

2013/2014 Annual Report

*epicenter  
of discovery*



THE ACADEMY  
OF NATURAL SCIENCES  
*of* DREXEL UNIVERSITY



# epicenter \'e-pi-,sen-tər\

noun

**1** : the part of the earth's surface directly above the focus of an earthquake

**2** : center **2a, b, c**

**a** : a point, area, person, or thing that is most important or pivotal in relation to an indicated activity, interest, or condition

**b** : a source from which something originates

**c** : a group of neurons having a common function



# Dear Friends,



**THE ACADEMY OF NATURAL SCIENCES** of Drexel University approached its 202nd year with an ambitious action plan for our present and future. Guided by our Sustainable Strategic Plan (2012–2017), we created innovative exhibits and conducted relevant research—all to position the Academy to become the public stage for natural and environmental science in the Philadelphia region. We are increasingly called upon to contribute to sustainability and conservation efforts, and we are pleased to fill this important role.

In fiscal year 2014, the Academy was honored to be granted three years' funding from the William

Leadership—to provide scientific oversight for the entire project, overseeing more than 40 grantees working at over 100 sites to restore degraded habitats, protect undamaged areas, and monitor watershed health. The initiative is truly remarkable not only because of the massive area that it covers, but also because of its impact—protecting and restoring sources of drinking water for the 15 million people who rely on the Delaware River Basin's resources. With local organizations adopting Academy protocols and Academy scientists providing guidance on methods, all the data gathered can be used together to measure the project's impact on water quality.

The Academy and Drexel University's Biodiversity, Earth & Environmental Science (BEES) program has grown tremendously in the past year, contributing research assistants and co-ops to many Academy projects, including the Delaware River Watershed Initiative. Beginning in 2012 with a cohort of just nine environmental science majors, BEES is currently approaching 200 students in five majors and minors at the undergraduate and graduate levels (more on page 4). Several BEES classes have taken place in the Academy's labs, offering students access to our collections, identification guides, microscopes, and other learning tools. For these courses, our scientists have developed teaching collections of specimens drawn from the Academy's diverse holdings and have demonstrated the techniques and skills they use to identify each species. Our hope is that the

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Our ongoing analysis of our changing world has made the Academy a top resource in the region for research, teaching, and learning about our environment.

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Penn Foundation for the Delaware River Watershed Initiative (more on pages 6 and 14), a momentous program working to assess, maintain, and improve the quality of aquatic ecosystems within the Delaware River Basin. The Academy has been working with its partners—The William Penn Foundation, the Open Space Institute, the National Fish and Wildlife Foundation, and the Institute for Conservation



Academy VIREO Director Doug Wechsler photographed this black-sided flowerpecker on Mount Kinabalu in Borneo.

First-year BEES  
Department  
students canoed  
in the New Jersey  
Pine Barrens  
during their fall  
field experience



students who participate in these courses will grow to become the next generation of environmental scientists and advocates.

As of this writing, we are setting the stage for future generations by developing a blueprint for a hands-on, next-generation natural science exhibit space in the Library Reading Room. Our vision is to immerse visitors of all ages in our changing world through a signature, multi-media exhibit space while maintaining the historic character of this striking room. Central to the renovations is a state-of-the-art library research center where scientists and students can access the Academy's collection in a safe and secure space. We look forward to sharing more information about this exciting initiative.

This annual report guides you through an epicenter of discovery, from our museum on the Parkway to the many classrooms and field stations where the Academy's work is unfolding. At our museum in fiscal year 2014, we welcomed more than 208,000 visitors to explore our dioramas, dinosaurs, butterflies, live animals, and the renovated children's nature discovery center, *Outside In*. In Philadelphia, we implemented new programs for children on the autism spectrum and helped to train future museum leaders at Drexel University. At our Barnegat Bay Field Station, we guided high school students in an Environmental Science Leadership Academy. We traveled to Brazil to collect specimens of threatened fishes in a river affected by an immense new hydroelectric dam. We even

celebrated an international scientific breakthrough with the announcement of new fossil material of the 375-million-year-old species *Tiktaalik roseae*, discovered on the tundra of Nunavut, Canada.

As we plot our course on the road ahead, we thank our members, contributors, volunteers, staff, and visitors—many of whom have joined the Academy's community from various parts of the world—for making our institution an epicenter for research and discovery. With your help, we will place even more pins in our world map as we continue to explore and share our world through our third century.

All the best,

  
George W. Gephart, Jr.  
President and CEO

  
Cynthia P. Heckscher  
Chair, Board of Trustees



# At our University



THE ACADEMY'S affiliation with Drexel University has created positive changes for both institutions, including the creation of the Biodiversity, Earth & Environmental Science (BEES) Department at Drexel—now in its third year. BEES draws on the traditional strengths of both institutions in the fields of biodiversity and evolution, environmental science, environmental policy, earth sciences, and aquatic ecology. The BEES Department is focused on experiential learning, in which Academy and Drexel faculty and staff conduct outdoor classes where students can hike through dense forests, wade among marsh plants, and collect fish from fast-flowing streams.

At the opening of fall quarter 2014, 182 students were enrolled in BEES classes: 133 in undergraduate programs, 21 in the master's program, and 28 in the PhD program. The department added majors in geoscience, environmental studies, and sustainability in addition to its already popular major in environmental science and minors in ecology and environmental studies. The reputation of the BEES program continues to grow, as two scholars selected through the Intel International Science and Engineering Fair, the world's oldest and

most prestigious pre-college science competition, enrolled in the BEES program. The Academy built a new teaching lab and classroom space for Drexel students, allowing faculty and students to examine specimens from the Academy's world-renowned collections during their classes.

The Academy and Drexel University are working together to shape a new generation of teachers, leaders, and environmental advocates.

More than 30 high school students attended the Drexel Environmental Science Leadership Academy, a weeklong summer program in which rising juniors and seniors get a taste of the BEES program and environmental science careers up close and hands-on. Academy scientists and Drexel University professors guided the students from seaside to salt marsh to maritime forest, integrating environmental science training and field experience with leadership training. Students who have completed the summer program and choose to enroll at Drexel will receive a \$2,000 renewable scholarship.

