head shape and a differently positioned and smaller eye than those of other similar creatures of its time. The group of bones that covers the gills and provides structure for the face was more narrow than previously thought.

Daeschler and Downs also concluded that *Hyneria lindae* had an elaborate sensory canal system through its skull bones and scales, which enabled it to sense the movement of other organisms swimming nearby. This feature gave the fish a strong advantage for hunting and navigating deep channels within the sediment-laden streams.

Daeschler and Downs' findings were published in the *Journal of Vertebrate Paleontology* in May. The scientists wanted an illustration of *Hyneria lindae* to help others visualize what the creature may have looked like in life. They didn't have to look far to identify their artist.

Painting a Monster

An experienced paleoillustrator with a background in fossil excavation and preparation, Poole worked closely with Daeschler and Downs to depict this three-meters-long fish on an 11x14 canvas. He looked to fossils, modern-day fishes, previous illustrations of *Hyneria lindae* and his own imagination to bring life to the monster fish.

"This is a really beautifully ugly fish," Poole says. "It looks like it wants to bite something."

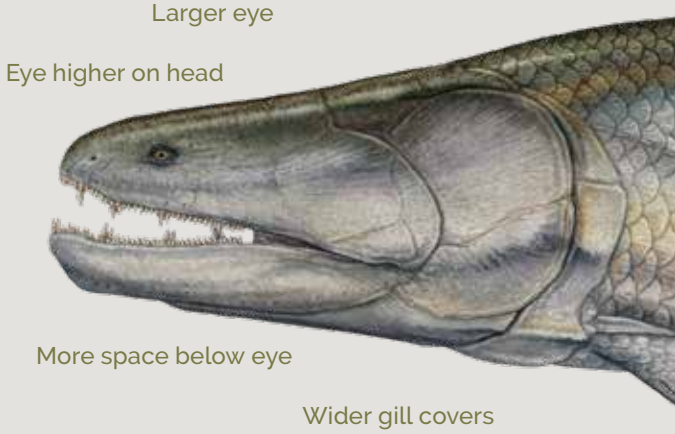
Poole's initial sketches perfectly captured the undulating movement of the fish through the water, but the scientists tweaked the predator's proportions. *Hyneria lindae's* tail was too long, the fins needed to be moved and the curvature of its body was a bit off. Its skull was not shaped quite right,

(CONTINUED ON PAGE 11)

HYNERIA LINDAE: 2009 vs. 2018

Daeschler and Downs worked with author and accomplished fish artist Flick Ford (at right) in 2009 to create this stunning illustration of *Hyneria lindae*. The scientists advised Ford on many of the details of his reconstruction based on what they knew then about this aquatic predator.

Comparing and contrasting this illustration with the new painting by Jason Poole (below left and on cover) demonstrates the wealth of information the scientists have gathered since 2009, as they recovered more and more fossils from the research site in Clinton County, Pennsylvania. A side-by-side review also highlights the range of choices available to illustrators as they reconstruct a creature that scientists have never seen in life.



HYNERIA LINDAE by JASON POOLE (2018)

