ACADEMY

FRONTIERS

INSIDE:
The Student Issue

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

Spring 2015

President and CEO: George W. Gephart, Jr.
Vice President of Institutional Advancement: Amy Miller Marvin
Editor: Mary Alice Hartsock
Graphic Designer: Stephanie Gleit
Contributing Writers: Carolyn Belardo, Bridget Clancy, Mike Servedio

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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: *15 students from the Academy's Women In Natural Sciences program are participating in a yearlong cultural and scientific exchange with students from Mongolia. Photo by Bruce Tepper/ANS*

Academy Greetings

Katie Clark/ANS

Dear Friends,

Teaching is at the core of the Academy's mission—to advance research, education, and public engagement in biodiversity and environmental science—and every day, we help students of all ages cultivate a love of science. With our youngest explorers, we explain how we can use our senses to observe nature. We teach older children how to ask complex questions and take responsibility for their impact on the environment. College and graduate students ask to study our collections and develop scientific careers alongside our researchers. Adult visitors never cease to amaze us with their curiosity and openness to learning more about our changing world.

In this issue of *Academy Frontiers,* we focus on our students' contributions. On page 7, you will meet Sarah Pellecchia, a graduate of our Women In Natural Sciences (WINS) program and a sophomore in Drexel University's Department of Biodiversity, Earth & Environmental Science. Pellecchia developed her love of fieldwork while interning with our wetlands team. Awarded a full scholarship to Drexel University as a result of her success in WINS, Pellecchia dreams of a career in environmental education. She wants to pass on what she has learned to others who may follow in her footsteps.

WINS has resulted in 100 percent of its students graduating high school and over 96 percent attending college. Last spring, WINS was selected to take part in a program that pairs our students with Mongolian teens to explore each other's cultural heritages and discuss how they relate to climate change in their communities. Four Mongolian teens visited the Academy in March, and the young women had a wonderful time learning about each other and doing science together.

Thanks to your generosity, the Academy is able to extend its excellent education programs throughout our community and our world. I offer my sincerest thanks to those who have already supported the Academy through the Annual Fund. As our fiscal year comes to a close on June 30, we ask those who have not yet donated to consider a contribution at ansp.org/support or by using the enclosed postage-paid envelope. We are tremendously grateful for your support of our mission.

All the best,

George W. Gephart, Jr.
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.

Contents

FEATURE

People

Science in Your Life

Notebook

At the Museum

Tradition and technology meet in this photograph of a Mongolian yurt east of the capital, Ulaanbaatar. Nomadic herders are especially affected by climate change. A significant temperature increase and accompanying weather changes have caused pasture grasses to become scarce, making it hard for the herders to properly prepare for the harsh winters. Photo by Robert M. Peck/ANS

Caryn Babaian: Nature in Chalk

Art of Science Gallery
Open through May 31, 2015

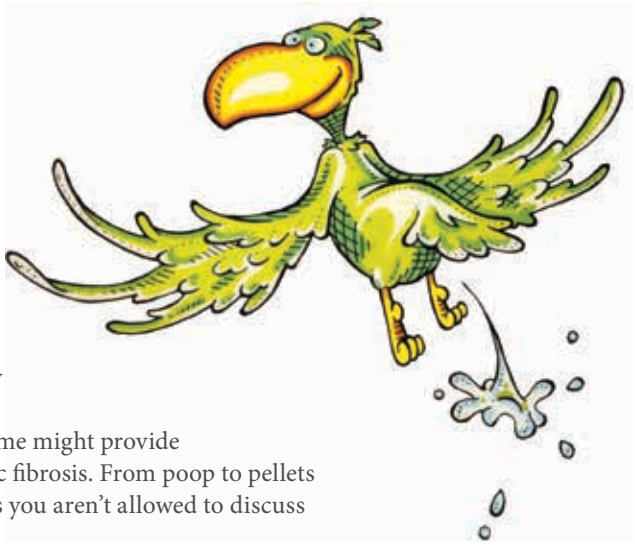
Caryn Babaian's exhibition of large-scale "nature mandalas" in colorful chalk focuses on the complexity and beauty of living systems within the natural world. Babaian, a biology professor and accomplished artist, uses circular compositions to reference traditional Hindu and Buddhist mandalas, spiritual and ritual symbols representing the universe in those religions. In doing so, she hopes visitors will be encouraged to contemplate the natural world and establish a connection to their place within it. Art-making is a key component of her Bucks County Community College science classes. By actively observing and drawing, she believes that her students will more deeply observe and relate to the details within nature.

Caryn Babaian

Animal Grossology

Special Exhibits Gallery
May 16–August 30, 2015

Animal Grossology is the slimiest, stinkiest, and downright yuckiest exhibit you will find in Philadelphia in 2015! Based on Sylvia Branzei's best-selling children's book series *Grossology*, this hands-on 3-D exhibit oozes with disgusting science and provides a slightly off-kilter view of the animal kingdom. Learn why cows chew cud and why snail and slug slime might provide scientists with more insight into treating cystic fibrosis. From poop to pellets and scales to hairballs, check out all the things you aren't allowed to discuss at the dinner table!



