

# ROTUNDA



AMERICAN MUSEUM OF NATURAL HISTORY

Member Magazine  
Summer 2012 Vol. 37 No. 3

## LIVING EXHIBITS

IN  
SEARCH OF  
SPIDERS



*Spiders Alive!*  
Opens July 28



## From the President

Ellen V. Futter



Summer 2012 marks an exciting and historic milestone for the American Museum of Natural History. This June, we welcome our inaugural class of teacher candidates into our new Master of Arts in Teaching (MAT) program, the nation's first free-standing, museum-based Master's program to prepare science teachers, in this case, Earth and space science teachers for grades 7 through 12.

This new 15-month program addresses a critical shortage of qualified science teachers in New York State, particularly in high-needs schools with diverse populations. Co-developed by Museum scientists and educators, the program incorporates academic theory and learning with residency-based practice in five New York City-area high-needs partner schools. It offers an innovative approach to preparing science teachers who have a deep understanding of scientific content, of the practice of scientific inquiry, and of the relevance of science to students' daily lives.

Our first cohort of 21 students is a passionate, diverse, and devoted group of individuals who care deeply about science and about young people. Two-thirds are recent graduates with Earth science degrees ranging from geology to atmospheric science, Earth and space science, and Earth and environmental engineering. One-third are career changers, coming from fields that include social work, risk management, and informal education. More than half currently reside in the greater New York metropolitan region, with the remainder coming from a variety of locations including Oregon, California, Illinois, Pennsylvania, and even Shanghai, China.

We are delighted to welcome these students to the Museum community and look forward to updating you on the progress of our first class of teacher candidates and of the MAT program overall as we continue to forge a new role for museums in actively improving science education in the United States.

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## ROTUNDA

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## Spiders Alive! to Feature Sculpture by Louise Bourgeois



This spider sculpture will be installed in the Grand Gallery to mark the exhibition *Spiders Alive!*

Near the entrance to the Museum's new exhibition *Spiders Alive!*, visitors will encounter a particularly striking specimen: a sculpture by the late French-born American artist Louise Bourgeois, who was famous for her renderings of arachnid forms. The roughly 4-foot-diameter bronze piece, which was completed in 1995 and is called Spider 1, will be installed in the Grand Gallery on the first floor.

"There are more than 42,000 species of spiders in the world—and then there are the intriguing spiders of Louise Bourgeois," says David Harvey, senior vice president for exhibition. "*Spider 1* is a wonderful work of art, welcoming visitors to experience *Spiders Alive!*"

With a bulbous body and spindly legs, Spider 1 exudes both strength and delicacy, a characteristic of the artist's work, in which, as *New York Times* art critic Holland Cotter once wrote, "fragility and fierceness were...the twin poles." Bourgeois, who died in Manhattan in 2010 at the age of 98, had a particular fascination with spiders, expressed in a set of etchings called *Ode à ma Mère* and in towering spider sculptures named *Maman*. As the titles make clear, the inspiration for these works was her mother, whose occupation the artist famously compared to a spider's. "Like a spider, my mother was a weaver," Bourgeois was quoted as saying in 2008, when the Tate Modern in London acquired a *Maman*. "My family was in the business of tapestry restoration, and my mother was in charge of the workshop. Like spiders, my mother was very clever. Spiders are friendly presences that eat mosquitoes. We know that mosquitoes spread diseases and are therefore unwanted. So, spiders are helpful and protective, just like my mother." *Spiders Alive!* opens July 28.

## Northwest Coast Hall Conservation Complete

Several months ago, *Rotunda* reported about the efforts to restore wooden carvings from the Hall of Northwest Coast Indians (see "Conserve and Protect" on page 8 in the Winter 2012 issue). The project is now complete and the carvings, an assemblage of house posts, totem poles, and masks from the Pacific Northwest, are back on view in the hall, the Museum's oldest.

The Division of Anthropology's Objects Conservation Lab spent months strengthening the poles by inserting removable fills and investigating layers of coatings to find the original artists' creation, a project made possible with support from the Institute for Museum and Library Services and the Stockman Family Foundation.

"You want to restore them to be as close as possible to when they came into the Museum so that they can continue to speak for the people whose culture they represent," says Curator Peter Whiteley. "But you also want them to be stabilized and to be preserved as safely as possible for the long term."

On your next visit, look for the two large house posts with outstretched arms near the front of the hall that have been placed in new positions to "greet" entering visitors.

To read the Winter 2012 story about the Objects Conservation Lab, or other back issues of *Rotunda*, visit [amnh.org](http://amnh.org).



Restored house posts have been reinstalled to "greet" visitors.

Louise Bourgeois, SPIDER 1, 1995; Bronze, dark and polished patina, wall piece; 50 x 46 x 12 1/4", 127 x 116.8 x 31.1 cm; Courtesy Cheim & Read and Hauser & Wirth; Photo: Allan Finkelman, © Louise Bourgeois Trust; bottom, © AMNH/D. Finnin



NOT QUITE SQUID

Though the vampire squid’s scientific name, *Vampyroteuthis infernalis*, means “vampire squid from hell,” it’s not actually a squid. The cephalopod is the sole member of its order, Vampyromorpha, a type of intermediate between squids and octopi. And at 1 foot long, it’s not as terrifying as the name suggests, although its red eyes and black skin in some light levels give it an otherworldly appearance.

MAKING THE MODEL

Preparator Carlisle Champalimaud crafted the vampire squid model for *Creatures of Light* using a squid from the market as a guide to re-creating the animal’s gelatinous texture. While the model’s tentacles are solid, the body is hollow and lightweight. After attaching the tentacles to the body, Champalimaud applied a two-part epoxy across the whole animal to make it appear as one piece. The final touch was the vampire squid’s cloak, made of linen cloth painted with liquid plastic.

BRIGHT IDEAS

The vampire squid model gets its glow from interior LED lights in the tentacles and body. The whole animal was painted with black primer save for the arm tips and two large photophores so the model would glow in all the right places. Since a vampire squid’s eyes reflect light rather than glow, Champalimaud painted them red from the inside and lined them with foil—yet another advantage of creating a hollow body mold.

SPLIT PERSONALITY

The larger-than-life model shows the vampire squid in the process of switching between poses: not full “pineapple” position, yet with its beak and cirri visible. “The vampire squid is so transformative and elusive that the hardest part was narrowing it down to one form,” says Champalimaud. “And being certain I’ve chosen the most interesting pose so viewers can see all the parts.”

MAKE YOUR OWN

Kids can make their own model that flashes, blinks, or glows with the “Make Your Own Creatures of Light” OLogy activity at [amnh.org/OLogy](http://amnh.org/OLogy). Grab a flashlight and art supplies to see what vampire squids, fireflies, anglerfishes, and other animals look like in the dark.

A Brilliant Defense

Humans marvel at the beauty of glowing organisms, but usually, nature’s light displays serve a much more practical purpose.

When pushed to the limit by a predator, the vampire squid envelops its adversary in a smokescreen of glowing particles. After ejecting luminescent mucus from the tips of its eight tentacles, this master of disguise makes its escape, “flying” through water with its fins rather than jet-propelling like most other cephalopods. The sticky mucus, which glows for up to 10 minutes, may even coat the predator and make it more vulnerable to attack.

While this technique is the vampire squid’s last resort, the animal has evolved a suite of finely controlled light tricks to avoid becoming a meal. When threatened, the creature curls its Dracula-like cloak of webbed arms around its soft body, exposing a black underside and fanglike projections, or cirri. From this “pineapple” position, meant to intimidate predators, the animal waves its glowing arm tips in a confusing display of fireworks. Should the predator bite off an arm tip, it can be sacrificed and regenerated, much like a lizard’s tail.

Meanwhile, two large light organs that mimic eyes peer from beneath the cloak. The vampire squid can slowly contract the muscles around these photophores, giving the impression that the “eyes” are shrinking and that the squid has sped away. With all these moving and glowing parts, predators are often too disoriented to strike.

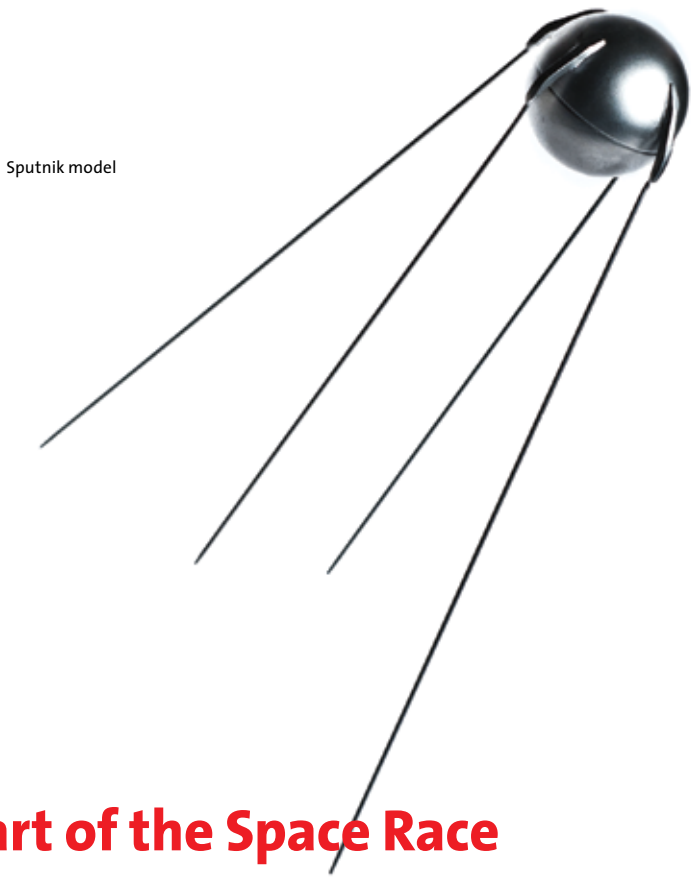
Scientists still have much to learn about this creature of light, which lives 3,000 feet below sea level in the zone of the ocean with the lowest concentration of oxygen.

