

The Academy of Natural Sciences of DREXEL UNIVERSITY

Where We Stand

2016/2017 Annual Report



Dear Friends,

I am honored to introduce Scott Cooper, PhD, the Academy's new President and CEO. Scott joined our team in the fall following an international search. He comes to us from the Royal British Columbia Museum in Victoria, Canada, where he served as vice president of collections, knowledge, and engagement. He is a remarkable museum veteran whose professional journey began in his native Northern England and eventually took him to Edinburgh, Venice, London, Qatar, and Canada's Pacific coast. The Academy will benefit from Scott's experience, energy, and openness, as well as his passion for science, research, nature, art, and how people interact with our natural world. We are thrilled to welcome him to the team.

Scott joins us amid a year of tremendous growth. For the first time in our 205-year history, the Academy has taken public positions on four crucial topics. In spring 2017 we posted our position statements on climate change, evolution, water, and biodiversity and extinction to our website, ansp.org. These issues often have been at the center of broader debates, yet they have become even more critical in our current political climate. Now we believe it is more important than ever to articulate and champion the established scientific consensus on these issues and to support policies that are driven by that proven and credible scientific consensus.

In this Annual Report, you will see excerpts from these position statements alongside highlights of our work that bring these statements into practice. We hope that you, our most loyal contributors, will enjoy exploring our newest initiatives through this framework. Your generosity enables us to stand up for our science and safeguard our most valuable resources. We know you will stand with us in the days ahead. Thank you for your support.

Regards,

Peter A. Austen Chair, Board of Trustees

Dear Friends,

In getting to know the Academy, I've been inspired by the energy, engagement, and commitment of the people who make up this magnificent institution. Turn a corner, and you might spot a volunteer and a visitor examining a dinosaur fossil side by side. Just a few steps into a gallery, you're bound to see a wide-eyed child and an encouraging parent peering into a terrapin tank. A walk down a quiet corridor can lead you to a lab where a biogeochemist is analyzing samples taken from a local creek. Two flights of stairs more and you will stumble upon rows and rows of birds that our ornithologists collected last summer in Brazil.

The Academy is filled with treasures: our people, our specimens, our artifacts, and our data. All are vital to our efforts to advance research, education, and public engagement in biodiversity and environmental science. I am proud to join an institution that is standing up for science—insisting that climate change threatens our planet, that our water supplies must be protected, that biodiversity and extinction require our utmost attention, and that evolution is how we got here today. I hope you enjoy reading about our work in this report and learning how these critical issues inspire the discoveries we make every day.

I look forward to getting to know each and every one of you and hearing about your visions for the Academy's future. I can't wait to stand alongside you as we work toward common goals: an innovative path forward for the Academy, and a sustainable future for life on Earth.

Regards,

Scott Cooper President and CEO

I am proud to join an institution that is standing up for science.





SCIENCE MATTERS

At the Academy of Natural Sciences, the study and communication of environmental and biodiversity sciences are central to our mission. We strive to share our love of the natural world with our community, seeking to engage and enlighten through fun, interactive programs and exhibits focused on the natural world.

Most people don't realize how much we depend on science. Drink a glass of water, swallow an aspirin, check the weather report—all these mundane actions depend on a science infrastructure, not just for discovery and invention, but also for making the system operate. Science is a process for knowing and learning, a systematic way of reducing uncertainty in how the world works. To be successful, it has to adhere to a broader set of values. One of the most important of these values is the use of evidence as the basis for understanding and for reaching conclusions.

Supporting Early Learning

In fiscal year 2017, the Academy received a significant grant from the William Penn Foundation to build Science and Literacy for Success (SLFS), a new, comprehensive pre-K learning program for children, educators, and lowincome families in Philadelphia. The Academy's goal is to improve performance of early childhood learning centers by blending STEM instruction with literacy skill building and lessons in positive social-emotional development.

With guidance on cultural competency and evaluation from Drexel University's School of Education, the Academy's educators are using a STEM-based literacy curriculum to teach lessons in early childhood centers throughout the city. This systematic model engages preschoolers in observing, questioning, predicting, experimenting, and sharing—all of which encourage the development of language and math skills.