Jack Kelly/Animal Grossology

Joe McDonald

Reptiles: The Beautiful and the Deadly

Special Exhibits Gallery
September 28, 2015–January 10, 2016

Get eyeball to eyeball with live deadly snakes, colorful lizards, bizarre turtles, and rugged crocodilians from around the world in *Reptiles: The Beautiful and the Deadly*. Nestled in naturalistic habitats, these cold-blooded animals will help dispel common myths and foster a basic understanding of how reptiles fit into the animal kingdom and their native environments. Engaging, interactive components let visitors "milk" a viper, learn to speak croc in less than five minutes, and test their knowledge with Turtle Trivia and Lizard Wizard.

Reptiles: The Beautiful and the Deadly was created by Peeling Productions at Clyde Peeling's REPTILAND.

Sarah Pellecchia (center) with fellow WINS students in 2010.

Betsy Payne/ANS

SARAH PELLECCHIA: WINNING AFTER WINS

By Mary Alice Hartsock

When Sarah Pellecchia thinks about science, the first person who comes to mind is her mom. Pellecchia's mom, Barbara Pellecchia, didn't have the opportunity to go to college, but she probably would have been a scientist if she had realized the breadth of the field. Instead, she spent years working in an office environment and longing for more time outdoors. When Sarah decided to study environmental science at Drexel University, Barbara was thrilled to imagine the activities that might fill her daughter's days. Then her daughter invited her along for a day of research—and to Barbara's surprise, they headed into the woods to collect plants.

"Mom always thought science happened in a lab," Pellecchia says. "She never realized this kind of science could be an option as a job. And she was good at it!"

As a graduate of the Academy's Women In Natural Sciences (WINS) program, Pellecchia learned about the wide range of careers in the sciences long before many other students even considered applying to college. WINS is a free after-school and summer science enrichment program for young women from Philadelphia public and charter high schools. In addition to introducing hundreds of high school women to future careers in science, the program offers hands-on workshops, college exploration, and positive youth development opportunities. Pellecchia applied because WINS would give her the chance to learn science—and get a job.

And it turned out just as she had expected. Pellecchia worked in the Academy's *Butterflies!* exhibit, where she eventually became a part-time manager. She also interned in the Academy's Botany Department and did fieldwork with wetlands scientists, discovering how much she loved to work outdoors. She showed up to every WINS class and raised her hand so often that she earned the nickname "Question."

Her efforts paid off when she became the first to receive a full tuition scholarship from WINS to study science at Drexel. She is now a sophomore in Drexel University's Department of Biodiversity, Earth & Environmental Science (BEES), the department developed as a result of the Academy's affiliation with Drexel University.

"WINS gave me the advantage in my classes immediately," she says. "Most freshmen didn't have experience with fieldwork, but I said right away, 'I've done this.' Most people don't start their actual major classes until sophomore year, but I was already using my major in freshman year!"

During a recent Plant and Animal Identification course taught by Academy Curator of Entomology and Drexel Professor Jon Gelhaus, PhD, Pellecchia began the collections project that led her and her mother into the woods in search of specimens. From her botany internship, she knew what tree parts to collect and how to preserve each specimen. She stunned her professor with her expertise.

Pellecchia feels lucky to have found a career path that keeps her active outdoors, and she wants to help others learn about the field. She recently declared a minor in education so that she can teach environmental science in a museum—something she already does at the Academy.

"Environmental science is working toward a sustainable future," she says. "It's time people know we've been using too many resources and that it's having an impact on the environment.

"I want to tell visitors how they can make a difference," Pellecchia says.

CLASS OUTSIDE THE CLASSROOM

By Mike Servedio

Can you remember your first day of college? Many students recall getting lost trying to find their classrooms, receiving syllabus handouts, and making general introductions. For students in Drexel University's Department of Biodiversity, Earth & Environmental Science (BEES), the first day is just a little bit different.

"Field experience, early and often" is the motto of the growing department, created as a result of the Academy's affiliation with Drexel University. The students and professors take that motto very seriously.

"I remember a big group of them got stuck in the mud of the marsh," BEES Operations Manager Roger Thomas recalled fondly. It was the first day of the first-ever BEES Fall Field Experience (FFE) in 2012, and the mud got the best of some students who were exploring one of the few remaining Barnegat Bay marshes, located at the BEES field station in Waretown, New Jersey.

BEES students and faculty gather at Waretown for the FFE even before the start of fall classes. They canoe through the Pine Barrens, seine for fish along the shoreline, take water quality measurements aboard the BEES Department's largest research vessel, and take sediment cores in the marsh, among many other activities.

Kerry Rugenstein, a freshman in the 2012 BEES class, told *Drexel Magazine*, "In the first 48 hours of college, I was knee-deep in mud. I don't think any of my friends at other schools can say that."

Amanda Chan, now a member of the Academy's Delaware River Watershed Initiative team, said having access to the actual tools scientists use in the field was one of the biggest advantages of getting into the field early. "It's one thing to have a professor bring an instrument to a classroom and show you how it works," she said. "It's another to be outside in a real-life situation to see exactly what the tools do."