Drexel Environmental Science Leadership Academy students identified marsh plants and collected data at the Barnegat Bay Field Station



During fiscal year 2014, the Academy and Drexel University worked together to bring about several major developments in programs throughout the institution.

### In West Philadelphia

The Academy assisted Drexel University in its efforts to improve educational opportunities for children living in the University's West Philadelphia neighborhood. The neighborhood was designated by the White House as a Promise Zone, where the Administration will partner with local leaders to create jobs, increase economic activity, improve educational opportunities, and reduce violent crime. Academy educators are providing training for West Philadelphia schoolteachers and are enabling elementary school students to experience real science through interactions with live animals and specimens during free outreach lessons. Our educators are also serving as advisors as Drexel University works to establish a new K-8 STEM-focused school complex in the Powelton and West Powelton neighborhoods of West Philadelphia.



### At Westphal College of Media Arts & Design

Students from the new Master of Science in Museum Leadership program at Drexel University's Westphal College of Media Arts & Design volunteered in the museum and attended "Foundations of Informal Education in Museum Settings," taught by Academy Vice President of Education Jacquie Genovesi, PhD. The multi-disciplinary curriculum prepares students to successfully lead museums in our changing world and engage their broader communities.



## DREXEL UNIVERSITY

### Making Science Accessible

The Academy implemented several programs designed specifically for children with autism spectrum disorders in a new initiative aimed at making a museum visit as stress-free, fun, and educational as possible. Sponsored by the Institute for Museum and Library Services, this work was part of Changing Attitudes Towards Autism Access (CATAAlysis), an initiative of the Academy, the Center for Aquatic Science at Adventure Aquarium, Drexel's Schools of Education and Public Health, the A.J. Drexel Autism Institute, and Autism Inclusion Resources (AIR).

In fiscal year 2014, the Academy and the A.J. Drexel Autism Institute surveyed attendees of two free Access to Science events, which welcomed families with younger children on the spectrum or children facing more severe challenges to the museum outside regular hours. The families reported their appreciation for the opportunity to explore the museum with fewer crowds. They also noted that

their children were enjoying and engaging with the exhibits during these special events.

Drexel University also assisted the Academy in the development and evaluation of an application for the iPhone that will provide guidance for future museum visits. The application provides access to "museum stories," a pre-visit tool to prepare families, teachers, and children for what they might experience in the museum, where loud noises, unfamiliar sights, bright and dark rooms, and unpredictable live animals may cause discomfort or stress.

To help visitors overcome these challenges, the Academy worked with the A.J. Drexel Autism Institute to secure funding to create a training video intended to be shared with museum professionals across the region. The work follows on a 2013 training of education and visitor services staff to work successfully with visitors with autism spectrum disorders.



# In the Field

Scientists take measurements in the Tenmile River near Tusten, New York (above)

ACADEMY SCIENTISTS travel throughout the world to document biodiversity, understand evolution, and assess the ways our environment has changed over time. They return from the field to share their discoveries with our visitors and members through festivals, behind-the-scenes tours, and popular publications. In fiscal year 2014, our scientists produced more than 20 peer-reviewed publications for academic audiences.

Many Academy scientists are professors in Drexel University's Department of Biodiversity, Earth & Environmental Science (BEES). In addition to fieldwork and publications, these researchers teach courses at Drexel University, host students in the museum's classrooms and laboratories, and take students into the field for real-world applications of classroom learning.

Tiger swallowtail butterfly photographed on the Musconetcong River near Hackettstown, New Jersey



## In the Delaware River Watershed

The Academy was granted three years of funding from the William Penn Foundation for its work on the Delaware River Watershed Initiative, a massive multi-year initiative to protect and restore critical sources of drinking water in the Delaware River Basin. The Academy is working alongside The William Penn

Academy researchers travel the world to preserve our environment, explore the diversity of life, assess impacts of sea level rise, and augment the Academy's collections of 18 million scientific specimens.

Foundation, the Open Space Institute, the National Fish and Wildlife Foundation, and the Institute for Conservation Leadership to provide scientific oversight for the entire project, with more than 40 grantees working to restore degraded habitats, protect undamaged areas, and monitor watershed health.

The Academy's work includes monitoring of ecological conditions at over 100 sites across the River Basin. In addition, local organizations are adopting Academy protocols and undertaking their own monitoring programs at individual sites, often for the first time. Academy scientists are providing guidance to ensure consistency of methods so that all the data can be used to understand whether the initiative's stream restoration and protection activities are improving water quality.



## In Brazil's Lower Xingu River

In September and October 2013 and March 2014, ichthyologist Mark Sabaj Pérez led two successful four-week expeditions to inventory the lower reaches of the Xingu River, the third largest tributary to the Amazon and home to at least 26 species that live nowhere else on Earth. International teams of more than 20 scientists and students worked with local fishermen to collect over 17,000 specimens of rare and threatened fishes from 114 sites above, below, and within the stretch of the Xingu River that will be impacted by construction of the Belo Monte dam, the third-largest hydroelectric dam on the planet. These trips were the first two of at least three expeditions scheduled for the Xingu Project, funded by the National Science Foundation.

## Between Trenton and Philadelphia

Academy and Drexel researchers Roger Thomas and Danielle Kreeger, working with researchers from the Partnership for the Delaware Estuary, Philadelphia Water Department, and the United States Environmental Protection Agency Region 3, have discovered large populations of freshwater mussels in the Delaware River between Trenton, New Jersey, and Philadelphia, Pennsylvania. Researchers previously believed that several of these species no longer existed in this section of the Delaware River. Future research may reveal numbers of mussels high enough to be transplanted back into small streams in southeastern Pennsylvania.



## NUNAVUT, CANADA

### In the Arctic

*The New York Times*, *The Washington Post*, *The Boston Globe*, BBC News, and countless other newspapers and networks just couldn't say enough about fish hips. Academy paleontologist and Drexel Professor Ted Daeschler and co-author Neil Shubin (The University of Chicago) had 10 years of research behind this coverage, which focused on new fossil material of the internationally famous 375-million-year-old species *Tiktaalik roseae*.