398

5

spots filled by summer science campers

Women In Natural Sciences students attending Drexel University this year as freshmen—1/3 of last year's senior class



Sharing Our Science

Fiscal year 2017 saw major renovations to our most popular signature exhibit space, Dinosaur Hall. Our brandnew version of the beloved Time Machine offers daring visitors seven temporal field sites to visit while flying alongside pterosaurs and walking in the footsteps of dinosaurs. Additional updates include a marine reptile nook providing a quiet retreat for families, a new naturalistic entry wall, new flooring, and bases for our dinosaurs.

190,808

total visitors to the Academy



CHANGE

The Academy supports the consensus of the scientific community that the earth is warming and climates are changing at an unprecedented rate.

CLIMATE

Diorama Renovations Highlight Conservation Priorities Dioramas tell the story of exploration, habitat loss, conservation, artistry, and evolution, preserving a snapshot of a specific location at a recorded time.



1,300

attendees to public environmental programs



plastic bottles saved through the Academy's hydration stations

100%

renewable energy sources powering the Academy

The Academy received generous gifts enabling the conservation and interpretation of two of its most important habitat dioramas. From the Vandy Charitable Foundation, we received support to renovate the Gorilla habitat diorama, collected during George Vanderbilt's 1934 African Expedition. Thanks to a significant gift from the E. Rhodes and Leona B. Carpenter Foundation, the Academy will restore the rare diorama of the Takin, a large mountain goat collected in 1931 from a richly diverse natural area on the Sichuan/Tibet border. This year the Academy will remove the glass from the dioramas so that experts can clean, restore, and reinterpret these moments in history.

Dioramas tell stories of exploration, habitat loss, conservation, artistry, and evolution, preserving a snapshot of a specific location at a recorded time. The intense documentation that goes into them enables researchers to track changes in biodiversity and habitat due to climate change or other impacts. We can trace a rich history of each place by comparing the habitat in the diorama to the century of impacts we might find there today. Which animals and plants still exist? What has changed and why? And how have diorama artists played an important role in educating visitors about planetary and social issues? Future work, including the implementation of new interpretive strategies, may include opportunities to explore the current climate and habitat conditions of these areas virtually to answer these important questions.

where we stand WATER

The Academy has led critical water research and environmental outreach for over 70 years. We will continue to investigate the complex human and natural systems connected to water quality and quantity and to seek potential solutions for our threatened water resources.





Water Quality in the Susquehanna

For nearly 70 years, the Academy's Patrick Center for Environmental Research has been a leading authority on human impacts on aquatic ecosystems. In 2017, the Academy of Natural Sciences received a significant gift to develop a multi-faceted plan to address surface water quality in critical locations in the Susquehanna Basin. This program builds upon our years of work to address the water quality of streams and rivers in the Susquehanna Basin, as well as the major sources of agricultural pollution entering the Chesapeake Bay.

We are exploring strategies to reduce levels of nutrient and sediment pollution related to agricultural and land use practices in the lower Susquehanna Basin. Our goal is to develop methods that will result in measurable, scientifically verified improvements in water quality in targeted locations while working with local and regional stakeholders to sustain progress. Through this work, we will develop strategies, models, and "lessons learned" that can be used for similar purposes across the Susquehanna and in other watersheds throughout the United States.

In the last five years, we have done intensive work in the Delaware River Basin as a key member of the coordinating committee of the Delaware River Watershed Initiative. This massive effort strives to monitor, protect, and restore conditions in the streams, rivers, and landscapes in targeted regions within the watershed.