POOLE'S ARTISTIC CHOICES

Animal is painted in life

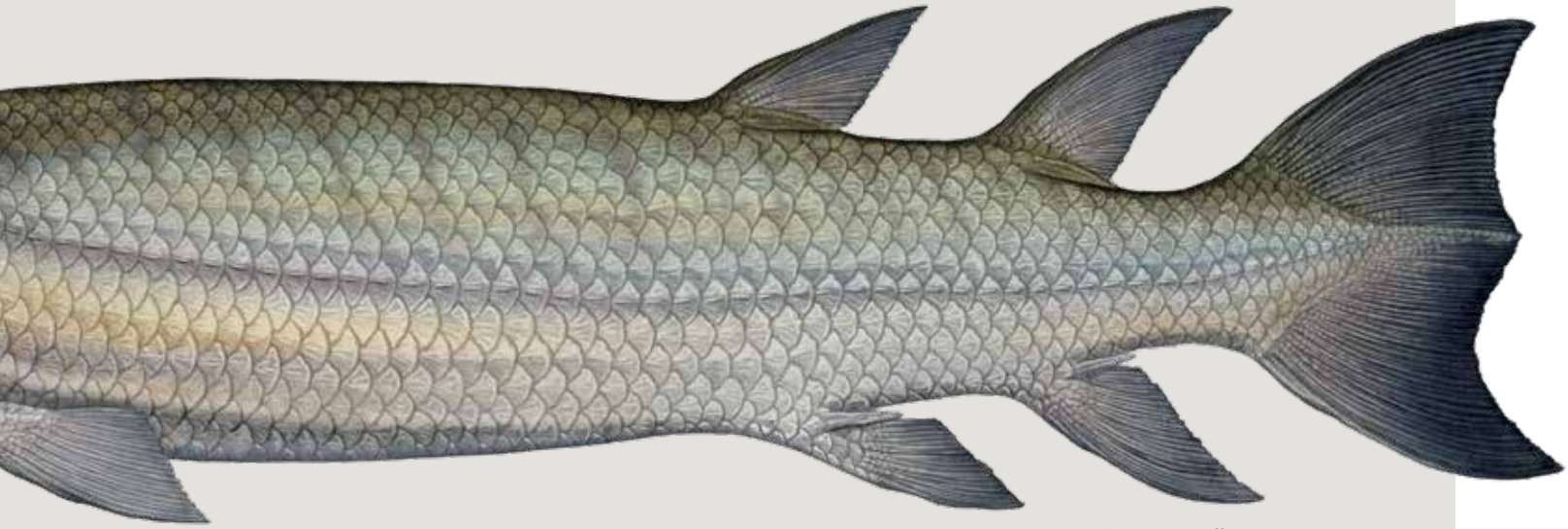
Artist shows sides of fins to illustrate motion of tail

Animal is facing the viewer

Animal appears in a murky aquatic environment

Artist has chosen coloration of fins and body

HYNERIA LINDAE by FLICK FORD (2009)



Longer tail

FORD'S ARTISTIC CHOICES

Animal is static, not in life position

Animal is painted from the side

Animal does not appear in an environment

Artist has chosen coloration of fins and body

(CONTINUED FROM PAGE 9)

which threw off the placement of the eyes and nose.

"Good paleo-art is art by committee," Poole says. "I know what looks fun and cool and will grab the eye, and they know what's correct."

Where the fossil evidence is lacking, such as the fish's coloration, there is room for artistic interpretation, Daeschler notes.

"In this case the artist can focus on bringing life to the image rather than making it a study," he says.

Poole was inspired by the pattern on the modern-day muskellunge, an aggressive freshwater predator found in North America that is the largest member of the pike family. Having seen fossils of *Hyneria lindae's* scales, he was fascinated by their lacey margins. He made the body a silvery white color, allowing the scales to show through.

Poole chose to make *Hyneria lindae's* fins reddish to show that they are reflecting red light from the sun, which is penetrating the surface of the water. He added green spots to the body, helping the fish blend in with the murky water while waiting to ambush prey. The white dots of paint in the water add sparkle as light bounces off the debris.

Is this exactly how Daeschler or Downs would have imagined *Hyneria lindae*? Probably not, but that's the beauty of paleo art. After all, nobody has ever seen *Hyneria lindae* in the flesh. With a partnership between a stellar paleoillustrator and accomplished scientists, the result is the best possible interpretation. Unless we figure out how to travel back in time, the canvas version will just have to suffice.

Plate 2- Carp

Plate 25 – Flounder

Plate 26 - Lamprey

Plate 5 – Perch

Work of a Pioneer

By Ria Capone, Reference Librarian

Author, naturalist, illustrator, traveler and collector Sarah Bowdich (1791–1856) is recognized as the first woman to undertake a detailed study of Britain's most important freshwater fishes. Her observations, images and authoritative text can be found in her book *The Fresh-Water Fishes of Great Britain*, an exceptional work of ichthyology housed in the Academy Library's rare book room.