Members receive free admission to *Creatures of Light: Nature’s Bioluminescence*, which features a model of the vampire squid at 350 percent its natural size. For exhibition credits, see page 15.



© AMNH/R. Mickens

Sputnik model



Start of the Space Race

On October 4, 1957, the Soviet Union launched Sputnik-1, the first man-made satellite to successfully orbit the Earth, its beeping signal picked up by radio operators around the globe. Weighing in at just under 184 pounds and measuring 22.8 inches in diameter, Sputnik soared to space amid the tensions of the Cold War between the United States and the Soviet Union, creating significant political and scientific fallout. A life-sized model of the satellite, whose name means “fellow traveler” in Russian, is featured in the current exhibition *Beyond Planet Earth: The Future of Space Exploration*.

Sputnik’s success sparked a space race in which the U.S. would eventually claim victory when it landed a crew on the Moon on July 20, 1969. But the story of jockeying for supremacy in space obscures the lasting, positive legacy of Sputnik—the myriad technological advances that this first leap into space inspired and the countless subsequent satellites that have seemingly compressed distances on Earth while expanding our knowledge of the vast universe beyond.

Unmanned missions have explored every planet in the solar system and continue to travel beyond it, seeking images of the oldest, most distant galaxies. The International Space Station has hosted more than 200 men and women from countries around the world who conduct experiments and live and work in space. Private companies are also in the mix, developing commercial vehicles to ferry astronauts, private citizens, and cargo beyond Earth’s atmosphere. Scientists talk of lunar bases, elevators from the Moon to Earth, mining asteroids, sending manned missions to Mars, and even creating a habitable environment there for humans through a process called terraforming.

“We’ve made some fabulous discoveries but there’s much more yet to learn,” says astrophysicist Michael Shara, curator of *Beyond Planet Earth*. “In the next 50, 75, 100, 500 years, if we put our minds to it, the solar system can be ours, the detection of life beyond Earth can be ours, and eventually all of the stars in the Milky Way, the 200 billion stars, the trillion planets can be ours to explore. We just have to have the will to do it.”

Don’t miss *Beyond Planet Earth: The Future of Space Exploration*, on view until August 12 and free for Members. For exhibition credits, see pages 15–16.

COMPETITIVE ADVANTAGE

A generation of schoolchildren felt the reverberation of Sputnik in the classroom. On September 2, 1958, Congress passed and President Dwight D. Eisenhower signed the National Defense Education Act, which poured federal money into elementary and high schools across the country to boost math, science, and foreign language education.

GOOD CONNECTIONS

It is impossible to overestimate the impact that satellites have had on everyday life, from the first television signals transmitted by AT&T’s Telstar satellite in 1962 to the thousands of satellites supporting global positioning systems, the telecommunications industry, world-wide weather monitoring, scientific research, and more.

PICTURING SPACE

Satellites help generate images and data used by the Museum’s astrovisualization team to create popular Space Shows in the Hayden Planetarium and to update the Digital Universe Atlas, the scientifically accurate, three-dimensional map of the universe. The monthly Hayden Planetarium Astronomy Live! programs sometimes show all the satellites in Earth-orbit now.

THE HUBBLE LEGACY

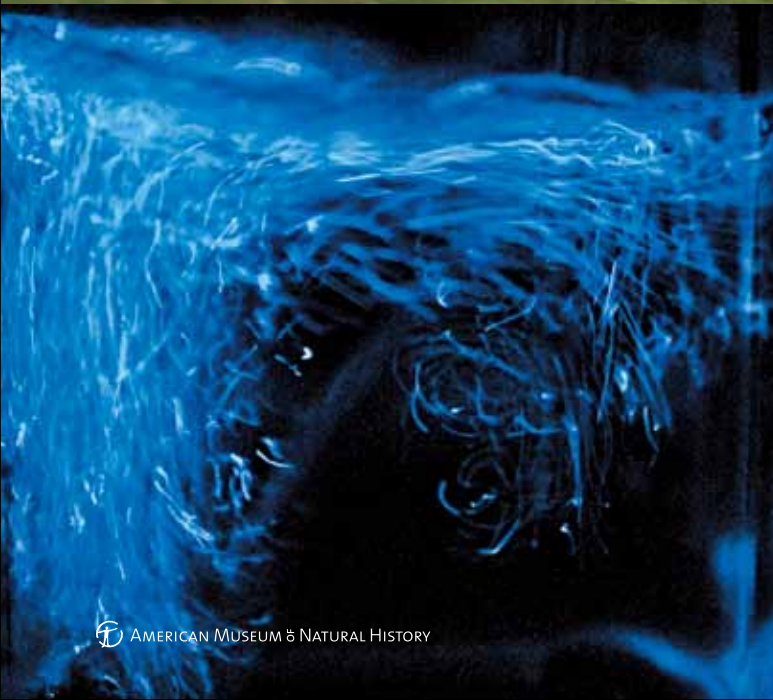
For more than 22 years now, the Hubble Space Telescope has been orbiting Earth every 96 minutes at a distance of 380 miles, well beyond the distorting effects of Earth’s atmosphere. Named for astronomer Edwin P. Hubble (1889–1953), it has sent back incomparable views of the universe and enabled such key discoveries as dark energy—the force thought to drive the expansion of the universe—and exoplanets, planets orbiting other stars.

ON THE HORIZON

Scientists look forward to the planned 2018 launch of the James Webb Space Telescope. Named for the NASA administrator who oversaw the Apollo manned missions to the Moon, this telescope is designed to orbit about 1 million miles above the Earth and detect celestial objects much fainter and further back in time than even Hubble can detect.



# Exhibits Alive!



**On July 28**, the Museum's new exhibition *Spiders Alive!* will offer visitors access to the hidden worlds of arachnids, from red-kneed tarantulas and burrowing trapdoor spiders to the feared black widow and gargantuan goliath bird eater.

The latest in a series of special live-animal exhibitions, which in the last few years have included the amphibian favorite *Frogs: A Chorus of Colors*, reptilian showcase *Lizards and Snakes: Alive!*, and the ever-popular *Butterfly Conservatory*, *Spiders Alive!* is a powerful illustration of the biodiversity of a specific animal group and an opportunity for a rich learning experience. "When we present live-animal exhibitions, we're giving people a way to personally connect to science," says Museum Curator Darrel Frost, who oversaw the 2010 *Lizards and Snakes* exhibition.

While live animal exhibitions offer visitors a unique chance to experience nature, animals are much less predictable than fossils to display. When selecting species for shows—whether for all-live exhibits focused on particular groups of animals or for major exhibitions where live animals highlight particular concepts—curators and exhibition staff must consider lighting, placement, temperature, and in some cases, an animal's age or sleeping habits. "Animals have personalities and preferences," says Frost. "There are some fascinating animals that can't be shown because they don't do well with people or the exhibition environment. To put them on display, you'd have to put them in an uncomfortable situation."

For animals that do acclimate, creative display solutions are required. In 2009, *Extreme Mammals* featured sugar gliders, small marsupials with a membrane between their front and back legs that allows them to coast between trees. The animals were included in the exhibition in large part because of this trait, which is highly unusual among mammals. Since they are nocturnal, however, their internal clocks had to be reset so that they would be active during Museum hours. "We essentially switched their day and night so that people would be able to see them," explains Manager of Living Exhibits Hazel Davies. Her team created two boxes that mimicked natural nests where the sugar gliders could sleep during the night under bright lights calibrated to approximate the Sun, while during the day, the dim enclosure in the gallery imitated the night.

Spiders present their own difficulties in a live exhibition. For one, they're hardwired to hide. "A spider's instinct is to be



Spotting Dangerous Species

Visitors to *Spiders Alive!* will have a chance to see trained staff members handle several species of spiders, which are generally not dangerous to humans. As Curator Emeritus Norman Platnick explains, spiders are rather shy: they tend to avoid people and bite only as a last resort. Even then, their fanglike chelicerae are often too small to pierce human skin, and, while almost all produce venom, in most cases it is too weak or too scant to pose a threat to humans. The exhibition will include a few potentially harmful species—behind glass, of course—in part to help visitors learn when to keep their distance.