15 million+

people in the area impacted by Delaware River Watershed Initiative research

13,500

square miles covered by the



Delaware River Watershed



Drexel students and co-ops assisting with Delaware River Watershed Initiative research

WHERE WE STAND

BIODIVERSITY AND EXTINCTION

The earth is experiencing a sixth mass extinction and a significant loss of biodiversity. Clear scientific evidence reveals that its cause is the effects of human activities over just the last few centuries. The wholesale burning of fossil fuels, reduction of forests and wetlands, and increase in impervious landscapes greatly threaten our ecosystems, on which all life depends. Since its founding in 1812, the Academy has amassed a research collection of more than 18 million specimens. The Academy will continue its research on biodiversity and extinction, which enables scientists to better understand the dynamics of the natural world and allows policymakers and stakeholders to make informed decisions about issues that impact our everyday lives.

Expeditions Take Flight

A generous gift from the RJM Foundation has helped the Academy establish the Ornithology Expedition Fund, which helps Academy researchers travel around the world conducting annual expeditions to build and enhance our Ornithology Collections. This gift follows on last year's \$1 million in gifts to our Campaign for Ornithology, which secures the significance of our research and collections for generations to come. Fiscal year 2016 marked the first time in over 80 years that our Ornithology Department conducted two simultaneous collecting trips.





In fiscal year 2017, Ornithology Collection Manager Nate

Rice, PhD, and Curator of Ornithology Jason Weckstein, PhD,

traveled to Marajo Island, Brazil, a huge river island near the

mouth of the Amazon. Their team of collaborators included colleagues from the Museu Paraense Emílio Goeldi and Universidade Federal do Pará, and former Academy postdocs

Alan Fecchio and Vitor Piacentini. The scientists collected over 400 bird specimens and intensively sampled each

specimen for ecto- and endo-parasites. They also collected

Post-doctoral researcher Therese Catanach, PhD, and Drexel

doctoral candidate Matt Halley, with colleagues from the

University of Kansas, departed on a treacherous climb to

conquer Cerro Saslaya, a montane site on the Caribbean

coast from which bird specimens have never been collected.

The researchers collected 217 bird specimens of 111 species,

Specimens collected by our ornithologists are enabling

our team to describe new parasite species, understand the

gain new insights into the biology of the bird communities

in unstudied tropical regions. Preserved in our collection,

the specimens are a gold mine for future scientific studies by researchers at the Academy and throughout the world.

diversity of the birds and parasites in biodiverse locations, and

including tissue, blood, and parasite samples.

blood and tissue samples and other associated data.



90%

of the world's bird diversity represented in the Ornithology Collection

^{\$}1.5 million

raised for the Ornithology Endowment

217

bird specimens collected in Nicaragua

210,000

specimens in the Academy's Ornithology Collection



different dinosaurs

unearthed



2,000



pounds of jacketed dinosaur fossils brought back from our dig in Montana Stegosaurus toes unearthed during fieldwork in Montana

7



The Bighorn Basin

In summer 2016, Academy paleontologist and paleoillustrator Jason Poole traveled to the Bighorn Basin, near the Wyoming/Montana border, to excavate dinosaurs. The prior year Poole and a team from the New Jersey State Museum and the Bighorn Basin Dinosaur Project discovered obvious fossil bone protruding above the surface near the old site, where a team including Poole had found Suuwassea, a sauropod from the Jurassic Era, nearly two decades before. After a month of digging, the team had collected bones from a juvenile Diplodocus, toes from a Stegosaurus, an unidentified sauropod, two theropods, including an Allosaurus, and a possible second specimen of Suuwassea, an Academy type specimen.

WHERE WE STAND

EVOLUTION

To teach or practice science without acknowledgement of evolution deprives the public of a powerful concept that explains the order and coherence of life itself.



Fossils From Antarctica

Academy Vertebrate Paleontologist Ted Daeschler is used to traveling to remote regions of the earth for research. But he's never traveled quite as far, or seen conditions quite as harsh, as he did in December 2016 and January 2017 when he traveled to Antarctica with support from the National Science Foundation. He and a team of researchers explored the McMurdo Dry Valleys within the Transantarctic Range, located in Southern Victoria Land, Antarctica. They studied the sedimentary rocks of the Aztec Siltstone to reconstruct environments that existed during the Middle Devonian, about 390 million years ago. Fossils from that period have provided important clues to how life made the transition from the water to land.