A decade ago, Daeschler, Shubin, and the late Farish A. Jenkins, Jr., of Harvard University discovered *Tiktaalik*, a textbook example of the evolutionary transition between finned and limbed animals. *Tiktaalik roseae* was a lobe-finned fish with many features only seen in tetrapods (limbed animals). The new findings, published in the *Proceedings of the National Academy of Sciences* in January 2014, reveal a well-preserved pelvis and partial pelvic fin that demonstrate that the evolution of robust pelvic appendages happened before the origin of limbs—not after, as scientists originally thought. Daeschler



The team working in the *Tiktaalik* quarry in 2004

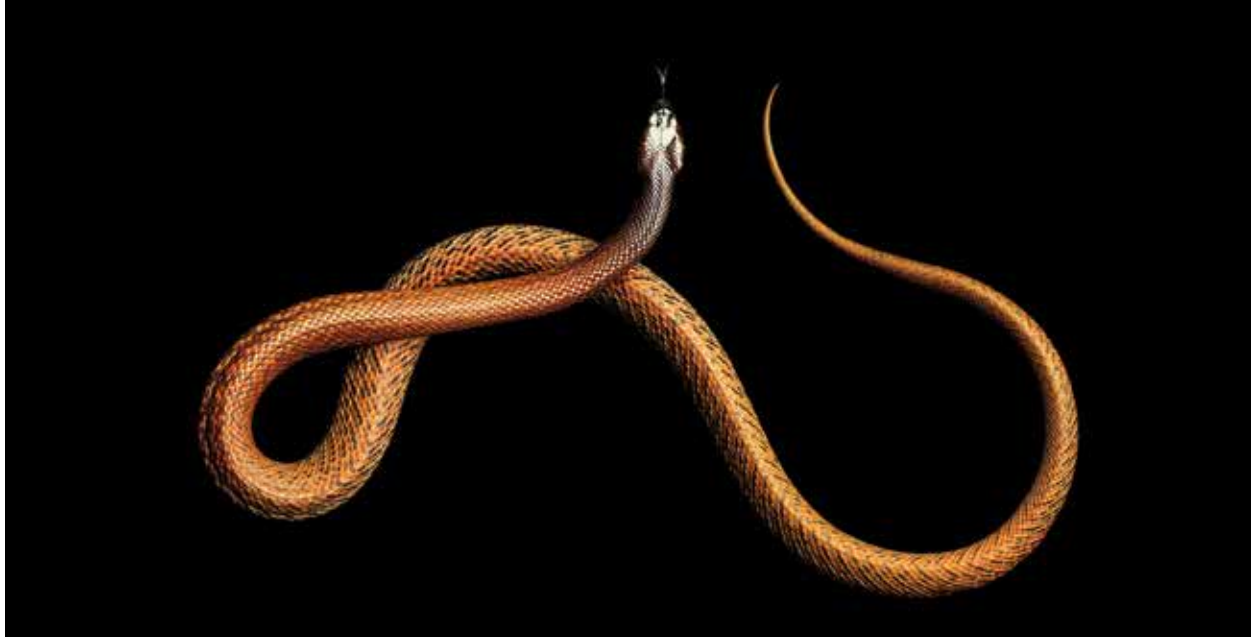
explains that these rear appendages enabled a shift from “front-wheel drive” to “four-wheel drive” movement in fish, rather than in limbed animals.

In the past two years, Daeschler and the team closely examined material from the back end of *Tiktaalik*, which they had gathered during multiple expeditions to Canada's Nunavut Territory. *Tiktaalik*'s “fish hips” quickly drew attention as the researchers noticed that, although the basic architecture of the pelvis was primitive, there were also distinct similarities to tetrapods. Like tetrapods, *Tiktaalik* had similarly sized front and rear appendages, plus a ball-and-socket hip joint that allowed the pelvic fin a greater range of motion, including beneath the body.

According to Daeschler, *Tiktaalik* used the fin similarly to the way tetrapods used their limbs, but mostly in aquatic settings. Daeschler and Shubin's significant discovery fills yet another gap in our knowledge of evolution from creatures of water to those of land.

Underside of *Tiktaalik roseae* type specimen with pelvis in place (1) and enlarged (2)





# In the Museum

Inland taipan, 2011, by Mark Laita, appeared in the Art of Science exhibit *Serpentine* (above)

THE ACADEMY'S PUBLIC PROGRAMS integrate live animals, real specimens, and experienced educators who bring natural science to life for learners of all ages. In fiscal year 2014, the Academy engaged nationally recognized science and education consulting firm David Heil & Associates, Inc. to conduct a comprehensive evaluation of the Academy's educational programs and visitor experiences. The consultants made recommendations to strengthen and advance the Academy's public engagement and educational enterprise. Drawing from these recommendations, the Academy launched a number of exciting new initiatives aimed at taking our visitor experience to the next level.

The Academy's educational offerings make science fun through hands-on, real-life interaction with the natural world.

## In the News

We began planning for a Science Now station that will use the Academy's research and collections to help answer visitors' questions about topics that are important to them. Educators will share information about science topics in the news and how visitors can make a difference for our planet.

## On the Stage

We boosted the presence of live animals in museum programming by adding more daily shows, hosting a popular story time, and acquiring a porcupine, a blue-tongued skink, and two hedgehogs. Seeing our animal ambassadors up close connects our visitors with the natural world. We also installed a high-definition projector and began showing movies and videos coordinated with our special exhibits, allowing our visitors to continue thinking critically about the exhibits' subject matters.

## Under the Microscope

We developed new carts of curiosity, which offer up close encounters with Academy staff, live animal ambassadors, research, and technology, thanks to a generous grant from the Dolfinger-McMahon Foundation. Equipped with microscopes, cameras, and computers, the carts allow our educators to make science larger than life. Visitors gravitate toward magnified images of animals and specimens on the sizable overhead screens.