Brown Recluse

Also known as fiddleback spiders for the violin-shaped pattern on their backs, *Loxosceles reclusa* spiders have three pairs of eyes rather than the usual four. Common in the southern and lower midwestern U.S., these small (1/4 inch to 3/4 inch) brownish spiders are rarely aggressive. Their bite, however, can be serious, in some cases causing lesions, fever, muscle pain, and other symptoms. While the bite is seldom fatal, skin lesions can be slow to heal and leave deep scars.

Black Widow

These spiders of the genus *Latrodectus* include more than 30 species, five of which are common in North America and some of which can be found in New York State. Females are about 1/2 inch long and black with a red hourglass marking or red spots on their underside. They produce neurotoxic venom, which attacks the nervous system of bite victims and can cause headache, nausea, stomach cramps, tremors, chest pain, and even death in humans (although healthy adults usually recover from bites). The much smaller gray or brown males are not dangerous.

Others to Avoid

Although they won't be part of the exhibition, worldwide the most dangerous species include Australian funnel-web and Brazilian wandering spiders, which have high levels of lethal neurotoxic venom that attacks the nervous system of bite victims.

as far away from you as possible,” says Curator Norman Platnick, who is Peter J. Solomon Curator Emeritus in the Division of Invertebrate Zoology and the Museum scientist who oversaw the exhibition. “You have to work to be bitten. It’s a last resort for them.” Most spiders blend into their habitats and spend much of their time lying in wait for prey, their stillness making them even more difficult to spot.

The Exhibition Department has a few strategies planned to maximize the number of spiders visitors will see while keeping the animals within their comfort zone. All of the habitats will be custom made for maximum visibility and ease for the particular species.

For example, since tarantulas enjoy dark, protected spaces, many of their enclosures will include a piece of bark to serve as shelter. The cages will be oriented so that visitors will be able to see the underside of the wood, as well as the “hidden” spider, who will still feel safe and secure. Some of the tunneling arachnids, such as desert hairy scorpions, will be displayed in a matrix of individual “condos.” And the branches in the enclosures of web-building spiders will be positioned to encourage them to build webs in visible locations—so that even if a spider is hiding, its out-of-body artwork can still be on show.

Creating a display-friendly habitat is just one important ingredient in a live exhibition. Sometimes, human presenters are the other solution. In *Spiders Alive!*, staff explainers will use handheld microscopes that project onto a large screen to point out miniscule features of spider anatomy, such as their fine hairs and fangs. They will also demonstrate, through careful handling, that reasons for fearing arachnids are greatly exaggerated. Spider venom, after all, evolved to work on small insects rather than humans.

Interacting with animals calls for precise timing and breaks. Spiders in the demo areas will be alternated to allow them time for rest, and explainers will also use spider molts as an illustration tool. Similarly, the glowing dinoflagellates in the Museum’s current exhibition *Creatures of Light* need breaks from their bright blue light shows (previous page, bottom left). These microorganisms, famous for creating the luminous “bio bays” in Puerto Rico, only flash when the surrounding water is in motion. While the Exhibition Department solved this problem by using a device to blow bubbles into the water, there’s a limit to the commotion dinoflagellates can take. “The animals can’t flash constantly since they’ll use up their bioluminescent chemicals,” explains Davies. “So we keep the bubbles intermittent.” Three canisters that bubble at different intervals ensure visitors can see the glow.

As with any live show, there will always be an element of the unexpected. There’s no guaranteeing that the orb weavers in *Spiders Alive!* won’t build their webs on the cage doors, which will have to be opened at night for feeding. And while the Exhibition Department hopes to coax the trapdoor spider to build its burrow along the glass to showcase its underground, web-lined home, the animal may not cooperate.

Lessons learned about exhibiting live spiders may someday come into play in the Discovery Room, a hands-on hall for all ages to explore nature, science, and culture. Located on the first floor, the room is home to live frogs, lizards, and tarantulas, as well as to some of the stars of former special exhibitions, including the mudskipper from the 2007 exhibition *Water: H2O = Life*. The Discovery Room plans to take on additional spiders to coincide with the upcoming exhibition.

“The more people look, the more they question, the more they see,” says Discovery Room Manager Daniel Zeiger. “These animals are launching points for rich conversations about science.”

See live arachnids in *Spiders Alive!* starting on Saturday, July 28, or visit *Creatures of Light* to view flashlight fish and glowing dinoflagellates.

Photos on page 6: Top row: © AMNH/D. Finnin (l), R. Mickens (r) Center row: © AMNH/D. Finnin (l, c), R. Mickens (r); Bottom row: D. Finnin (l, c), Courtesy of Clyde Peeling's Reptiland (r)

Photos on page 9: © AMNH/D. Finnin (top, center) and R. Mickens (bottom)

You're Invited  
MEMBER PREVIEW: JULY 27

For centuries, spiders have inspired storytellers from Ovid to E.B. White to the creators of the eponymous superhero. No wonder: these incredibly versatile animals inhabit every continent except Antarctica and can survive in environments that range from deserts to rain forests to crowded cities.

*SPIDERS ALIVE!* will offer visitors a close look at the fascinating world of arachnids and features 20 species that include the goliath bird eater, one of the largest spiders in the world, and the venomous black widow.

Members are invited to see this exciting new exhibition on **FRIDAY, JULY 27**, before it opens to the public. Explore the gallery at your leisure between 10:30 am and 5 pm.

This exclusive Member benefit is **FREE**, but timed-entry tickets must be picked up that day at any Membership Desk. Call 212-759-5606 for additional information.

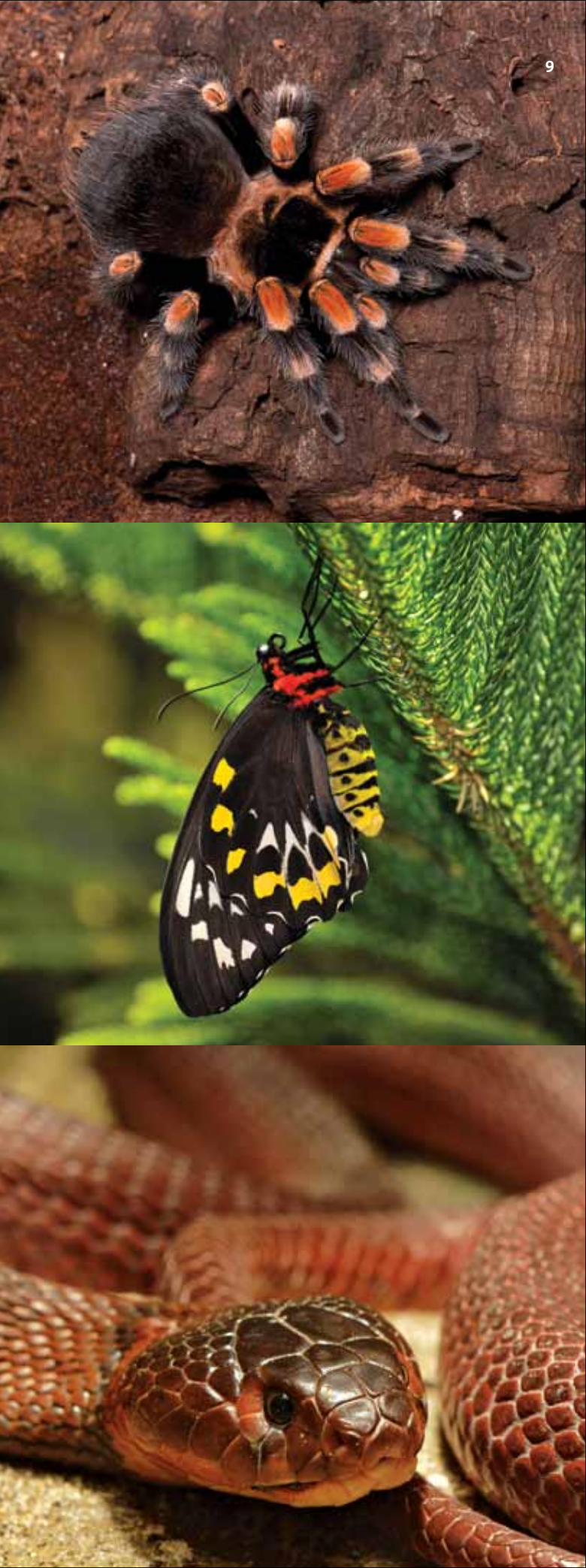
Objects May Be Closer Than They Appear

The stars of any Museum exhibition must be photographed for the gallery’s graphic panels, promotional materials, and more. This can be a delicate process when the model is a jumping spider or a deadly spitting cobra.

While shooting this venomous African snake for *Lizards and Snakes*, for example, the Museum’s Photography Studio Director Denis Finnin used a long lens. But much like a rear-view mirror, this gave him a false sense of where the cobra was even as the animal inched closer. “I had to keep one eye on the camera and one eye on the snake,” Finnin recalls. Once the cobra was in its enclosure in the exhibition, Senior Photographer Roderick Mickens was able to get even closer for a portrait (right).

Timing was also an issue when photographing the *Spiders Alive!* models. Though spiders spend most of their time standing still waiting for prey, they move quickly when on the hunt or agitated. “You have to shoot up close, which means you don’t have much depth of field,” says Finnin. “And if they keep moving, it’s hard to stay in focus.” As a solution, Finnin used the spiders’ heads as a focus point.