The students who register for the BEES program know that they will be in the field much earlier than their colleagues at other schools, Thomas says, and for many, that is their most important reason for selecting the program. Classes have traveled to the wetlands of Tinicum near the Philadelphia airport to study soil cores, explored the impacts of the invasive Northern snakehead fish in FDR Park in South Philadelphia, studied ancient geological formations in the Poconos and New Jersey, and dug for fossils at the world-famous Inversand quarry in Mantua, New Jersey. Having instructors from the Academy who have worked throughout the U.S. and in faraway field sites in Mongolia and South America, students see and hear about the amazing places that a career in science can take them.

This type of learning by example benefits students even before they begin entering the workforce. Many of their classmates use their co-ops to gain valuable experience in the field they are going into, yet BEES students are building upon their existing experiences and often have access to opportunities that augment the work they've already begun.

The BEES program offers both undergraduate and graduate programs of study. Find more information on the program, research opportunities, and the pre-term field experience at drexel.edu/bees.

Rich Horwitz/ANS

Kristen Kepics/ANS

Song Qiuju/123RF Stock Photo; Image not to scale

WHY DO WE NEED WORMS?

Opening Saturday, May 16, in the Special Exhibits Gallery, *Animal Grossology* is the slimiest, stinkiest, and downright yuckiest exhibit in Philadelphia this year. When you tour the exhibit, you'll get a chance to explore topics you aren't allowed to discuss at the dinner table, plus you'll learn why some of the grossest things animals do are really important for their well-being, human health, and the sustainability of our planet. Special Exhibits Educator Mary Bailey suggests how you can learn more about one of the slimier, and super important, members of the animal kingdom: the common earthworm (*Lumbricus terrestris*)!

Have you ever helped someone take care of a vegetable garden? If your answer is yes, you probably know that many foods need moist, loose, nutrient-rich soil to grow. Earthworms (sometimes called night crawlers) are nature's little helpers for growing a healthy garden. They prefer warm, moist, and dark conditions. By wriggling through soil, these worms loosen it and let in oxygen, which helps the soil stay fertile.

Throughout the course of a day, some worms can eat about a third of their weight in soil. The digestion process concentrates nutrients and minerals found in the soil. When earthworms release their waste, also known as cast, they deposit vital nutrients, such as nitrogen, phosphorus, and potassium—plus a variety of minerals—into the soil. This process creates amazing nutrition for your plants.

LEARN ABOUT WORMS

Want to watch earthworms in action? Complete the activity below. Then when you visit *Animal Grossology*, bring your drawings and tell a staff member what you learned!

You will need:

A few pieces of blank paper
Crayons or colored pencils
A small shovel for digging
A clean plastic jar with a wide mouth
Dark construction paper and tape
Sand
Dried leaves

1. Before you begin your experiment, draw an earthworm onto a piece of paper. Fill in as many details as you can. Try to answer the following questions: How big is the worm? What color is it? What shape is it? How does it move?
2. Bring your favorite adult, a small plastic shovel, sand, and a plastic jar outside. Put a layer of sand into your jar. In a garden or patch of dirt, dig a couple of inches into the soil and add a layer of soil to your jar. Alternate layers of sand and soil until the jar is almost full.
3. Make sure the soil is damp, and then add several earthworms. Cover them with some dead leaves. They will bury themselves—you don't have to!
4. Tape your piece of dark construction paper around the jar, and leave it alone for a couple of days.
5. Remove the construction paper and observe the worms. Draw a new picture of the worms based on your observations. Compare your picture with the picture you drew in step one. What did you get right, and what has surprised you? Has your dirt and sand mixture changed? If yes, why do you think that happened?
6. Make sure to return the worms to your garden after you complete the experiment!

iFong/123RF Stock Photo

Mike Servedio/ANS

TEEN EXCHANGE: Climate and Culture from the United States to Mongolia

By Carolyn Belardo

Excitement and anticipation—and a bit of apprehension—hang in the air. Days earlier, the 15 teenagers seated around the long rectangular table in a room off Dinosaur Hall received envelopes in the mail announcing their selection to participate in a new program that could change their lives.

Today is the first time the young women, all Philadelphia public school students, are gathered together to share their thoughts and feelings.

"This is a once-in-a-lifetime opportunity," says DaiJzanaée Martinez, a junior at World Communications Charter School.

"I don't know what to expect, but I know it will be different than Philly," offers Allure Gray, a junior at Central High School.

"I never in my wildest dreams thought I'd meet somebody from there," Ti'anna Cooper, a junior at Philadelphia High School for Girls, chimes in.

The teens and a dozen of their colleagues in the Academy's Women In Natural Sciences program are talking about a new initiative centered on climate change and involving a new partnership between the Academy of Natural Sciences of Drexel University and the National Museum of Mongolia in Ulaanbaatar.

Climate change is one of the most critical issues facing the world, experts say, yet the people who will be most affected by its impacts—today's teenagers—are the least engaged. This new partnership seeks to bridge that gap.

Building on more than 20 years of climate change research in Mongolia, the Academy is bringing together young women in the two cities to explore their cultural heritages and how they relate to climate change in their individual neighborhoods, cities, and countries. Uniting the 30 teens half a world apart in a nearly yearlong cultural, educational, and scientific exchange will ultimately benefit a larger community.