## Behind the Scenes

We established the cross-departmental Experience Planning Committee (EPiC), whose mission is to improve the public experience through the development of cohesive programmatic and exhibit offerings, the gathering and analysis of museum and visitor data, and the facilitation of cross-departmental collaborations. The committee is developing an intentional experience for visitors, ensuring that they feel the thrill of discovery while exploring the museum.



Barton the porcupine met museum visitors at a lively story time in December 2014

## In the Classroom

The Academy piloted an eight-week program for teens with mild autism spectrum disorder, built around the topic of paleontology. The program is a tool for building social skills and friendships as well as science knowledge in the teens, many of whom are particularly talented and interested in science, technology, engineering, and mathematics (STEM). The program intentionally provides a pathway for increased engagement with other students and the museum, where social expectations can challenge individuals with autism spectrum disorders.

The first eight-week program took place in fall 2013 with nine students from the Y.A.L.E. school. Sponsored by the Institute for Museum and Library Services, this work was part of Changing Attitudes Towards Autism Access (CATAAlysis), an initiative of the Academy, the Center for Aquatic Science at Adventure Aquarium, Drexel's Schools of Education and Public Health, the A.J. Drexel Autism Institute, and Autism Inclusion Resources (AIR).



## PHILADELPHIA, PENNSYLVANIA

### In Philadelphia's Schools

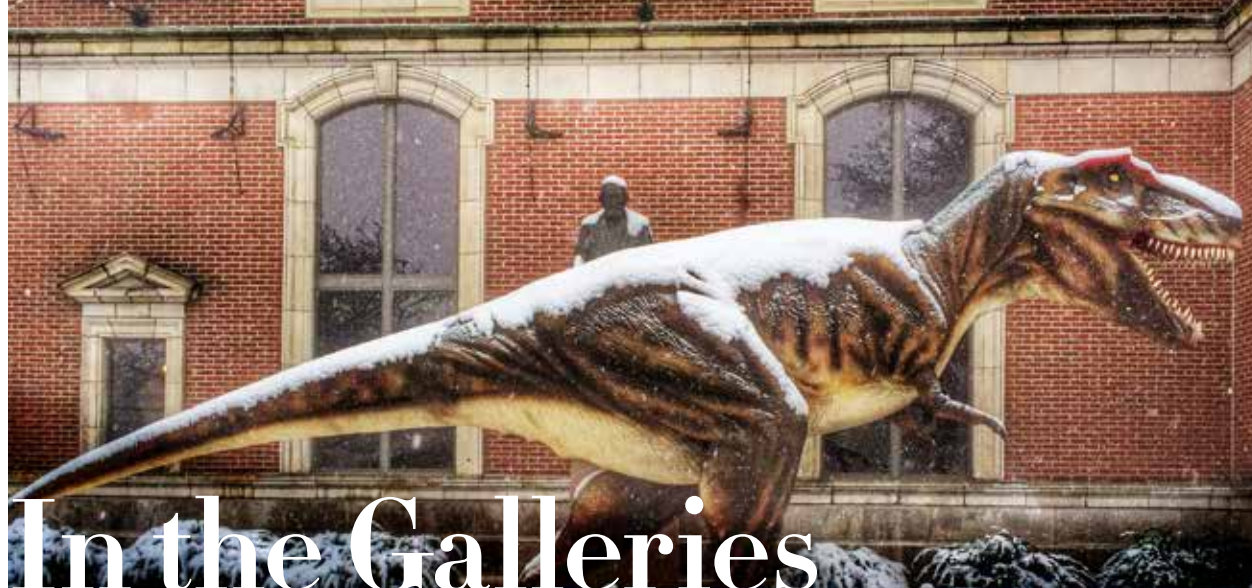
Through Supporting and Enriching Natural Sciences Education in Schools (SENSES) and the Women In Natural Sciences (WINS) program, the Academy brings science education to students from our community who may not otherwise have opportunities to excel in this field. Last year the Academy's SENSES program provided free museum visits and gallery experiences or outreaches to more than 24,000 children in the school districts of Philadelphia, Cheltenham, Hatboro-Horsham, Interboro, Norristown, Penn-Delco, and Souderton, thanks to funds from Pennsylvania's Educational Improvement Tax Credit program (EITC). EITC enables eligible companies to donate funds to support qualified innovative educational programs for students and receive a tax credit in return for the donation.



100 percent of WINS students graduate high school and over 96 percent attend college

EITC funds also support WINS, a 32-year-old program that provides science education and career exploration for young women in Philadelphia high schools. In spring 2014, WINS was selected in a highly competitive grant process to take part in a program that will pair our students with Mongolian teens to examine each other's cultural heritages and discuss how the students relate to climate change in their neighborhoods, cities, and communities. Administered by the American Alliance of Museums, this Museums Connect project is made possible by the U.S. Department of State's Bureau of Educational and Cultural Affairs.

For more information on how your company can support the Academy through the EITC program, please contact [corporatepartner@ansp.org](mailto:corporatepartner@ansp.org), call 215-405-1542, or visit [ansp.org/eitc](http://ansp.org/eitc).