Plates from ANS QL633 .G7 L48 1828

Plate 1 – Stockbridge Trout

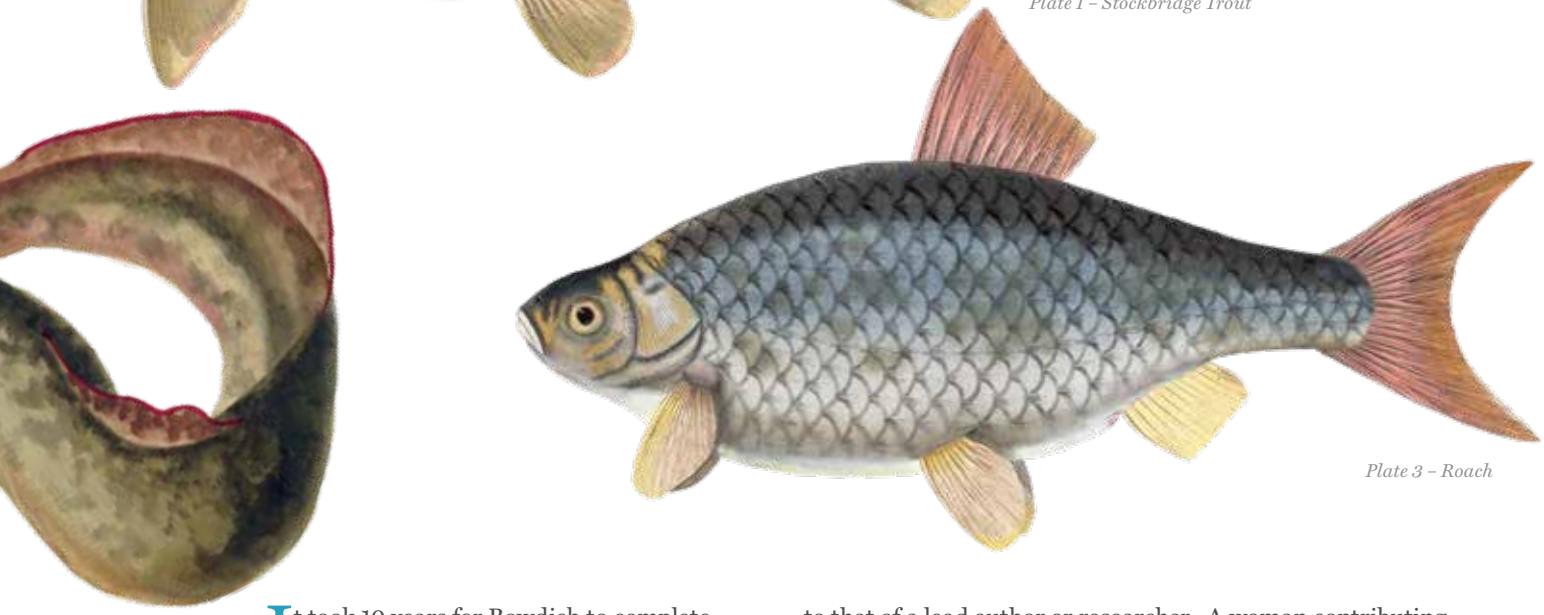


Plate 3 – Roach

It took 10 years for Bowdich to complete *The Fresh-Water Fishes of Great Britain* (1828–1838). Over this time, she carefully drew and painted each fish fresh from the water before its colors faded. This technique was more accurate than painting from the dull-looking dried or preserved specimens that existed in collectors' cabinets.

Bowdich's application of paint mixed with ground fish scales gave each illustration a lifelike appearance. This technique rendered the natural sheen of the fish (a sheen that is still visible on the page today). Bowdich did not use an engraver to produce her work, as was customary during this time. She drew and hand-colored every illustration in the 50 copies that were published, totaling approximately 3,000 plates.

Along with each fish, Bowdich provided the classification/family and a full description of its shape and colors, followed by information on specific behaviors, instincts and favored environments. The work was distributed in 12 installments, and the illustrations were presented in a visually appealing manner rather than being arranged by scientific classification. When the book was completed, pages could be easily disassembled and arranged according to the reference given in her text. Our copy has been arranged to reflect the proper order of species.

Upon completion, *The Fresh-Water Fishes of Great Britain* was largely ignored by others in the field due to a common belief that women's contributions to a scientific work should be secondary to that of a lead author or researcher. A woman contributing illustrations to a scientific work was appropriate, but it was deemed improper for a woman to sole-author and publish a reputable scientific work.