"The stark differences in their schools, cities, and cultures will serve to demonstrate that climate change is a global issue," says Academy Vice President of Education Jacquie Genovesi, PhD.

VIEWPOINT: CLIMATE CHANGE

"Do they experience the same kinds of things we do in Philly?" wonders Ariel Bradley, a sophomore at Central High School.

"Will I be able to keep up with all the work?" worries her twin Arianna, also a sophomore at Central High School.

Under the leadership of WINS Manager Betsy Payne and a team of Academy scientists, the students in the two countries are studying climate change issues together online through the practical lenses of culture, water, and food. They are already communicating across continents using Facebook, Twitter, Skype (right), and other online tools. Their virtual exchanges are carefully scheduled to take into consideration the 12-hour time difference.

Through the months, the students are absorbing the ecological principles they will use to create an electronic museum program guide that will be used to train student museum "explainers." The explainers will share their newfound cultural and climate change knowledge with Academy visitors through short programs and interactive activities that they will design themselves.

The students also will give presentations at community events, such as the annual Philadelphia Science Festival. And they will develop an after-school curriculum on climate change and its impact on their cultures. They will be charting new territory.

"We don't know what they'll come up with," says Genovesi. "We want the teens to actually develop these materials so that we get climate change from their viewpoint. While an emphasis will be on cultural exchange—building bridges between nations and students—we want to build science and understanding that is generated by these young women."

Of the 15 participating students in the nationally recognized WINS program, five have earned the opportunity to travel to Mongolia for two weeks in July 2015. Similarly, four of the 15 Mongolian students selected from a program in their country called ROOTS spent a week with their Philadelphia "pen pals" this past March, at press time. We can't wait to share updates from these trips with you in a future issue of *Academy Frontiers*.

Participation in this Museums Connect project is made possible by the U.S. Department of State's Bureau of Educational and Cultural Affairs. Administered by the American Alliance of Museums, Museums Connect pairs museums in the U.S. with museums abroad for a cross-cultural exchange that brings people, especially youth, together to open a dialogue through community projects, partnerships with local or tribal governments and schools, and local events.

This story was originally published on the Academy's Blog, anspblog.org, on December 3, 2014.

These five Philadelphia public school students in the Academy's Women In Natural Sciences program were chosen to travel to Mongolia in summer 2015 to study climate change. They are (from left) Faatimat Sylla of George Washington Carver High School of Engineering and Science, Linda Gutierrez of The Academy at Palumbo, Geré Johnson of Mathematics, Civics and Sciences Charter School of Philadelphia, Harleen Gonzalez of Central High School, and Ti'anna Cooper of Philadelphia High School for Girls.

"The stark differences in their schools, cities, and cultures will serve to demonstrate that climate change is a global issue."

—Academy Vice President of Education Jacquie Genovesi, PhD

WHY MONGOLIA?

"What I do in Delaware affects Pennsylvania. One part of the world affects the other," says Geré Johnson, a junior at Mathematics, Science, and Civics Charter School of Philadelphia.

"We don't think about what we do here, but everything we do affects others and will affect our kids' kids," remarks Tenzin Chemi, of Science Leadership Academy.

Mongolia is a country with a rich history, unique cultural traditions, and varied environmental features. It is also one of the regions most impacted by climate change. Between 1940 and 2012, the temperature warmed by 3.8 degrees Fahrenheit. This substantial rise in temperature has caused pasture grasses to become scarce, making it difficult for the large herder population to properly prepare their animals for the harsh winters.

The Academy's scientific work in Mongolia began in 1994 when Dr. Clyde Goulden began researching climate change and its effect on Mongolia's herders and one of the most pristine lakes in the world, Lake Hövsgöl. During a 20-year partnership, Goulden and Academy entomologists and ichthyologists have conducted research and have provided guidance to a new generation of Mongolian scientists.

Q: HOW DID THE EARLIEST ACADEMY SCIENTISTS ACCESS IMAGES OF PLANTS AND ANIMALS?

Wolf Room QK41.T63v.3

Vault QL466.S26

A. Students today have the world at their fingertips. If they want to see what a tarantula looks like, they just type that term into a search engine, and voilà! Full color images of tarantulas appear, often with access to related publications.

During the 18th and 19th centuries, students observed nature and relied on books, particularly those with illustrations, to "see" flora and fauna. Scientific illustration required a set of unique skills and tools to depict the natural world as correctly as possible. Adding color to illustrations increased the time needed for publication and the resulting price. Color illustration was uncommon and added by hand, after a page or a plate was printed.

Whether or not images had color, it was important that they be accurate. Students and scientists needed to be certain that what they were seeing in print would match what they saw in nature. Seeing a lemon tree for the first time, they should be able to recognize it based on the description and illustration of the fruit like the one to the left.

Identifying flora and fauna based on scientific illustrations became simpler when color was added. When Thomas Say wanted to publish *American Entomology*, he created a prospectus including hand-drawn and colored plates so that the visual was as helpful as the descriptive text. Anyone studying the image and reading the description could feel confident about recognizing this butterfly (below left), knowing where it could be found and what details distinguish it from similar ones.