# In the Galleries

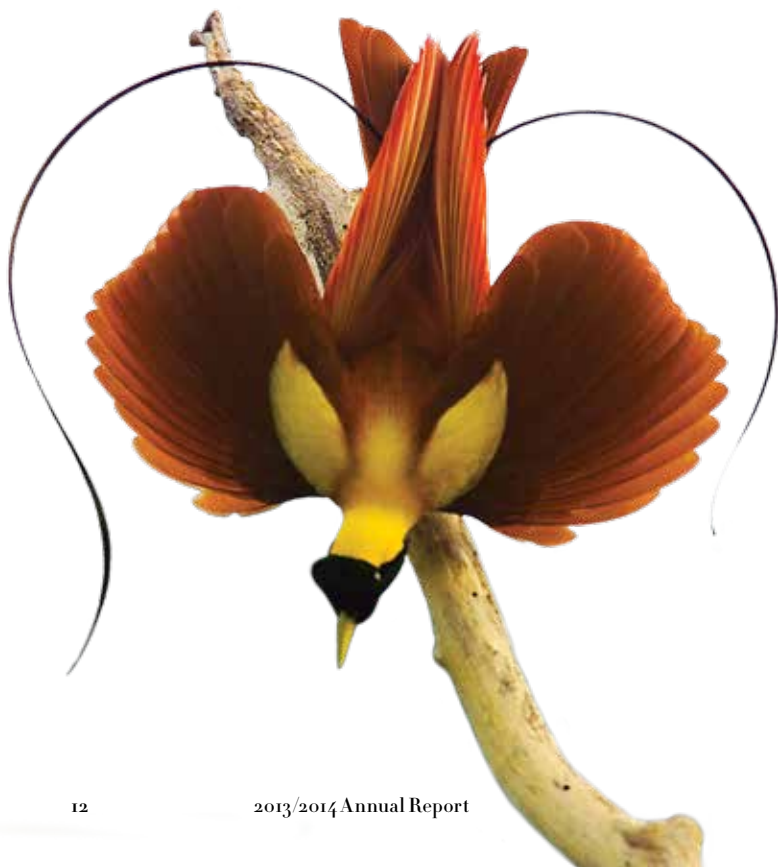
THE ACADEMY inspires curiosity in our visitors by bringing them face-to-face with dinosaurs, live animals, butterflies, and classic dioramas. In summer 2013, *Glow: Living Lights* took visitors on a journey through land and sea in pursuit of creatures with the incredible ability to produce their own light. Our Exhibits Department supplemented *Glow* with specimens from the Academy's collections, glowing live scorpions, a human-sized firefly jar photo opportunity, and firefly and jellyfish costumes for children.

In fall and winter 2014, the Academy hosted the special exhibit *Dinosaurs Unearthed*, which featured roaring, moving, life-size animatronic dinosaurs.

A snow-covered *T. rex*, glowing sea monsters, birds-of-paradise, and our ever-popular live animals drew more than 208,000 total visitors to the Academy last year.

Over the six-month run of the exhibit, the Academy drew nearly 115,000 people, a more than 35 percent increase in average visitation. The exhibit extended onto the Benjamin Franklin Parkway, where an extremely popular animatronic *T. rex* became a magnet for photos and selfies. An image of the snow-covered *T. rex* made the front page of *The Philadelphia Inquirer* and became one of our most popular Facebook posts to date.

In spring 2014 visitors laced up their dancing shoes for *Birds of Paradise: Amazing Avian Evolution*, a special exhibit on the exotic birds of the New Guinean rain forest co-developed by the National Geographic Society and the Cornell Lab of Ornithology. The exhibit's centerpiece was a dance-off where visitors could learn signature bird moves and compete for head bird-of-paradise status. Even Academy President George Gephart and *T. rex* mascot Eddie took part in a dance-off on the exhibit's opening day. (More on page 16.)





## 1900 BENJAMIN FRANKLIN PARKWAY

### Inside *Outside In*

A six-year-old boy and his father enter *Outside In*, the Academy's children's nature discovery center. The space is alive with sound, movement, color, and light. Off to the boy's left, owls hoot and songbirds chatter. His right ear detects the crashing of ocean waves. Behind him, a stream skips and gurgles, and a bee buzzes over his head.

There is more to experience in *Outside In* than could ever be covered in one, two, or even three visits. Regardless of what activities young visitors choose or which animals they touch, children and the adults who accompany them emerge with a clear message: nature is fun!



*Outside In*'s popularity draws thousands of visitors each month. But by 2013, the space showed evidence of many years of wear and tear. The carpet was worn, the forest seemed dark, the animal enclosures had grown shabby, and the microscope was not user-friendly. A number of generous donations from individuals, foundations, and corporations made it possible for renovations to begin.

Working with our educators, the team of experts in exhibits and public spaces updated *Outside In*'s signage, lighting, colors, wallpaper, and soundscapes. Our staff also integrated interactive investigation opportunities previously spread throughout the exhibit into a single ADA-compliant lab that can be spotted immediately upon entry to the exhibit. Here, all sorts of specimens can be placed under a huge microscope. Opposite the lab are attractive, comfortable enclosures for the live animals. Elsewhere, kids can explore an eagle's nest, search for shark teeth, play in the sandy beach, and learn about stream life.

Opened in February 2014, the new *Outside In* offers open sight lines throughout the space so that parents can keep an eye on children playing in different areas. Educators are stationed throughout the space seizing every opportunity to spark a child's imagination through nature. Now, the staff's workspace is much more conducive to interactive teaching and learning, and children (and their parents) continue to develop a love of nature and science every day.

#### Thank You

We are grateful to the many donors who helped to make the renovation of *Outside In* possible. We would especially like to recognize the following contributors:

Austelle Foundation  
Christian R. & Mary F. Lindback Foundation  
Dolfinger-McMahon Foundation  
Gilroy and Lillian Roberts Charitable Foundation  
Dorrance H. Hamilton and the Hamilton Family Foundation  
Cynthia and Martin Heckscher  
Leo Model Foundation  
Mannington Mills  
In Memory of Cheryl Beth Silverman

#### Endowment Support

The Cheryl Beth Silverman Memorial Fund  
Florence R. Foerderer Endowment Fund  
The Sherry E. Weiss Fund for *Outside In*



# In the Collections

The Syrphidae in the Fee Collection make up one of the largest private collections of this insect group ever amassed (above)

THE ACADEMY'S internationally significant scientific collections represent a veritable library of life on Earth. While conducting research into systematics, evolutionary biology, and ecology, our scientists actively add to the collections and loan out specimens to assist scientists around the world.

## In the Library and Archives

The Academy's Library and Archives contain information from many researchers of the Academy's past and present. The Academy's remarkable Library Collection houses a host of materials ranging from works published in the 1500s to current serials, as

## In Ichthyology

In fiscal year 2014, Academy Ichthyologists John Lundberg and Kyle Luckenbill published a study revealing the unusual bone structures in the face of *Kryptoglanis shajii*, an "alien" catfish with a subterranean lifestyle. Appearing in the *Proceedings of the Academy of Natural Sciences of Philadelphia*, the study utilized 3-D digital radiography and high-resolution CT scans to examine the bone structures in the catfish's face without damaging the tiny specimen.