When Finnin recently photographed the regal jumping spider, known for its quick movements, three people stood around the table with cups, ready to catch it. The photo team also used strobe lights instead of hot lights, which would have agitated the spider and made it move even faster. All arachnid models received a break every five minutes, giving the photographers a chance to review the shots on the computer and decide whether more would be needed.







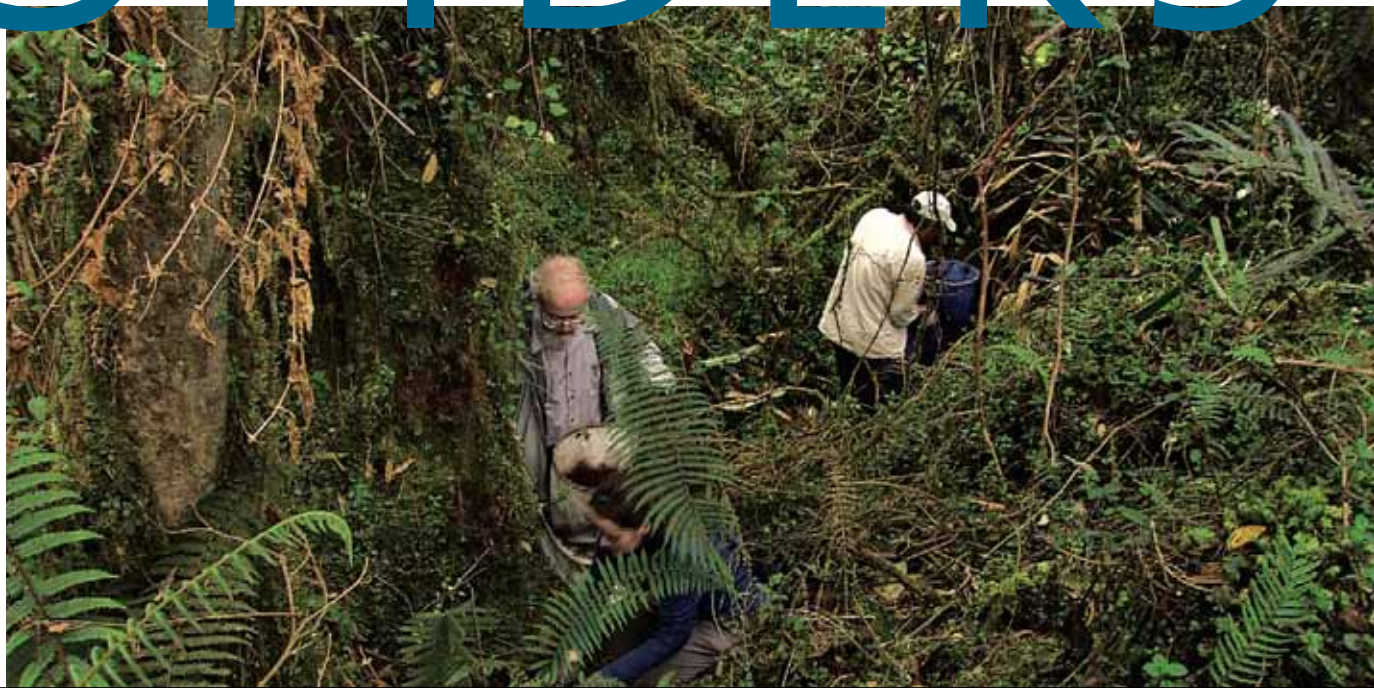
SEEKING



OUT



# SPIDERS



© AMNH/Science Bulletins; SEM image © AMNH/N. Dupérré

**The Museum is home to the largest collection of spiders** in the world, one that is still growing through the fieldwork of scientists such as Norman Platnick, Peter J. Solomon Family Curator Emeritus in the Division of Invertebrate Zoology. Platnick, who has discovered and described more than 1,600 new spider species, says there are many more to find.

“Collections are the only way we can document the plants and animals with which we share this planet,” says Platnick. “For groups that are as poorly known as spiders, there are many areas in the world where they have not been collected at all.”

One of his recent collecting efforts, in late 2010, took Platnick and his team on a month-long expedition into the cloud forests of northeastern Ecuador. Science Bulletins, the Museum’s multimedia program that covers current science, followed the researchers as they worked day and night seeking out spiders from the forest floor to the high canopy.

“Fieldwork is a messy enterprise, which is part of what makes it fun,” explains Platnick, pictured in the field on the left. “If you go on an expedition with a purpose that’s too specific, you’re going to come home very unhappy—it isn’t always easy just to go to an area and find one particular species.”

Though Platnick specializes in goblin spiders, a family of tiny arachnids found mostly in forest leaf litter, his international team



of arachnologists collects not only every spider they can, but also the insects and other invertebrates they find. At the end of the trip, these samples are packed up and sent to scientists who study those species all over the world.

The goblin spiders, however, are sent directly to Platnick and his team in New York. Here, on the Museum’s fifth floor, scientific assistants photograph the microscopic details of each specimen using a high-powered scanning electron microscope (SEM), an immense undertaking.

“Because our spiders are really small, the regular microscope is not powerful enough to show in detail the surface of the spiders,” says scientific assistant Nadine Dupérré. “So the SEM is very useful.” With the SEM, scientists can visualize the individual body parts of each spider, the hairs emerging from between those parts, and even the complex pattern of bumps on the spider’s exoskeleton that may be unique to that species. It’s often the only way to find out whether a particular spider has been seen before or is completely unknown to science. ①

For more about Dr. Platnick’s fieldwork, watch Science Bulletins’ documentary about the spider expedition, now playing in the Hall of Biodiversity and online at [amnh.org/sciencebulletins](http://amnh.org/sciencebulletins).

## Three Ways Scientists Collect Spiders



### **SORT BY HAND**

Traditional hand-sorting is a basic but essential technique for collecting spiders. Scientists haul white sheets to the field that serve as a background. Occasionally, they use tubes called “pooters” to suck up specimens like soda. A screen at the end of the tube ensures no spiders are swallowed.



### **GRAB THE FUNNEL**

A device called a Berlese funnel lets scientists sort through leaf litter in the field. As they spread the litter over a fine mesh and shine a hot light from above, the leaves dry out and animals stir. The smallest ones fall through the mesh, down a funnel, and into a collecting jar, making this ideal for finding tiny goblin spiders.



### **SEIZE THE NIGHT**

Scientists who study web-building spiders rely on night collecting to find these species at their most active times. After locating spiders and their webs with the help of headlamps, scientists dust the webs with cornstarch in order to visualize them for photography or later study.





ention spiders to a book lover and, inevitably, talk turns to *Charlotte's Web*, E.B. White's story of love and loyalty between a spider named Charlotte and her friend Wilbur, the runt pig.

The story has charmed children and adults alike since it was first published 60 years ago.

Its plucky heroine is fiction, of course. After all, this spider talks and writes: who can forget her cheery "Salutations!" or the words she weaves into her web, most memorably "SOME PIG," the start of a public relations campaign to spare Wilbur's life. This is an act so out of the ordinary it leads a clergyman to conclude that "human beings must always be on the watch for the coming of wonders."

Still, there are aspects of Charlotte's life that have some basis in scientific fact, and this is where the American Museum of Natural History comes in. According to several accounts, including *The Story of Charlotte's Web: E. B. White's Eccentric Life in Nature and the Birth of an American Classic* by Michael Sims, White relied heavily for his research on Willis J. Gertsch, a curator in what was then the Museum's Department of Insects and Spiders. The results are readily apparent in certain details—Charlotte is sedentary, near-sighted, stuns her prey, works at night—and an attention to anatomy rare in a children's book.

"You have awfully hairy legs, Charlotte," said Wilbur, as the spider busily worked at her task.

"My legs are hairy for a good reason," replied Charlotte. "Furthermore, each leg of mine has seven sections—the coxa, the trochanter, the femur, the patella, the tibia, the metatarsus, and the tarsus."

"...Say those names again, I didn't catch them the first time."

"Coxa, trochanter, femur, patella, tibia, metatarsus,

and tarsus."

"Goodness!" said Wilbur, looking down at his own chubby legs. "I don't think my legs have seven sections."

"Well," said Charlotte. "You and I lead different lives. You don't have to spin a web. That takes real leg work."

In the many months White spent studying spiders before starting to write *Charlotte's Web*, he pored over scientific texts, including *The Spider Book* by John Henry Comstock, a 1912 work revised by Curator Gertsch, and Dr. Gertsch's own newly published *American Spiders*. Eventually, White met with Gertsch in person, a list of questions in hand.

Gertsch's generosity was legendary. In an appreciation published in the *Bulletin of the American Museum of Natural History* in 1981 on the occasion of Gertsch's 75th birthday, fellow arachnologist B. J. Kaston wrote, "Gertsch was always helpful, not only to the scientists who visited him, but also to those who wrote for help... He also encouraged youngsters who came to the Museum with their questions. I can recall a number of occasions while I was in the laboratory when he would take time to help a youngster who had come to his door, or to answer questions over the phone." Kaston went on to note, "The well-known author E. B. White, in his book *Charlotte's Web*, acknowledged Gertsch's help when it became necessary to suggest the name of the species to which Charlotte belonged."