Another unusual type of illustration is "nature printing." A specimen, such as a butterfly, is "transferred" from nature to the book, meaning that the scales of each wing are carefully collected and placed onto the paper after the bodies have been printed from engravings and hand-colored. Seeing the volume in person, the wings look "alive." This process is extremely labor-intensive, expensive, and not feasible for all species. As a result, books using the nature printing method are very rare.

Images like those described and shown here increase appreciation for the unique efforts required to make information available to scholars during a time when global travel was a challenge. These works still form the basis for much of what we know and observe of the natural world. They are invaluable not only to natural scientists, but also to those studying the history of publishing, printmaking, and illustration. True knowledge relies on all forms of information, and those who study these materials have a more complete view of the natural world. *~ Bridget Arthur Clancy, Cataloging and Serials Librarian*

SEVEN THINGS TO PUT ON YOUR SPRING TO-DO LIST

Whether you have a large backyard or a few flowerpots on your front steps, the actions you take in your outdoor space can have a significant impact on the environment. In this issue of *Academy Frontiers*, Kylie Ford, an associate with the strategic sustainability management firm Sustrana, helps us consider ways to make our outdoor space safe for human health, native wildlife, and our environment.

1. GROW FOOD

It doesn't matter if you are limited to a few containers or you have a large space to plant a full garden—growing your own food is one of the simplest, smartest things you can do to benefit your health and the environment. Growing your veggies (or buying local foods) helps support your community, plus your foods will not have to travel long distances or require extra fuel to get to your table. It's okay to start small. Think first about what's in season, choose a couple of "easy-to-grow" veggies, such as beans and tomatoes, and plant them in pots or in the ground.

2. TEST YOUR SOIL

Not sure which foods or plants to grow? Home improvement stores sell soil testing kits (between $10 and $15) that can tell you what nutrients are present in your soil. Your results may help you choose what to grow or might tell you whether to add compost to enrich the soil.

3. PLANT NATIVE SPECIES

Sticking with flowers instead of vegetables? No problem—as long as you choose plants that are either native to your area or that have adapted to your local climate. Native plants are especially beneficial to local animals for food and pollination.

4. COMPOST

If you're not composting, today is the day to start. All you need is a small outdoor space and an understanding of how to get started. Visit ansp.org/composting to find out how!

5. DON'T USE CHEMICAL PESTICIDES AND FERTILIZERS

Is your emerald green lawn worth the damage it may be doing to the environment? Chemical pesticides and fertilizers expose our families, pets, and local wildlife to potentially hazardous substances, which can later contaminate surface water and groundwater. Instead, use compost to provide nutrients for your plants.

6. DO YOUR RESEARCH

See poison ivy or oak growing nearby? Before you reach for a chemical to kill it, do your research. Making sure not to step on or touch the offending plant, take a picture of it and compare it with pictures you find online. Some plants may remind you of poisonous ones—but they're not actually a danger! If the pictures do not match perfectly but you're still concerned, call in an expert to evaluate.

7. TAKE NOTES

Be a scientist. What birds and insects do you see on your property? Are mammals leaving tracks in your yard? Learn about your local wildlife by taking pictures and doing research online or at your local library. You may be surprised at the diversity of wildlife counting on your outdoor spaces for food and shelter. After you know more about the animals that make their homes in your outdoor space, you can make choices that improve life for them—and for you.

Mike Flippo/123RF Stock Photo

SEAN RHOADS AND KERI FISHER:
HOW STEWARDSHIP BEGINS

Michael Long Fotografffic for ANS

The land where Sean Rhoads and Keri Fisher built their home is wild—in every sense of the word. Of their four acres of property, three are located in a flood plain, so the couple simply doesn't care to obsess over neat and tidy rows of colorful flowers. Instead, they're letting nature do its thing, and it's putting on quite a show.

Fish swim the creek that runs through their property, salamanders peer out from under rocks, and the tap-tapping of a woodpecker accents the cacophony of songbirds. White-tailed deer browse the small meadow, and the occasional fox stops by to survey the scene. A trilling whinny recently revealed an Eastern screech owl—a wide-eyed predator that is now feeling right at home among the field mice, rabbits, toads, raccoons, and groundhogs that have taken up residence nearby.

Last year, Rhoads and Fisher arranged for the Delaware Nature Society to certify their land as a Wildlife Habitat. Now their property is among about 1,000 in the state of Delaware that provide an ideal balance of food, water, shelter, and space for native animals to raise their young. Rhoads and Fisher avoid using fertilizers and pesticides to brighten their lawn and landscape, and they do not pollute the air through excessive mowing. Instead, they are setting an example of environmental stewardship for their neighbors and peers by prioritizing conservation and making responsible, sustainable choices for local wildlife.

Since Rhoads and Fisher can remember, protecting the environment has been top of mind within their peer groups. Both integrated natural and environmental science into their formal educations, Rhoads through his master's thesis on environmental pollution in a popular movie, and Fisher through studies in biology, earth and atmospheric sciences, and paleontology. When the couple began considering a charitable giving strategy, organizations that share science and nature with the public were at the top of their list.