## In Entomology

In April, the Entomology Department received the Frank D. Fee Collection of about 92,000 pinned, prepared specimens with data and associated field notes. Frank D. Fee (1941–2014) was an amateur entomologist and authority on important insect pollinators called "hoverflies" or "flower flies" (Diptera: Syrphidae). Fee's specimens provide extensive data on the morphology, phenology, geographical distribution, and life cycles of syrphid flies in North America.

The Academy's research collections of more than 18 million specimens continue to grow every day.

well as monographs from all over the world detailing significant developments in the field of natural history. In addition to administrative records and official Academy documents, the Archives hold an abundance of unpublished scientific and personal materials from scientists and others associated with the Academy.

In 2014, the Academy Archives received a unique collection of sketchbooks and related materials of Benjamin Waterhouse Hawkins, the sculptor who mounted the skeleton of *Hadrosaurus foulkii* in 1868. The dinosaur was the first to be displayed in a museum anywhere in the world—at the Academy of Natural Sciences. Donated by the artist's great-great-granddaughter, Valerie Bramwell, these holdings will constitute the largest single collection of original materials relating to Hawkins in the world.

## On the Road Ahead

Plans are currently underway for a new hands-on, multi-media exhibit space in the Library Reading Room that will engage people of all ages. Nationally recognized consultants David Heil and Associates, Inc. (more on page 8) recommended that the Academy repurpose the Library Reading Room as

a signature exhibit space that will be used for public engagement, education, cultivation, and rental activities. The Academy's architects and planners are striving to maintain the historic character of the room, including the high, ornate ceiling and windows stretching two stories, as a backdrop for an immersive, next-generation natural history visitor experience where people of all ages can learn about biodiversity, environmental science, and the changing world around us. The renovations will include the development of a modernized library center where researchers can access the Academy's collection in a safe, secure, and environmentally controlled space.

The Academy's Library Gallery opened to the public in January 2014 on weekday afternoons. Since then, our scientists have curated exhibits for display on topics such as extinction and skulls, bringing many rarely seen specimens out from behind the scenes. Opening the doors is helping us to explore how visitors interact with the space and exhibits to inform the development of the new gallery.



### 1900 BENJAMIN FRANKLIN PARKWAY

## In the Vertebrate Paleontology Type Collection

In spring 2014 the Academy announced an uncanny match—that of a recently unearthed, fossilized partial humerus of a massive Cretaceous period sea turtle, *Atlantochelys mortoni*, and a partial humerus that had been in the Academy's collection since the 19th century. An amateur paleontologist had recently discovered a partial fossil bone in Monmouth County, New Jersey, and brought it to the New Jersey State Museum. Curators at the New Jersey State Museum thought the fossil looked extremely familiar and joked that perhaps it was the missing half of a large, partial turtle limb in the Academy's collection. That bone also had a broken shaft, but only its end nearest to the shoulder remained. It was originally named and described by 19th-century naturalist Louis Agassiz as the first, or type specimen, of its genus and species. In the intervening years, it remained the only known fossil specimen from that genus and species until the New Jersey scientists carried the "new" fossil to the Academy ... and the halves fit together perfectly.



The fully assembled *A. mortoni* humerus helps scientists calculate the turtle's size—about 10 feet from tip to tail

The scientists believe that the entire unbroken bone was originally embedded in sediment 70 to 75 million years ago when the turtle died. Then those sediments eroded and the bone was broken in two. It was re-buried and protected for a few thousand years more until the discovery of the halves at least 160 years apart.



# On our Planet

THE ACADEMY has been a leader in the research, monitoring, and evaluation of water quality in watersheds around the world for many years. Scientists from the Academy's Patrick Center for Environmental Research analyze water and sediment samples and study the health of our aquatic ecosystems by examining the animals and plants that inhabit them.

In fiscal year 2014, a team led by Vice President of Academy Science David Velinsky, PhD, received significant funding from the New Jersey Department of Environmental Protection for tidal wetland research, phosphorus cycling, and phytoplankton ecology in New Jersey's Barnegat Bay. Scientists in the Academy's Patrick Center also received a three-year grant from the William Penn Foundation to provide scientific

oversight for the Delaware River Watershed Initiative, a large-scale collaborative program to maintain and improve the quality of aquatic ecosystems in the Delaware River Basin (more on page 6). To assist in this significant project, the Academy hired Carol R. Collier, an experienced leader in regional watershed

The Academy's environmental researchers are exploring nearby water bodies to ensure that our water is safe to drink in the future.

Scientists explore Bear Creek in the Upper Lehigh cluster of the Delaware River Watershed

management and planning, as its senior advisor for watershed management and policy.

With these initiatives, the Academy is becoming a recognized leader in sustainability in our region. We have made significant efforts to collaborate with local partners and demonstrate sustainable practices in Academy operations.

### In the City of Philadelphia

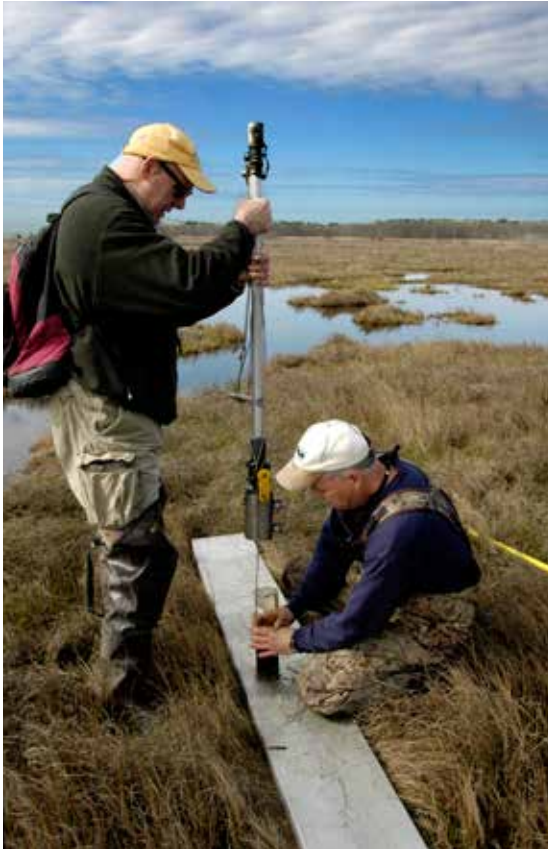
The Academy presented the first Ruth Patrick Award for Environmental Stewardship to Mayor Michael A. Nutter in September 2013 in recognition of his ongoing initiatives to make Philadelphia the greenest city in America.