"My name," said the spider, "is Charlotte."

"Charlotte what?" asked Wilbur, eagerly.

"Charlotte A. Cavatica. But just call me Charlotte."

White had at first thought the book's inspiration, a spider he had seen firsthand on his farm in Maine,

was a gray cross spider of the genus *Epeira*. But after reading Comstock and consulting Gertsch, he came to name her Charlotte A. Cavatica, for *Aranea cavatica*, a species of barn spider. (In the book, one of Charlotte's 514 offspring takes the first name Aranea.)

White no doubt also took a cue from Gertsch's lyrical descriptions of a spider's "urge toward ballooning."

"What is an aeronaut?" asked Wilbur.

"A balloonist," said Charlotte. "My cousin used to stand on her head and let out enough thread to form a balloon. Then she'd let go and be lifted into the air and be carried upward on the warm wind."

"Is that true?" asked Wilbur. "Or are you just making it up?"

"It's true," replied Charlotte. "I have some very remarkable cousins."

The Museum figured in Charlotte's appearance, too. White sent Gertsch's *American Spiders* as a picture reference to the book's illustrator, Garth Williams. One of the letters from the book's editor, Ursula Nordstrom, to E.B.'s wife, Katharine, even mentions that Williams was "on his way to the Natural History Museum" to make sketches. At that time, there was a Hall of Insect and Spider Life on the Museum's third floor.

As far as possible in a fantasy, White used his research to remain true to Charlotte's nature, down to the bitter end—that she would die after she had produced her egg sac, her "magnum opus," while away at the County Fair.

"I will not be going back to the barn," she said.

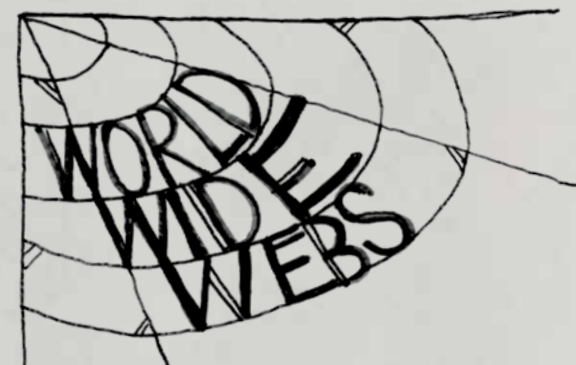
Wilbur leapt to his feet. "Not going back?" he cried.

"I'm done for," she replied. "In a day or two I'll be dead. I haven't even strength enough to climb down into the crate. I doubt I have enough silk in my spinnerets to lower me to the ground...Come now, let's not make a scene."

The publisher, Harper & Brothers, had misgivings about the death of the heroine in what was essentially a children's book but "on this point [White] refused to budge," writes Sims in *The Story of Charlotte's Web*. "Natural history could not be dodged: Charlotte's species of spider dies after spinning its egg sac."

White's choice stands the test of time. *Charlotte's Web* is as popular and enduringly poignant as when Eudora Welty first described it in her 1952 review. "What the book is about," Welty wrote, "is friendship on earth, affection and protection, adventure and miracle, life and death, trust and treachery, pleasure and pain, and the passing of time. As a piece of work it is just about perfect, and just about magical in the way it is done."

And if the Museum played even a small role in giving Charlotte her name, her anatomy, and bits of her behavior, all we can say is SOME MUSEUM. ⑥



The spinning of spider silk and weaving of webs are central to the story of *Charlotte's Web*. They are the means by which Charlotte saves Wilbur and creates her egg sac. And when her spiderlings hatch, the first thing they do is send out silk balloons to sail away upon. The three that remain immediately start weaving webs. In the book, one human concludes the process is "a miracle." But to Charlotte, it's just the way she's made: "A spider has to pick up a living somehow or other," she tells Wilbur, "and I happen to be trapper...I can't help it."

Spider webs take many forms to serve their purpose. Here's a quick look at just a few:

The most familiar web type—and the one spun by Charlotte—is the **spiral, wheel-shaped orb** used by Araneidae, Nephilidae, and other spider families. The webs are usually vertical and consist of sticky threads to catch prey and non-sticky lines for the spider to move around on.

Sheet weavers (family Linyphiidae) build **horizontal sheets of silk between branches** of plants and irregular nets above the sheets. Insects fly into the nets and fall, and the spider claims its prey. Charlotte reports that one of her cousins used this method to snare a small leaping fish. Here, White may have taken liberties. Gertsch, in *American Spiders*, describes spiders catching fish, but by direct capture rather than by "netting" them.

Diving bell spiders (*Argyroneta aquatica*) live underwater and construct a **bell they fill with oxygen from air bubbles** that they carry down from the surface on the hairs of their bodies. They dash out to catch prey, but spend most of their time inside the bell, digesting, mating, and raising offspring.

Trapdoor spiders (family Ctenizidae) don't exactly spin webs. They dig burrows in the ground which they line with silk and cover with **trapdoors** made of silk, vegetation, and soil.

Programs and Events

For more programs and to purchase tickets, visit [amnh.org/calendar](http://amnh.org/calendar).

For updates and reminders, sign up for monthly eNotes for Members by sending your membership number and request to subscribe to members@amnh.org. The Museum does not trade, rent, or sell this information.

**Tickets**

Tickets are available by phone at 212-769-5200, Monday–Friday, 9 am–5 pm, or by visiting [amnh.org](http://amnh.org). Please have your Membership number ready.

Availability may be limited. Please purchase tickets in advance.

Please be aware that ticket sales are final for all Member programs. All programs go ahead rain or shine. There are no refunds unless the program is cancelled by the Museum.

JULY

**After-Hours Tour of *Beyond Planet Earth***  
**Tuesday, July 10**  
**Tuesday, August 7**  
**6:30–7:30 pm** (family tour)  
**7–8 pm**  
**7:30–8:30 pm**  
**Free** (Registration required; call 212-769-5200)  
Blast off into the future of space exploration with one of the Museum’s knowledgeable guides before *Beyond Planet Earth* closes August 12.

**Manhattanhenge**  
**Wednesday, July 11**  
**7 pm**  
**Member price is \$13.50**  
Learn the history and simple astronomy behind Manhattanhenge, when the setting Sun aligns with Manhattan’s numbered streets. A live viewing will follow.

**Evening Bat Walks in Central Park**  
**Friday, July 13**  
**Friday, July 20**  
**Friday, July 27**  
**Rain date Saturday, July 28**  
**8:30 pm**  
**\$40** adults; **\$25** children ages 12 and younger  
**Meet at 77th Street**  
Join members of the New York City Bat Group to monitor and catalog bat species.

**Great Gull Island Research Project**  
**Thursday, July 19**  
**8 am–6 pm**  
**\$120**  
Join Project Director **Helen Hays** for a tour of the Museum’s Great Gull Island, the site of the largest breeding colony in the Western Hemisphere of the endangered Roseate Tern and threatened Common Tern. Learn about the long-term research on these seabirds, track nests, see young terns fledge, and tour the old army fort.

**Walk to Little Red Lighthouse**  
**Thursday, July 19**  
**6–8 pm**  
**\$25**  
Join geologist **Sidney Horenstein** for a stroll through Fort Washington Park and a visit to the beloved Little Red Lighthouse.

**Journey to a Lost World**  
**Saturday, July 21**  
**9 am–4 pm**  
**\$85**  
Pack your collecting bag, old sneakers, and lunch, and journey to Big Brook in Monmouth County, New Jersey, with paleoentomologist **Paul Nascimbene**. The area offers a variety of invertebrate and vertebrate fossils.

**A Night at the Museum Sleepover**  
**Saturday, July 21**  
**Member price is \$119 per person**  
Break out your sleeping bags on this after-hours adventure.

**Family Members-Only Highlights Tour**  
**Sunday, July 22**  
**10:30–11:30 am**  
**Free** (Registration required; call 212-769-5200)  
Join a guide for an insider’s introduction to the Museum.

Exhibitions and Attractions

*Admission is by timed entry only.*

***Creatures of Light: Nature’s Bioluminescence***  
**Free** for Members  
Be dazzled by the world’s variety of bioluminescent organisms. Discover how and why they glow and the ways scientists study and use bioluminescence.

***Beyond Planet Earth: The Future of Space Exploration***  
Closes **Sunday, August 12**  
**Free** for Members  
Find out about robotic missions to explore our universe and what it will take to build a lunar elevator, deflect deadly asteroids, travel to Mars, and more.

***Spiders Alive!***  
Opens **Saturday, July 28**  
Member tickets are **\$12.50** adults, **\$8** children  
This exhibition immerses visitors in the fascinating and complex world of spiders, among the most versatile animals in the planet.

***Picturing Science: Museum Scientists and Imaging Technologies***  
**Free** for Members  
More than 20 sets of spectacular large-format images showcase the wide range of Museum research being conducted with cutting-edge imaging technologies.