"For a kid, seeing the dioramas and learning how the animals' ranges are decreasing is so important—it's a way to discuss how to take care of them," Rhoads says. "Otherwise what's going to be left [of the documented species] are just the dioramas in the museum."

Rhoads and Fisher became Academy contributors after Rhoads spent several years getting to know the institution through its membership program. After their marriage in 2012, they decided to increase their financial commitment. Rhoads and Fisher are members of the Academy's 1812 Society, having remembered the Academy in their will. Today they support the Academy through our Leadership Circles of Giving, a group of highly committed philanthropists who are sincerely devoted to exploring and addressing today's most pressing issues in biodiversity and environmental science.

"It doesn't take a lot of money to get involved and make a difference," Fisher says. "It gives you a more in-depth relationship with the place you are passionate about—just join as a member first and find out what organization you love."

Since their early days of membership, Rhoads and Fisher have been frequent visitors, and today they attend many events, such as *Cuisine from the Collections*, an annual event featuring food and drink inspired by the Academy's 18 million scientific specimens. They were especially excited to receive a backyard audit after bidding on it at *Cuisine from the Collections* in 2013.

In spring 2014, scientists from the Academy's Patrick Center for Environmental Research visited the couple's home and conducted the backyard audit. They surveyed their creek for fish, salamanders, and invertebrates, and they documented the variety of species present on the property. The scientists then developed a report and recommendations for how Rhoads and Fisher could make their property a wildlife refuge.

Having opportunities like this to interact with scientists is a primary reason Rhoads and Fisher continue to support the Academy. Fisher, who studies paleontology, spent time with vertebrate paleontologist Ted Daeschler and saw the type specimen of *Tiktaalik roseae*—the famous 375-million-year-old fossil lobe-finned fish with many features only seen in tetrapods (limbed animals). She counts that experience among the five best moments of her life.

Rhoads and Fisher recently deepened their involvement with the Academy by helping the institution consider how to share its science with museum visitors in the future. As the couple sees it, they are in a unique position to promote the accessibility of real science through their support of the Academy's growth. They are leading by example—making a difference through outreach, conservation, and stewardship. *~Mary Alice Hartsock*

THE TRUTH ABOUT CHARITABLE GIVING

Whether you have been supporting the Academy for decades or you are a new contributor, you may have questions about the best strategies for charitable giving. Below we present several common truths and misconceptions about giving, and we offer helpful tips for becoming an informed contributor.

1. True or False: Writing a check is always the best way to support a charity.

Believe it or not, the answer is **FALSE**. Charities love receiving cash. (Who doesn't?) But it's not necessarily the most advantageous way for you to make charitable gifts.

Do you own stock? It could be a better option. The shares in your brokerage account are probably "publicly traded," which means they're sold on the New York Stock Exchange, NASDAQ, or something similar. If those shares have grown in value since you purchased them and you've held them at least a year, then you probably have a great asset to give to charity.

Here's why: When you give this stock to a public charity like the Academy of Natural Sciences of Drexel University, you get an income tax deduction. That deduction is based on the stock price of those shares—the amount that it would take to buy or sell those shares on the day that the charity receives them. In addition, you are not subject to taxes on the gain that's built up in those shares. When the charity sells the shares, capital gains taxes are avoided because the charity is a tax-exempt entity.

2. True or False: Only rich people need to think about charitable deductions at tax time.

FALSE. Do you have a home mortgage? If so, you probably already itemize your deductions because the government gives you a tax break on your mortgage interest. Anybody who itemizes their deductions on their tax return can take advantage of the tax benefits of charitable giving, and if you volunteer for a qualified nonprofit organization, be sure to tell the IRS at tax time about any expenses you incurred. Both of these things can reduce your tax bill.

3. True or False: If you want to leave money to a charity when you pass away, your only option is to name the charity in your will.

Again, the answer is **FALSE**. Many people choose to heed the old saying, "You can't take it with you," and leave a bit of their estate to a charity like the Academy at their passing through bequests in their wills. Bequest gifts made through a will are among the easiest and most popular charitable giving options. But bequests are not the only way to leave a legacy at a place you care about.

Here's an even better idea: consider leaving some or all of the assets in your retirement plan to the charity. If you're like many Americans, these accounts could make up a significant source of your net worth. While these accounts offer some great tax advantages as you're building up money for retirement, the catch is that these accounts can be taxed harshly if you leave them to loved ones at your death. When an heir (even your spouse) takes money out of these plans, he or she will probably owe ordinary income tax on those withdrawals. Plus, if you're subject to estate taxes, your estate may owe up to 40 percent of the value of your plans to the IRS. That's two layers of tax on one account.

If you choose to leave your retirement plan assets to charity, neither federal estate nor income taxes are imposed. One hundred percent of the retirement plan funds that you leave to charity will be received by your designated nonprofit. Talk to your plan administrator about changing your beneficiary designation, and notify the charitable organization about your intentions to ensure that your gift will be used in exactly the way you intend.

If you have any questions, please don't hesitate to contact Amy Miller Marvin, vice president of Institutional Advancement, at 215-299-1013 or marvin@ansp.org. She would be happy to assist you. Thank you for your generous support!