In 2014, Warren Environmental Counsel LLP, a local environmental and water resources law practice, became the Academy's Sustainability Partner. Their gift has supported the work of the Academy's Sustainability Committee, including unique signs around the museum that highlight a sustainability fact and provide opportunities for visitors to apply the concept at home.





Scientists collect a sediment core to study impacts of mosquito-control ponds on nutrient cycling in Barnegat Bay marshes



Academy Sustainability Partner



### From Gallery to Conference Room

The Academy’s Sustainability Committee installed hydration stations throughout the museum to encourage our visitors to carry reusable water bottles. Signage at each station reminds visitors that they can make a difference by taking advantage of Philadelphia’s safe and clean water supply.

Behind the scenes, the Sustainability Committee audited staff compliance with the Academy’s waste disposal policies and implemented an updated recycling program to improve waste management practices. We purchased new receptacles to simplify the recycling process and trained a staff team to help colleagues comply with the updated policies.



**DR. RUTH PATRICK**

### In our Memory

The legendary Dr. Ruth Patrick passed away on September 22, 2013, at age 105. Her pioneering research led to the development of the Patrick Principle, a fundamental tenet in environmental research and management. Throughout her long and distinguished career at the Academy, Patrick led the study of freshwater habitats and the organisms that depend on them. She positively affected the quality of life of both humans and wildlife by providing policymakers with accurate information about the environment and the benefits derived from its protection.

Patrick’s tireless efforts to raise awareness about this crucial issue motivated generations of young sci-



entists to explore sustainability and environmental research. Many of these scientists and environmental advocates joined the Academy of Natural Sciences in April 2014 to honor her memory at the Ruth Patrick Symposium, *Environmental Science: From Roots to Revolution*. Attendees explored Patrick’s many contributions to the field of environmental science, including the ways in which her work was foundational to the development of the field and its evolution in the 21st century.

# In the Office



IN FISCAL YEAR 2014 the Academy increased its philanthropic support by 58 percent over the previous fiscal year, raising more than \$7.8 million in unrestricted contributions, bequests, memberships, and private support for research and education. The Academy earned Charity Navigator’s 4-star rating recognizing the institution’s fiscal health and commitment to transparency and accountability. The cost to raise a dollar was an exceptionally low 9 cents.

The Academy launched a new Sustainers’ Society to recognize members and donors with 10 or more consecutive years of support, and 392 members were inducted in the first year. Our Cuisine from the Collections fundraiser in November attracted 400 guests and net revenues of nearly \$50,000—surpassing the net revenue goal by 60 percent.

The Academy caught the attention of the international press, with coverage of our research, exhibits, and collections in *National Geographic*, *The*

*New York Times*, the *Los Angeles Times*, *The Boston Globe*, BBC News, *International Herald Tribune*, and other major outlets. The robust marketing and public relations plan for *Dinosaurs Unearthed* resulted in coverage by all four major Philadelphia television stations and front page photos of the outdoor *T. rex* installation in *The Philadelphia Inquirer* and *Metro*. Following on the success of *Dinosaurs Unearthed*, we launched online ticketing for *Birds of Paradise: Amazing Avian Evolution* to help capture data about visitors and track the effectiveness of our advertising.

Additional fiscal year 2014 highlights include:

- 15 percent increase in membership revenue
- 16 percent increase in annual fund giving
- 19 percent increase in overall member retention
- 29 percent increase in monthly visitors to ansp.org
- 55 percent increase in Twitter followers
- 64 percent increase in restricted/endowment giving
- 75 percent increase in likes on our Facebook page



## 1900 BENJAMIN FRANKLIN PARKWAY

### In the Dance Studio

The Academy built anticipation around our spring 2014 exhibit, *Birds of Paradise: Amazing Avian Evolution*, through a unique dance-off based on the exhibit’s Dance, Dance Evolution activity. Prior to opening day, Academy President and CEO George Gephart and Academy mascot Eddie the *T. rex* faced off in an exciting dance-off.

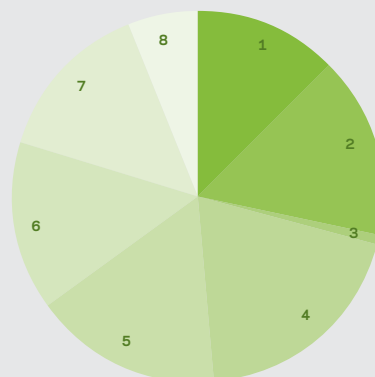
Every move leading up to the dance-off was featured on social media, including “training,” with Gephart exercising at the Drexel Recreation Center and Eddie taking the floor with the Pennsylvania Ballet (right), Philadanco!, the Philadelphia Museum of Art, and the Settlement Music School. The competition was fierce and the competitors gave it their all, but in the end it was Eddie by a snout, winning two out of three dance-off rounds.