**Who? Why? Which?**  
**Saturday, July 28**  
**3–4:30 pm**  
**Free** (Registration required; call 212-769-5200)  
Who is the deadliest drooler, why is the sky blue, and which is the heaviest tree in the world? Find out on this family-friendly guided tour of the Museum’s halls.

**Summer Skies and Telescope Party**  
**Tuesday, July 31**  
**7:30 pm**  
**Member price is \$13.50**  
Explore city, suburban, and rural summer skies with meteorologist **Joe Rao** and astronomer **Ted Williams**. Weather permitting, a star party on the Arthur Ross Terrace will follow.

AUGUST

**Jamaica Bay Birding Walk**  
**Saturday, August 4**  
**11 am–1 pm**  
**\$25**  
Observe some of the thousands of water, land, and shorebirds that stop at New York’s Jamaica Bay Wildlife Refuge during their migration with the help of Museum ornithologist **Paul Sweet**.

**Members-Only Sleepover**  
**Saturday, August 11–**  
**Sunday, August 12**  
**6 pm–9 am**  
**\$119**  
Join us for a special Members-only sleepover that concludes with a family-friendly presentation in the Hayden Planetarium and a campout under the blue whale.

**Sail on the *Clearwater***  
**Tuesday, August 14**  
**6–8 pm**  
**\$75**  
Embark on a sunset sail aboard the historic *Clearwater*, a 106-foot wooden sailing sloop modeled after Dutch cargo vessels that traveled the Hudson River in the 18th and 19th centuries.

**Carl Schurz Park Walking Tour**  
**Thursday, August 16**  
**10 am–Noon**  
**\$25**  
See northern Manhattan, the East River, Hell Gate, and Gracie Mansion from the unique vantage point of Carl Schurz Park with geologist **Sidney Horenstein**.

**Members-Only Highlights Tour**  
**Saturday, August 18**  
**3–4:30 pm**  
**Free** (Registration required; call 212-769-5200)  
Join a guide for an insider’s introduction to the Museum.

**Shamanism Tour**  
**Sunday, August 19**  
**3–4:30 pm**  
**Free** (Registration required; call 212-769-5200)  
Join this guide-led tour and explore the anthropological halls and cultures to learn about shamans, messengers between worlds.

**Brooklyn Bridge to Brooklyn Heights Walking Tour**  
**Thursday, August 23**  
**6–8 pm**  
**\$25**  
Join geologist **Sidney Horenstein** on this walking tour that takes Members from lower Manhattan, across the Brooklyn Bridge, and into Brooklyn Heights.

**Fun with Fossils**  
**Saturday, August 25**  
**9 am–4 pm**  
**\$85**  
Pack your collecting bag, old sneakers, and lunch, and travel back in time with Division of Paleontology Collections Manager **Carl Mehling** on an expedition to Big Brook in Monmouth County, New Jersey. Plentiful fossils and diverse fauna make it an ideal spot for collecting.

**Sky to Space**  
**Tuesday, August 28**  
**6:30 pm**  
**Member price is \$13.50**  
Research scientist **Jackie Faherty** and astrophysics educator **Christina Pease** re-create pivotal astronomical discoveries in the Hayden Planetarium.

*Credits*  
Spiders Alive! is organized by the American Museum of Natural History, New York ([amnh.org](http://amnh.org)).

Creatures of Light: Nature’s Bioluminescence is organized by the American Museum of Natural History, New York ([amnh.org](http://amnh.org)), in collaboration with the Canadian Museum of Nature, Ottawa, Canada and The Field Museum, Chicago.

Creatures of Light is proudly supported by the Eileen P. Bernard Exhibition Fund.

Beyond Planet Earth: The Future of Space Exploration is organized by the American Museum of Natural History, New York ([amnh.org](http://amnh.org)), in collaboration with MadaTech: The Israel National Museum of Science, Technology & Space, Haifa, Israel.

*Credits continue on page 16*



SEPTEMBER

Fall Bird Early-Morning Walks in Central Park

Begin Tuesday, September 4

7–9 am and

9–11 am

\$85

Observe the fall migration of birds in Central Park with naturalists **Stephen C. Quinn** and **Joseph DiCostanzo**. Learn how to use field marks, habitat, behavior, and song as aids in identification.

Fossils of Fifth Avenue

Thursday, September 6

6 pm

\$25

Have you ever noticed the fossilized clams, the pieces of 350-million-year-old coral reefs, or the chambered nautilus as you strolled Fifth Avenue? Join geologist **Sidney Horenstein** for a walking tour exploring the ancient fossils and rocks that can be found among the modern elegance of this famous thoroughfare.

Birding in Prospect Park

Saturday, September 8

10 am–Noon

\$25

Join Museum ornithologist **Paul Sweet** to explore Prospect Park’s birding spots such as Lookout Hill, the Peninsula, Lullwater, and Prospect Lake and to look for birds such as warblers, vireos, tanagers, and raptors. This tour will meet at the Grand Army Plaza entrance to Prospect Park in Brooklyn.

Gateway Storytime

Mondays starting September 17

10:15 and 11:15 am

Free (Space is limited)

Story hour for children ages 2 1/2 to 5 returns to the Discovery Room in September. Tickets are available on a first-come, first-served basis. Visit **amnh.org** for more details.

Members-Only

Highlights Tour

Saturday, September 22

3–4:30 pm

Free (Registration required; call 212-769-5200)

Join a guide for an insider’s introduction to the Museum.

Astronomy Live!

Tuesday, September 25

6:30 pm

Member price is \$13.50

Mark your calendars for September’s Astronomy Live! event. These monthly programs offer an interactive tour of the universe and a view of the constantly changing night sky.

OCTOBER

Meet the Scientist

Saturday, October 6

Free

Visitors ages 7 and up can chat with scientists in the Discovery Room and learn how they became interested in their fields. Call 212-315-7105 for details.

Geology and History of Woodlawn Cemetery

Saturday, October 13

10 am–noon

Join geologist **Sidney Horenstein** on a tour of Woodlawn Cemetery in the Bronx to learn about its 140-year history and the area’s geology.

Birding in Green-Wood Cemetery

Saturday, October 20

10 am–noon

\$25

Join Museum ornithologist **Paul Sweet** on a birding excursion to the historic Green-Wood Cemetery in Brooklyn.

Program credits:

*The Discovery Room was made possible by a grant from the Edward John Noble Foundation.*

Additional support has

*been provided by Joella and John Lykouratzos, the Ralph M. Cestone Foundation, Capital One Bank, Mitsui USA Foundation, the Rose M. Badgeley Charitable Trust, the Ducommun and Gross Family Foundation, Susanne and Douglas Durst, and the Larkin Family.*

*Credits continue from page 15*

*Beyond Planet Earth is made possible through the sponsorship of **Lockheed Martin Corporation**.*

*And is proudly supported by **Con Edison**.*

*Major funding has been provided by **The Lila Wallace-Reader’s Digest Endowment Fund**.*

*Additional support is generously provided by Marshall P. and Rachael C. Levine Drs. Harlan B. and Natasha Levine Mary and David Solomon*

*Presented with special thanks to **NASA**.*

*The presentation of Picturing Science at the American Museum of Natural History is made possible by the generosity of the Arthur Ross Foundation.*

*Journey to the Stars was developed by the American Museum of Natural History, New York in collaboration with the California Academy of Sciences, San Francisco; GOTO INC, Tokyo, Japan; Papalote Museo del Niño, Mexico City, Mexico and Smithsonian National Air and Space Museum, Washington, D.C.*

*Journey to the Stars was created by the American Museum of Natural History, with the major support and partnership of **NASA**, Science Mission Directorate, Heliophysics Division.*

*Made possible through the generous sponsorship of **Lockheed Martin**.*

*And proudly sponsored by **Accenture**.*

*Supercomputing resources provided by the Texas Advanced Computing Center (TACC) at The University of Texas at Austin, through the TeraGrid, a project of the National Science Foundation.*

JULY

4

Wednesday

The Museum is open with regular hours on July 4.

10

Tuesday

After-Hours Tour of *Beyond Planet Earth*

11

Wednesday

Manhattanhenge

13

Friday

Evening Bat Walk in Central Park

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Thursday

Great Gull Island Research Project

Walk to Little Red Lighthouse

20

Friday

Evening Bat Walk in Central Park

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Saturday

Journey to a Lost World

A Night at the Museum Sleepover

22

Sunday

Family Members-Only Highlights Tour

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Friday

Evening Bat Walk in Central Park

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Saturday

Who? Why? Which? Tour

Rain date for Evening Bat Walks in Central Park

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Summer Skies and Telescope Party

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Jamaica Bay Birding Walk

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After-Hours Tour of *Beyond Planet Earth*

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Members-Only Sleepover

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Sail on the *Clearwater*

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Carl Schurz Park Walking Tour

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Members-Only Highlights Tour

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Shamanism Tour

23

Thursday

Brooklyn Bridge to Brooklyn Heights Walking Tour

25

Saturday

Fun with Fossils

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Tuesday

Sky to Space

SEPTEMBER

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Monday

The Museum is open with regular hours on Labor Day.

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Fall Early-Morning Bird Walks begin

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Thursday

Fossils of Fifth Avenue

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Saturday

Birding in Prospect Park

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Monday

Gateway Storytime returns

22

Saturday

Members-Only Highlights Tour

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Tuesday

Astronomy Live!