On behalf of the Academy's Board of Trustees, we wish to recognize and thank those who have contributed to the Academy between **December 1, 2014 and February 28, 2015**. Your generosity helps to fund our many programs of research and education, and we are tremendously grateful for your support.

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WINS students Jasmin Gilliam (left) and Ariel Bradley

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WINS students Tenzin Chemi (left) and Harleen Gonzalez

SEPOS

ORCHID SHOW

On April 24–26, the International Orchid Show and Sale will transform the Academy into a spectacular world of orchids. Take in the luscious fragrance of thousands of orchids, and visit an extensive market to purchase plants, gardening supplies, and other treasures from all over the world. The International Orchid Show is presented in collaboration with the Southeastern Pennsylvania Orchid Society (sepos.org). For more information call 215-299-1167 or visit ansp.org/orchidshow.

Michael Long Fotografie for ANS

MEMBERS' NIGHT 2015

Every year, the Academy treats our members to a special evening during which you can meet our staff, see our collections, and experience the breadth and depth of work that takes place behind the scenes. This year, Members' Night is scheduled for Friday, September 18! Our staff teams are already strategizing in anticipation of winning the coveted Members' Choice Award. Check ansp.org this summer for more information!

ANS

SUMMER CAMP FOR KIDS

Registration is now open for Academy Explorers Camp! Campers ages 5–12 can learn about natural science in a safe, fun, and engaging environment. Each week of camp explores an exciting new theme—from fossils to our extreme earth to amazing animals—and features an off-site field trip. Visit ansp.org for more information, and call 215-299-1060 to reserve your spot.

Ted Daeschler/ANS

TIKTAALIK ON DISPLAY

From May 2 through June 7, specimens of *Tiktaalik roseae*, the famous 375-million-year-old fossil lobe-finned fish with many features only seen in tetrapods (limbed animals), will be on exhibit at the Academy. A team of researchers, including Academy Paleontologist Ted Daeschler, Neil Shubin (University of Chicago), and the late Farish A. Jenkins (Harvard University), discovered *Tiktaalik* in 2004 in the Nunavut Territory of Arctic Canada. Per their research agreement, later this year Daeschler and Shubin will deposit the *Tiktaalik* specimens in the collections of the Canadian Museum of Nature in Ottawa.

PHILADELPHIA SCIENCE FESTIVAL

SCIENCE FESTIVAL

On Saturday, May 2, Academy staff will bring wild science to the Parkway during the Science Carnival of the Philadelphia Science Festival. We're joining 175 other exhibitors for this free carnival, which includes family-friendly experiments, activities, games, and a packed lineup of live entertainment. More at ansp.org.

ANIMAL GROSSOLOGY PREVIEW

On Thursday, May 14, from 5:30–9 p.m., we have a special opportunity for you, our members, to see *Animal Grossology* before it opens to the public! Bring the whole family to see the grosser (and super interesting) sides of our furry, feathered, and scaled friends. Make a craft, experience an "Ew! That comes from where?" activity at our Carts of Curiosity, and ask your most pressing questions about things you aren't allowed to discuss at the dinner table! The *Animal Grossology* Member Opening is free, but registration is required. Call 215-299-1022 to sign up!

JUST FOR KIDS

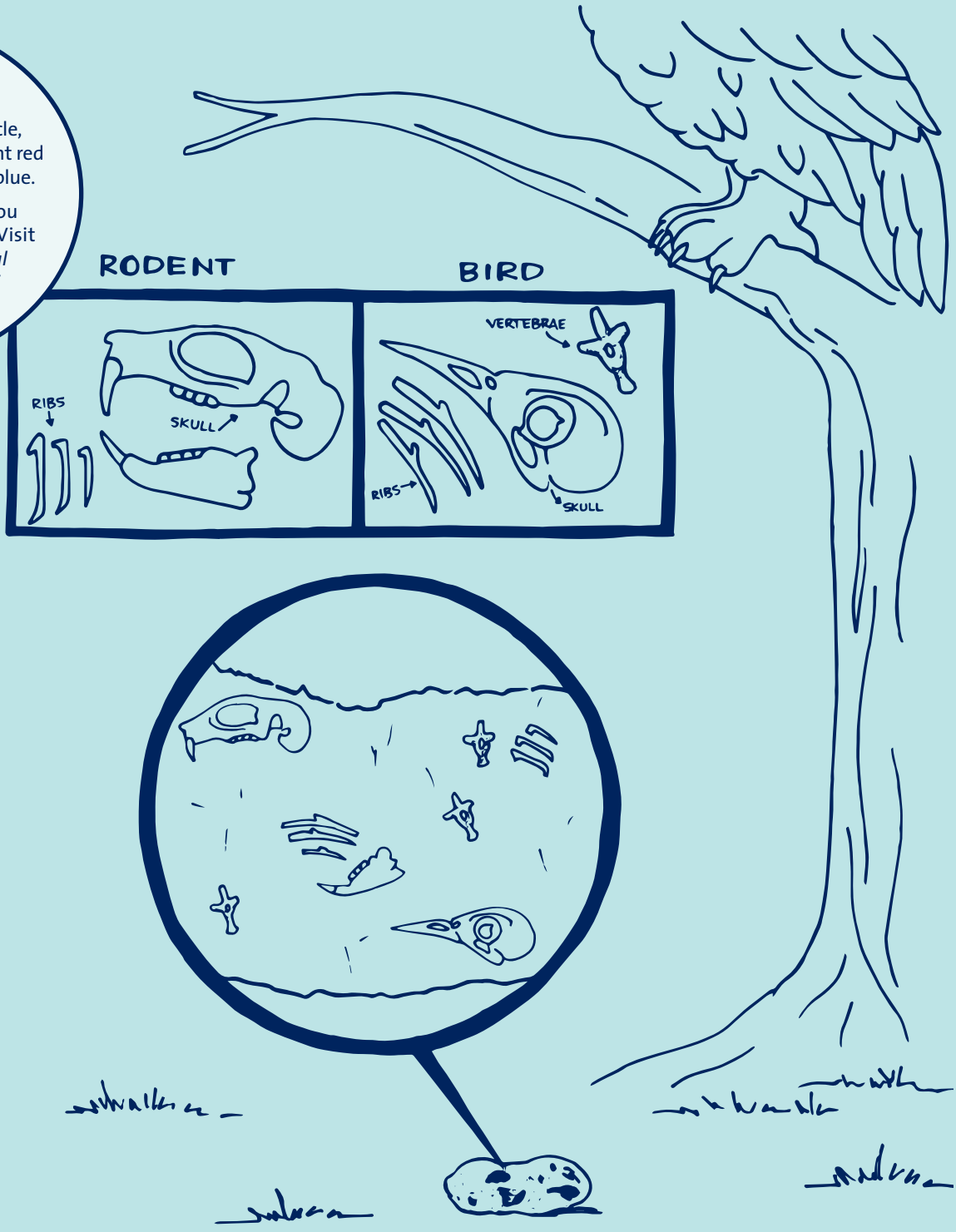
Welcome to the *Academy Frontiers* page for kids, one of the many great ways you can participate in the Academy's Kids Club!