Given these limitations, Bowdich was fortunate to be able to travel and collect specimens with her husband, naturalist Thomas Edward Bowdich (1791–1824). As a couple they traveled to West Africa and subsequently landed in France to prepare for a return trip to Gambia. In preparation for this expedition, they were acquainted with famed French naturalist Georges Cuvier (1769–1832), who allowed them use of his collections and libraries.

Within the year of arrival to Gambia, Bowdich's husband fell ill and died. Then widowed with three children to care for, Bowdich returned to Cuvier, who served as her collaborator and mentor. It was through this partnership that she was able to continue to gain access to collections and resources that women would not have otherwise been permitted to access.

Bowdich went on to publish numerous books on natural history. Among such publications is a work on taxidermy along with a book started by her late husband on their travels to Africa. Also, with the passing of her colleague Cuvier in 1832, she worked around the clock to quickly publish his biography. Through these works, Bowdich broke through obstacles for women in science, paving the way for exceptional scientific research and illustration by women in the years ahead.

Scott Cooper:
Academy President and CEO

By Alissa Falcone

Since taking the helm of the Academy in December, the Academy's new president and CEO, Scott Cooper, PhD, has been adjusting to a new museum, city and even country. He was born in England and came to the Academy from the Royal British Columbia Museum in Canada. Before that he worked in Qatar as the director of museums at the Qatar Foundation.

Cooper sat down with Drexel University's Alissa Falcone to discuss how his first three months on the job have gone and what he hopes the next years will bring for the Academy.

Q: To start off, can you tell me a little about your background?

A: I was raised in the industrial heartland of northern England, and from a young age I was desperate to escape and see the world. My way out was a high school expedition to the Udzungwa Mountains of eastern Africa. We gathered data for a speculative submission to the Tanzanian government to protect the forest as a national park and, against all odds, it was successful. I discovered at a young age not only a love for environmental conservation but a sense that individuals really can make a difference. It was an incredible experience.

My school did not offer environmental conservation courses, so I studied my second love: architectural conservation. I was interested in restoring historic buildings and pursued a master's in architectural conservation and earned a PhD in architecture. I began restoring historic buildings and turning some of them into public museums, based on the funding source. I've also helped build museums from the ground up, then became enamored with operating a museum.

Q: What made you want to come to the Academy? How did you find out about the Academy?

A: When the position came up, I thought this looked like the sort of professional challenge and remarkable opportunity that I'd been looking for. It's really a return to my previous historic restoration work, helping create amazing museums that society wants and needs. It also brings me back to my initial passion for environmental conservation. It's full circle, really.

Q: How have your first couple of months been?

A: Busy! Frantic! But I wouldn't change it for the world. It's been incredibly exhilarating to be able to explore and understand a new country, a new city and two new amazing institutions: Drexel and the Academy of Natural Sciences. It's been a joy so far.

Q: What are your goals for the Academy?

A: I want to implement a strategic plan that is generally inclusive. What I want is a process that unlocks the brain trust that we have in Drexel, in our board and in our staff that demonstrates the shared understanding of the problems we're faced with and the shared ownership of solutions we seek to implement.

Museums in the U.S. have a challenge in today's world with competition for people's time and money. Museums must demonstrate that they are not merely worthwhile and worth the price of admission. Museums, including the Academy, need to demonstrate what makes them so distinctive and relevant. For the Academy that comes from its collections, as distilled through the knowledge and experience of its scientific staff and education.

And we now have Drexel—this extraordinary parent and partner that gives us untold fresh opportunity to explore. What does that represent? How does that dovetail with Drexel's vision to become the most civically engaged university in the United States?

In understanding what the Academy does that is unique, we also need to understand what society wants and needs and what it is prepared to pay for. These are the ways we need to be thinking about ourselves and how we evolve. And in so doing we need to be clear about our own vision for the institution.