OCTOBER

6

Saturday

Meet the Scientist

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Saturday

Geology and History of Woodland Cemetery

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Saturday

Birding in Green-Wood Cemetery



# A Paleontological Field Project to Answer Questions About *Proconsul*



By William Harcourt-Smith

Over 60 years ago a remarkable find was made on a small island called Rusinga in the Kenyan waters of Lake Victoria. The discovery was a well-preserved skull of a primate called *Proconsul*. At the time, *Proconsul* made a lot of press for Mary Leakey, who, along with her husband Louis, had been excavating on the island since the 1950s. The Leakey name has of course become synonymous with the discovery of ancient human remains in East Africa, but back in 1948 it was not so well-known. In many ways *Proconsul* put the Leakey family on the map, but it was quickly eclipsed by their far more famous finds at Olduvai Gorge in the 1960s.

One of the reasons *Proconsul* got so much attention at the time is that, at about 18 million years old, it was argued to be one of the very earliest apes in the fossil record. Mary Leakey knew this because the skull had well-preserved molar teeth that, although primitive, linked it to previously discovered but more scrappy specimens also thought to be primitive apes. Ape molar teeth are different from those of their closest monkey relatives in that they are generally flatter with a number of distinct rounded cusps.

The emergence of apes is of huge interest to anyone concerned with understanding our own origins. The Miocene epoch (23 to 5 million years ago) saw the proliferation of numerous ape lineages, only to see the majority of them disappear and be

replaced by the large number of Old World monkey species we see today. Several ape lineages survived, including chimpanzees, gorillas, and, of course, our own, the hominins.

After the Leakeys left Rusinga, there was occasional work on the island. *Proconsul* specimens continued to be found, including a beautiful skeleton extracted from a fossilized tree trunk in the 1950s and a whole series of partial skeletons recovered at the site of Kaswanga in the 1980s by the paleoanthropologist Alan Walker. None of these specimens preserved tail bones, further solidifying the case for *Proconsul* being an ape, because tail loss is also a defining character of the ape group.

Despite these wonderful finds, very little was known about *Proconsul* beyond its immediate anatomy, implied behavior, and likely place in the primate family tree. How did it live? What did it eat? What was the environment that it lived in like? How long did it survive as a genus? Why did it die out? These are fascinating questions that have, despite some excellent individual studies, remained largely unanswered.

With such questions in mind, I have had the great fortune to work on Rusinga for the last six years. I co-direct the current paleontological field project on the island, and from a small survey of seven people in 2006 we have expanded into a truly international effort. On the last few expeditions, there were often

over 25 people around the dinner table in camp. One of the reasons we chose to revive work on the island is the outstanding fossil preservation it offers. Rusinga and the neighboring island of Mfangano are treasure chests of fossilized remains from the time *Proconsul* lived. The reasons for this are largely due to the distinct geology of the region. At the time *Proconsul* was flourishing, the nearby volcano of Kisingiri was highly active, and spewed out ash and pyroclastic lava flows at regular intervals over millions of years. This resulted in many plants and animal remains becoming covered and exquisitely preserved, in part due to the chemistry of the volcanic ashes. Of course you have to add to that a good dose of old-fashioned luck. On Rusinga, the fossil-bearing layers of just the right date are exposed at this particular moment in time.

Our approach has been deliberately multi-disciplinary. We have geologists, paleobotanists, soil chemistry experts, radiometric dating specialists, and even the world's only expert on fossil aardvarks. To date we have found over 4,000 identifiable fossils from a multitude of sites on the islands, and they promise to provide us with an extraordinary window into the time when *Proconsul* thrived. We have beautifully preserved remains of fossil leaves, wood, and seeds. There are abundant insect remains, including the tiny chambered nests of bees. On the larger scale, we have the immense long bones from extinct relatives of elephants called Deinotheres and from strange, knuckle-walking creatures called Chalicotheres. And, of course, we have plenty of *Proconsul*.



This delicate rodent jaw is among more than 4,000 recovered fossils.

All photos © W. Harcourt-Smith except for bottom left © Anthony Van Couvering

All these finds are very important in their own right, but perhaps one of the most relevant things we have been doing is to very precisely log every specimen we find at each locality using the latest technologies, such as differential GPS and high-resolution satellite imagery. Combined with precise microstratigraphic work and archaeological excavation techniques at a number of fossil-bearing sites, we are attaining an incredibly detailed glimpse into what the past depositional environment was like.

In paleontology, teams often prospect for fossils simply by walking across promising areas until they find something; if they do, it then gets methodically excavated out, but there is little in the way of context. I infinitely prefer this type of discovery to sitting in a hole all day with a dental pick, but in fact, that kind of painstaking work can reap highly significant results. Find a distinct type of plant at the same exact layer as a *Proconsul* tooth, and you can say something definitive about the environment *Proconsul* lived in. Find them scattered on the surface, and there is far less certainty.

We are still in the midst of processing and analyzing our data, but there are some exciting results coming out of the project. It's clear, for instance, that there were more than one species of *Proconsul* living at the same time and place on Rusinga. There is no modern correlate to this among apes, and we are currently trying to work out how the ancient environment would have supported them both. We are finding an abundance of new plant remains that will be hugely important for understanding the precise type of environment *Proconsul* lived in, and just recently we have gotten our first glimpse of environmental shifts over the 3 million or so years' worth of deposits we have on the islands. How the earliest apes like *Proconsul* might have dealt with this remains a fascinating prospect.

William Harcourt-Smith is an assistant professor at Lehman College and a research associate in the Museum's Division of Paleontology.

A Science Bulletin documentary that followed Harcourt-Smith's team into the field in 2011 will be on view later this year in the Spitzer Hall of Human Origins or online at [amnh.org/sciencebulletins](http://amnh.org/sciencebulletins).

## Found on Rusinga



**Fossil Millipedes**  
Volcanic activity ensured exquisite fossil preservation on Rusinga. Above are two millipede shells.



**Proconsul jaw**  
The team found this *Proconsul* jaw, one of the largest found on Rusinga, in the first field season.



**Fossil Mollusks**  
Fossilized invertebrates, like the mollusks above, can provide important clues about *Proconsul*'s environment.



## Special Tours Take Members Behind the Scenes at the Museum

### Make a Gift to the Museum and Earn Income for Life

A charitable gift annuity is an extraordinary way to make a gift to the Museum, increase your income, and slice your tax bill in one transaction.

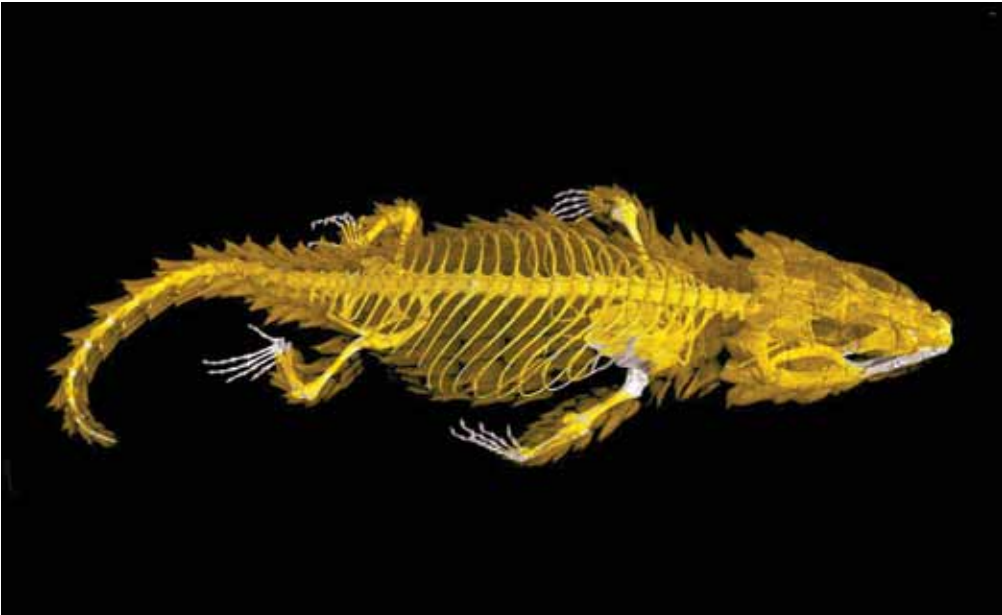
Transfer at least \$20,000 in cash or stock to the Museum to fund a charitable gift annuity and receive fixed payments for life. The amount we pay may be significantly higher than what you are currently earning. You also get an immediate income-tax charitable deduction; a portion of the income you receive is tax-free. If you fund your annuity with appreciated stock, there is capital gains tax due on a portion of the stock's value but the gain is smaller than it would be if you sold the stock, and it can be spread over your life expectancy.

The table below shows the payout rates when payments are made to one person (lower rates are available for two-life annuities).

#### One-Life Charitable Gift Annuity Rates

AGE	RATE
65	4.7%
70	5.1%
75	5.8%
80	6.8%
85	7.8%
90+	9.0%

For more information, please call 212-769-5119 or email [plannedgiving@amnh.org](mailto:plannedgiving@amnh.org).