Dissect an Owl Pellet

By examining the materials in an owl pellet, scientists can learn more about what an owl ate! Like many birds, owls cannot chew their food. Instead, food passes into their gizzard and intestines, where digestive fluids break down the fat, skin, and organs of the prey. Owls regurgitate (bring up) the materials they can't digest, such as fur, teeth, and bones.

Examine the contents of the owl pellet below to find out what this owl ate. In the circle, color the bones from the rodent red and the bones from the bird blue.

Then consider what else you might find in an owl pellet. Visit our special exhibit *Animal Grossology* to tell a staff member what you think!



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CALENDAR OF EVENTS

APRIL

Mega-bad Movie Night at PhilaMOCA
Thursday, April 16, 7 p.m. $

Family Safari Overnight
Saturday, April 18, 6:30 p.m. $ 📞

Last Day to See
Titanoboa: Monster Snake
Sunday, April 19, 10 a.m.–5 p.m. M

Tapping Our Watershed
Featuring Julie Slavet
Monday, April 20, 6 p.m. M
National Mechanics, 22 S. 3rd Street

Museum Closed for
Orchid Show Setup
Thursday, April 23–Friday, April 24 at noon

SEPOS International Orchid
Show and Sale
Friday, April 24, noon–6 p.m.
Saturday and Sunday, April 25–26,
10 a.m.–5 p.m. $ M

MAY

Philadelphia Science Festival
Science Carnival
Saturday, May 2, 10 a.m.–4 p.m. M

Farewell to Fins:
Ted Daeschler *Tiktaalik* Lecture
Wednesday, May 6, 7 p.m. M 📞

Animal Grossology
Member Opening
Thursday, May 14, 5:30–9 p.m. M 📞

Autism Access Early Opening
Saturday, May 16, 9 a.m.

Animal Grossology Opens
Saturday, May 16, 10 a.m.–5 p.m. $ *

Tapping Our Watershed,
Green City, Clean Waters
Monday, May 18, 6 p.m. M
National Mechanics, 22 S. 3rd Street

Mega-Bad Movie Night: *The Fly*
Thursday, May 21, 5:30 p.m. $ 📞

Last Day to See
Caryn Babaian: Nature in Chalk
Sunday, May 31, 10 a.m.–5 p.m. M

JUNE

Bruce Tepper/ANS

From left: WINS students Jaidah Murray, Linda Gutierrez, Arianna Bradley, Jada Parris

Clearly Beautiful: Photographs by Adam Summers Opens
Saturday, June 6, 10 a.m.–5 p.m. M

Last Day to See *Tiktaalik* on Display
Sunday, June 7, 10 a.m.–5 p.m. M

JULY

Academy Explorers Summer Camp
Weekdays, July 6–August 28 $ 📞

Tiny Tot Explorers
Wednesdays, July 8–August 26, 10 a.m. $ 📞

Mark Sabaj Pérez/ANS

M Free for members $ Fee 📞 Registration required

Unless otherwise noted, all events held at the Academy are free with museum admission.
*$3 Individual and Family level member fee for *Animal Grossology*. Family Plus level members and above receive free admission. Purchase or renew your membership today at ansp.org/membership.

Visit ansp.org for more information and to register.