## Financial Report for the Year Ended June 30, 2014

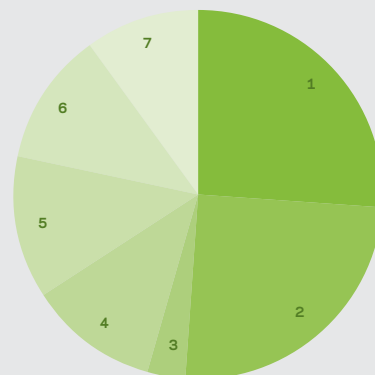
### Unrestricted Operating Revenue and Support

1. Research – Grants and Contracts	\$ 1,811,327
2. Public Programs, Including Admissions	2,240,340
3. Other Programs and Grants	100,328
4. Net Assets Released From Restriction – All Programs	2,766,697
5. Contributions, Bequests, and Memberships	2,337,020
6. Endowment Income	2,077,432
7. Net Support From Drexel University	2,006,621
8. Other Income	843,037
<b>Total Revenue and Support</b>	<b>\$ 14,182,802</b>



### Unrestricted Operating Expenses

1. Collections and Research	\$ 3,756,031
2. Public Programs	3,557,969
3. Library	485,021
4. Fundraising and Communications	1,632,647
5. Building	1,772,923
6. General and Administrative	1,648,165
7. Depreciation and Other	1,432,879
<b>Total Expenses</b>	<b>\$ 14,276,635</b>



### Non-operating Activity, net

<b>Total</b>	<b>\$ 5,820,274</b>
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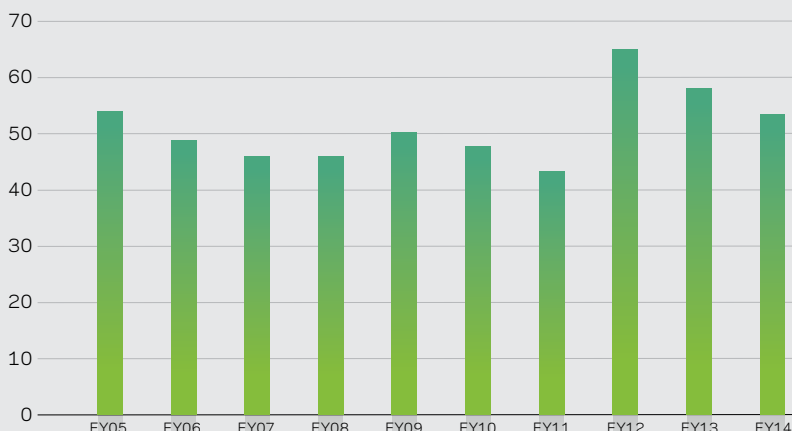
### Net Assets

<b>Change in Net Assets</b>	<b>\$ 5,726,441</b>
Beginning of Year	73,527,994
<b>End of Year</b>	<b>\$ 79,254,435</b>

### Endowment Market Value (in millions)

2014	Jun 30	\$ 53.612
2013	Jun 30	48.639
2012*	Jun 30	45.681
2011	Dec 31	45.794
2010	Dec 31	50.024
2009	Dec 31	47.439
2008	Dec 31	43.115
2007	Dec 31	64.743
2006	Dec 31	57.827
2005	Dec 31	53.230

### Year-End Endowment Market Value (MM)



\*Change in fiscal year from December 31 to June 30



# Thank You

On behalf of the Academy's Board of Trustees, we wish to recognize and thank those supporters who contributed to the Academy between July 1, 2013 and June 30, 2014. Your generosity helps to fund the Academy's many research and education programs, and we are tremendously grateful for your support.

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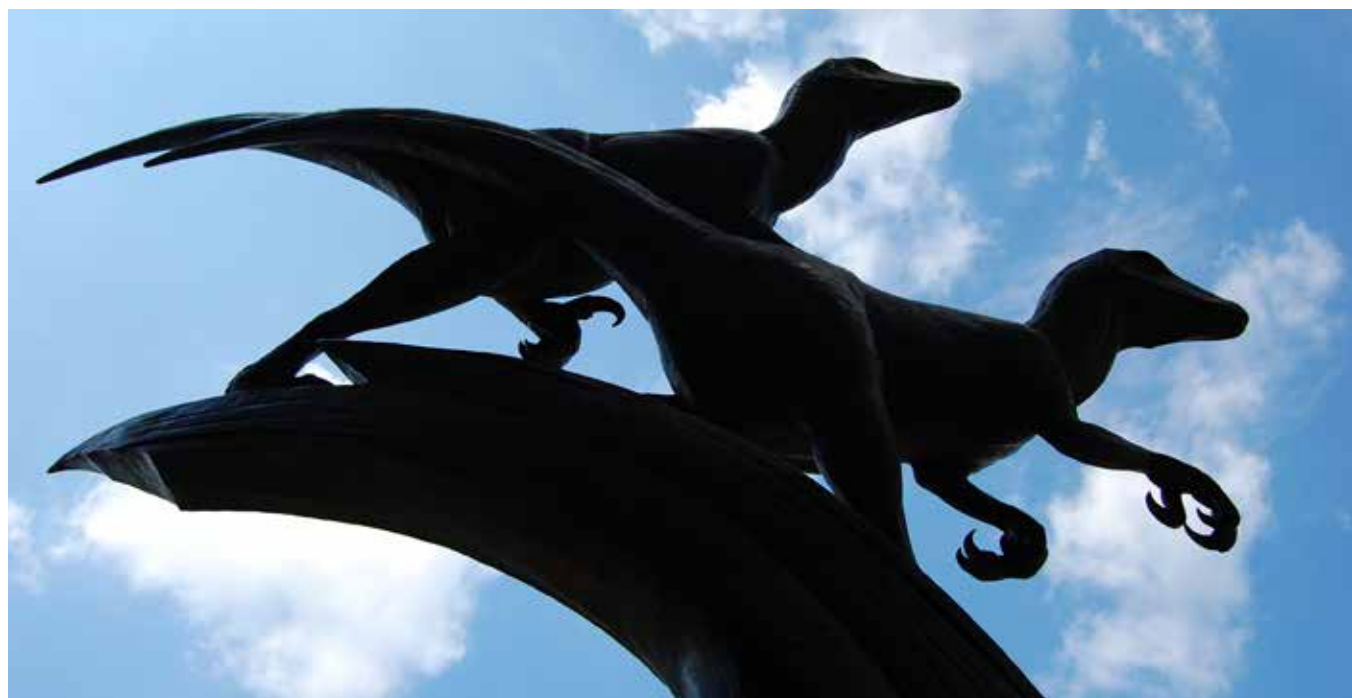
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