Personally, what I'd like to see is a museum that has genuine, broad, societal value that is helping in real ways to change the world for the better. And the brilliant thing about our museum is that we are already working toward that. What we've done in the last few years that has been very transformative for the institution, and quite pioneering for a natural history museum. We've decided to focus on making our voices heard and our opinion known about four general fields of study: water, climate change, evolution and biodiversity and extinction. I'd like to see us build on that and become an institution with agency; an institution looking to effect positive environmental change in the world; an institution that fundamentally is a crucible for conversation; and a place that develops policy and knowledge.

And we can do that! I happen to believe that Philadelphia needs it. Philadelphia was conceived as a place that looked to include a common natural world, to create a better way of life for its inhabitants. How wonderful for a museum such as ours to help deliver a vision from which Philadelphia is the most environmentally engaged city in the United States. What role might we play in that?

Q: So I know you're coming up with this strategic plan, but can you talk about the Academy as an educational resource?

A: I know we're going to be even more of an educational voice. I know we're going to be an institution that advocates. I know that we're an institution that's going to make our collections even more accessible.

We do wonderful work at the Academy, and another opportunity is online education. We're going to look into supporting online education in schools, not just across Philadelphia and Pennsylvania, but around the world with our collections.

We can build on and share more widely our remarkable Women In Natural Sciences program, and also our formal learning programs that we deliver in partnership with schools. It is important to reach children at a young age so that science can be woven effortlessly into their learning and weigh into their sense of self. There also are wonderful opportunities to explore for retired people and seniors, including an expanded series of author talks or lectures on a particular subject.

I'm particularly interested in the citizen science movement. That's something the Academy has done in the past and I'd like to see it embedded and woven more systematically through what we do. It's a remarkable opportunity not just for citizen scientists but for the institution itself. You've got a world of people out there who are asking relevant research questions and are able and willing to contribute to the research itself. We want to engage them.

Q: What do you think the Academy's role is as a cultural institution in Philadelphia?

A: It's a place where everyone seems to have invested a little bit of themselves during the course of their life, either as children or as parents. Sometimes both. Everybody has a memory of the Academy. That has to be respected and understood. We must tread carefully on people's dreams, to paraphrase Yeats. But we do need to move forward. That will flow from the strategic plan as we agree among ourselves what sort of museum society needs.

But in general, what I want to see is an institution that is—and this is vitally important—accessible for as diverse a variety of Philadelphians as possible. A place with a really powerful proposition that has people coming to visit not just once, but again and again. We are a place where people can refine their sense of self and the world they occupy. That's something that you should feel has relevance toward you and can be accessible to you whenever you want it. How do we do that?

We want to make the Academy more accessible, but for that we have to make it more relevant to wider audiences. As we move toward that goal, we need to ensure it's a place that holds on to our mission while becoming more community focused and more inclusive. Over the last decade, some libraries have reimagined themselves this way and become quite successful.

Q: Can you talk about the Academy's relationship with Drexel? Where do you see it going?

A: I see it as essential to the Academy's revitalized sense of self. It's a relationship that still has much low-hanging fruit to bear and I'd like to start picking up as much as possible with my colleagues and deans to explore areas of genuine and sustainable mutual benefit. It can be a place where we can sell product designs, a place where we can showcase digital or marketing work made by students and a home for museum co-ops and science co-ops. We're already doing some of this. We can add value to many of our schools and colleges throughout Drexel.

Q: Okay, last question—and this might be easy, or maybe not. What is your favorite exhibit or collection at the Academy?

A: That's a good question! You can't really have a favorite child. I'm only now getting any sort of intimate understanding of the collections. I think it's a slow process to understand them. Every time I go into a collection I'm blown away by the passion and expertise of those who manage and curate it. Most recently, I spent time in our Invertebrate Paleontology Collection and it was truly remarkable to learn what we have. It's always a joy to walk through the malacology section. And then there is the public museum itself, with the mighty *T. rex* and those beautiful live butterflies and live animals that greet our visitors every day. But I'm afraid I have to dodge that question, really. I don't have any favorites. I'm learning them all and the more I learn about each one, the more I love them.

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On behalf of the Academy's Board of Trustees, we wish to recognize and thank those who have contributed new gifts and pledges to the Academy between **January 1** and **April 15, 2018**. Your generosity helps to fund our many programs of research and education, and we are tremendously grateful for your support.