58

students working with the Academy through Drexel University's Cooperative Education program

\$**483,060**

National Science Foundation dollars awarded to Academy researchers

12

countries visited by Academy researchers



The team collected fossils of a wide range of Middle Devonian aquatic vertebrates, including the tiny scales of agnathans and acanthodians, a wide variety of placoderm plates, primitive shark teeth, early actinopterygians (rayfinned fish), and sarcopterygians (lobe-finned fish). Daeschler and the team plan to return to Antarctica in 2018 to explore more of the Aztec Siltstone.





Evolution of a Brand

In June, the Academy unveiled a new logo that powerfully reflects our interconnected mission and growth in research, education, and public engagement. The symbol evokes the interweaving pathways of knowledge, research, education, curiosity, and effort, resulting in years of groundbreaking discoveries by scientists in the lab, in the field, and even by visiting students on a class trip.

Financial Report for the Year Ended June 30, 2017

Unrestricted Operating Revenue and Support

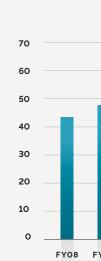
1. Research - Grants and Contracts	\$3,391,626
2. Public Programs, including Admissions	2,685,088
3. Other Programs and Grants	65,171
4. Net Assets Released from Restriction - All Programs	3,797,927
5. Contributions, Bequests, and Memberships	1,705,322
6. Endowment Income	517,507
7. Net Support from Drexel University	2,280,344
8. Other Income	697,546
Total	^{\$} 15,140,531

Unrestricted Operating Expenses

1. Collections and Research	\$5,349,154
2. Public Programs	3,511,629
3. Library	518,032
4. Fundraising and Communications	1,959,199
5. Building and Technology Services	2,066,241
6. General and Administrative	1,526,461
Total	^{\$} 14,930,716

Depreciation and Amortization	^{\$} (1,134,944)
Non-operating Activity, Net	^{\$} 6,308,856
Change in Net Assets	^{\$} 5,383,727
Net Assets, Beginning of Year	\$78,776,853
Net Assets, End of Year	\$84,160,580

Endowment Growth (in millions)		
2017	Jun 30	59.741
2016	Jun 30	55.032
2015	Jun 30	56.380
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



Creating the Library Research Center and new exhibit gallery is a bold effort for the Academy to link our science and collections to the visitor experience.



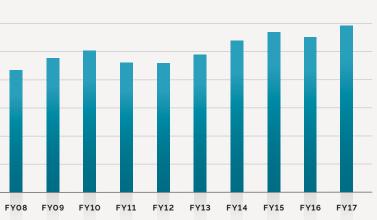
Preservation and Growth

Thanks to the generosity of many Academy supporters, we are breaking ground this year on a modernized Library Research Center and new exhibit gallery. The Library Research Center will offer greater access to the Library and Archives while improving environmental conditions and security of the collections, preserving these treasures for future generations. Following the Research Center expansion, the Academy will embark upon a project to transform our grand, historic Library Reading Room into a breathtaking exhibit and event space that will use fossil ecosystems to immerse visitors in biodiversity and environmental science. Creating the Library Research Center and new exhibit gallery is a bold effort for the Academy to link our science and collections to the visitor experience, effectively improve our organizational sustainability, and responsibly steward our valuable collections.

*Change in fiscal year from December 31 to June 30



The groundbreaking academic department, Biodiversity, Earth & Environmental Science (BEES), formed upon the affiliation of the Academy and Drexel University, had a full-time equivalent enrollment of 180 students in 2017. The department generated approximately \$4 million in tuition revenue net of financial aid.



Year-End Endowment Market Value (MM)

22

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, 2016 and June 30, 2017. Your generosity helps to fund the Academy's many research and education programs, and we are tremendously grateful for your support.

Unrestricted Gifts and Grants

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Leadership members play a critical role in sustaining the Academy's scientific research programs, which explore today's most significant questions in environmental science, biodiversity, and evolution.

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