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Current WINS students and alumnae celebrated 35 years of the Women In Natural Sciences program in May, along with many Academy supporters. More on pages 6–7.

*Deceased

DINO-MITE SUMMER

During Dino-mite Summer, meet living dinosaurs (you call them birds), get messy making a marvelous mixture or take a closer look at incredible live bugs. You can share a belly laugh with Marty the Moose and meet a live animal during Marty's weekly story times. Catch daily naturalist presentations featuring live butterflies, birds, fossil preparation and animal training and feedings. Members can register online for Dinos and Donuts and join us for some Kids Club fun before the Academy opens on July 14 and August 18. This special activity includes fun dino-themed activities, snacks and chances to hang out with Eddie, the Academy's *T. rex* mascot. Learn more at ansp.org.

Jeff Fusco for ANS

BIRTHDAYS

Looking for an alternative to the bounce house? Birthday parties at the Academy are unique and still off-the-walls fun. We make them even more enjoyable for you by handling all the details! Plus, your membership helps you save big on Academy parties. A theme birthday party at the Academy includes a private party room, a birthday party host to guide you on a tour of our hands-on exhibits and experiences the party guests will talk about all year long. We offer theme parties for kids who love dinosaurs, butterflies, bugs and animals. Basic parties and add-on encounters with fossils, live animals or bugs are also available. Visit ansp.org for more details.

Mike Servedio/ANS

BUG FEST

Join us on August 11 and 12 for our annual celebration of insects! This year is buggier than ever with our special exhibit, *Xtreme Bugs*, where you can come face-to-feet with nearly 20 massive, colorful, moving bugs. Enjoy new activities and shows plus revisit some old favorites—back by popular demand. See hundreds of live bugs, talk with real scientists, learn about insects from all over the world and see specimens from the Academy's behind-the-scenes collections. Eat bugs, get your face painted and relax as you enjoy a buggy show. Free for members or with general museum admission.

Jeff Fusco for ANS

NIGHT IN THE BOO-SEUM

This October 6, you can celebrate the start of the spooky season by experiencing the Academy's towering dinosaurs—including *T. rex*—after dark! Take a flashlight tour of our *Xtreme Bugs* exhibit if you dare—you'll come face-to-feet with giant animatronic bugs. Meet some creepy crawlies, and go on a hair-raising scavenger hunt. Then join us in the "lab" for some bone-chilling experiments. Explore the dark (and not-so-dark) corners of the museum, including our dino bone dig and butterfly exhibit. Watch a live animal show, hang out with your fellow brave explorers and enjoy delicious snacks. Then pick a sleeping spot next to lions, tigers or dioramas. Night in the BOO-seum is perfect for scout groups, birthday parties, kids' clubs, sports team retreats, families and others. We can't wait to spook you there! Visit ansp.org for more details.

Mike Servedio/ANS

DOOR 19: SKELETONS IN OUR CLOSETS

Have you heard about Door 19, our themed soiree featuring open bar, quirky science, behind-the-scenes tours and more? Door 19 is an oddly charming evening that will forever change how you think about science. Curated for the curious, Door 19 offers you the chance to go into specimen collections off-limits to visitors, alongside experts who will bring our coolest specimens out to play. Our rogue scientists will share their most incredible knowledge—and on October 18, they'll be sharing the literal and not-so-literal skeletons in our closets. We're teaming up with Eight Oaks Craft Distillers and 12th St Catering for this bone-chilling evening where you'll be reminded that no, in fact, you haven't seen it all—far from it. Members can purchase discounted tickets! Get in the loop, see photos and avoid FOMO at door19philly.com.

THE ACADEMY OF NATURAL SCIENCES

KIDS CLUB

WELCOME to the *Academy Frontiers* page for kids, one of the many great ways you can participate in the Academy's Kids Club!

DOWN
1. the material used by an artist
2. a repeated design
3. a person who is studying or has expert knowledge in the sciences

ACROSS
4. an optical instrument used for viewing very small objects
5. a person who produces paintings or drawings as a profession or hobby
6. a rough drawing of something

WORD BANK: Medium; Microscope; Pattern; Scientist; Sketch; Artist

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