On a recent tour, graduate student Edward Stanley discussed how he uses the CT scanner to study lizard osteoderms.

Of the many Museum programs designed just for Members, behind-the-scenes tours are consistently among the most popular. These tours, which are offered to Members from October through May, provide a glimpse of what's not usually visible in the public halls: scientists at work, research laboratories, and vast collections of artifacts and specimens from around the world that have not been exhibited.

"Speaking with scientists about their work gives Members a sense of how alive the Museum is," says Membership Coordinator Rogelio Plasencia. "They learn about cutting-edge research, new discoveries, and work with living cultures."

Tours are generally led by two or three scientists, each focusing on a different subject and guaranteeing that no two tours are alike. On a recent tour of the Department of Herpetology, for example, Members heard from Antonia Florio, a fourth-year graduate student in the Museum's Richard Gilder Graduate School whose research is revealing that *Furcifer lateralis*, a common chameleon in Madagascar, may actually be three distinct species. In a walk through the Museum's Sackler Institute for Comparative Genomics, Florio discussed the equipment and processes involved in gene sequencing and its importance to taxonomy.

The tour continued with Ed Stanley, a third-year graduate student who talked about how he is using the Museum's high-resolution CT

scanner and computer tomography to develop three-dimensional images of lizards to study their osteoderms, or bone deposits that form scales. Stanley showed the group how he is able to "see" inside the skeleton—view the braincase and inner ear on a computer screen, for example—without damaging the specimen.

And no tour is complete without a peek at the Museum's extensive collection.

On this particular tour, Curatorial Associate David Kizirian, who manages the collections in the Department of Herpetology, wowed the group with whole specimens of an alligator, a Komodo dragon, and a Galápagos tortoise that all share a 500-gallon ethanol-filled tank. In addition, Members saw the remains of Samantha, the famous 22-foot reticulated python that died at the Bronx Zoo a decade ago. Kizirian also displayed dozens of preserved lizards, snakes, turtles, frogs, and crocodiles while describing nighttime frog collecting in Vietnam using headlamps, GPS, and recording equipment. "Members have a real curiosity about what we do and ask educated questions," says Kizirian. "They like to learn about our fieldwork, and they are fascinated with the collections."

Behind-the-scenes tours take place in the evenings from October through May and are open to families. Check [amnh.org](http://amnh.org) in August for fall programs.

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## By Volunteering Their Time, Members Deepen Links to Museum



Member Kathleen Kinne has been volunteering for 12 years.

On any given day at the Museum, as many as 50 volunteers are stationed at information desks, managing specimen carts in exhibition halls, and leading tours. Some 30 others are working behind the scenes in scientific divisions, from anthropology to invertebrate zoology. All are part of a total pool of 1,000 volunteers who help keep the Museum and its mission going.

Membership in the Museum is not a requirement, but, in fact, many volunteers are Members—either through a continuing affiliation or because they were moved to become Members after signing on to volunteer. "You want to support the institution," says Donna Sethi, senior manager of teaching volunteers, who volunteered in 1985 before becoming a Member and, eventually, joining the staff.

Kathleen Kinne of Manhattan had already been a Member for six years when she decided to volunteer 12 years ago. A hospital administrator, she and her husband had recently retired when she came across an article in *Rotunda* announcing a new training class for volunteer tour guides, now a 24-week course. "I was just lucky they were offering it," she recalls. "I felt fortunate to be selected. And here I am."

© AMNH/D. Finnin

Member Sasa Tomic of Forest Hills became a volunteer five years ago. Passionate about science since his childhood visits to a natural history museum in his native Sarajevo, Tomic, a civil engineer for a water resources consulting firm, says he was inspired to become a volunteer by the tours he attended as a Member. He found himself staying afterward to pick the brains of the volunteers who led the programs. His wife told him, "You should do this!" Four years ago, he trained as a tour guide. And with a four-year-old daughter who is as thrilled to spend time at the Museum as her father, the Tomics have since upgraded their Membership to a Family Adventurer level.

### Membership in the Museum is not a requirement, but, in fact, many volunteers are Members.

In addition to the special programs available to them as Members, volunteers have many unique learning opportunities. Twice a year, the teaching volunteers get subject-specific training for their work with school children in the permanent halls. Volunteers chosen to work as tour guides or explainers for a new exhibition prepare for the role by attending a curator lecture, completing required readings, and walking through the exhibition with Exhibition Department staff.

All volunteers also have their own resource center, a dedicated lounge filled with books and magazines on scientific subjects. (A group of volunteers has even formed a science book club.) And they are invited to monthly enrichment lectures by Museum scientists, which recently included talks by a team of Museum conservators on renovations to the Hall of North American Mammals, which officially reopens this fall; Curator James Webster on economic geology; Research Associate William Harcourt-Smith on paleoanthropology; and Hazel Davies, manager of living exhibits, on mounting such exhibitions as *Spiders Alive!*, which opens July 28.

There is plenty to learn. "We are living in a really exciting time," says Tomic, citing recent breakthroughs in the study of human evolution, the origin of the universe, and the potential for life on other planets. "People will think back on this period the way we look at the Renaissance now!"

Inspired by Kinne's experience, her husband decided to follow his interests through volunteering, too. He now works at both the Metropolitan Museum of Art and Carnegie Hall. "It's been great for both of us," says Kinne, who was recognized by the Membership Department last year for her work with "Walk on the Wild Side," the winter exercise program. "You get to interact with a lot of interesting people. There's a lot of education that's not otherwise easily available. And there's a lot of very positive feedback in a whole variety of ways."

Volunteer applications can be obtained by calling the Volunteer Office at 212-313-7565 or at [amnh.org](http://amnh.org).



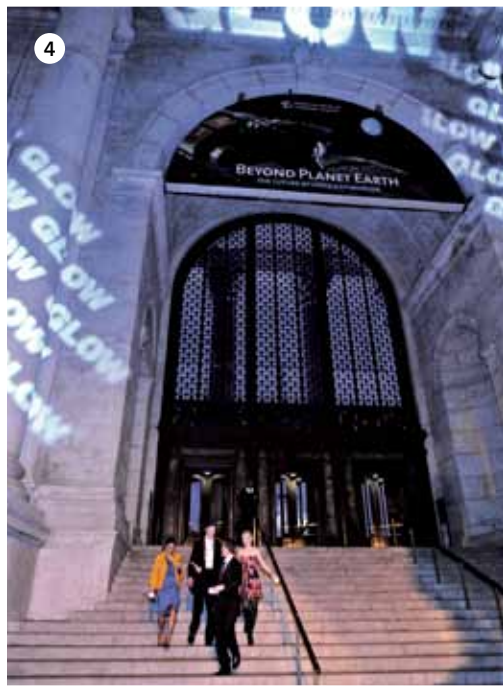


1. The Global Weekends program in March included a Japanese weaving demonstration.  
2. On March 20, panelists at the Isaac Asimov Memorial Debate, moderated by Neil deGrasse Tyson, discussed claims of faster-than-light neutrinos.

3. This year's sold-out Isaac Asimov Memorial Debate was streamed live on [amnh.org](http://amnh.org).  
4. On April 28, jazz trombonist Delfeayo Marsalis performed at the Global Weekends program New Orleans: Culture Remixed.

5. The April 28 Global Weekends program also featured a concert by Cajun bluegrass ensemble Hoppin' John String Band.

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1. Museum President Ellen V. Futter was joined by Saks Fifth Avenue CEO Steve Sadove, Karen Sadove, and Saks General Manager Suzanne Johnson at the Museum Dance on March 8, which celebrated the opening of *Creatures of Light*.  
2. Anthony and Carlisle Champalimaud were among

the guests at the annual spring fête.  
3. Museum Dance Chairs Michael T. M. Jones and Dana Wallach Jones, Gregory and Ali Kwiat, Zibby and Andrew Right, and Elizabeth and Jonathan Krupis.  
4. The Museum's façade was aglow for the Museum Dance on March 8.

## Save the Date! Upcoming Events at the Museum



### OCTOBER

10/6 Mingle with free-flying tropical butterflies when *The Butterfly Conservatory* returns.

10/17 The annual **Family Party** features activities for children of all ages, including opportunities to interact with live animals and hear from Museum scientists. For ticket information, please call 212-313-7161.

*Date to be announced:* The restored **Theodore Roosevelt Memorial Hall** and the **Hall of North American Mammals** reopen to the public.

10/31 Celebrate **Halloween at the Museum** as more than 30 halls open from 4 to 7 pm for trick-or-treating, arts and crafts, and live performances.

### NOVEMBER

11/14 Members will have a chance to see the Fall special exhibition at an **exclusive preview**.

11/15 The dazzling **Museum Gala** helps support the Museum's scientific and educational work. For ticket information, call 212-769-5932.

11/17 The Fall special exhibition opens to the public.

11/19 The delightfully decorated **Origami Holiday Tree** returns to ring in the festive season.

11/22 The Museum is closed on Thanksgiving.



11/29 The **Margaret Mead Film Festival** returns through December 3 with documentaries, discussions with filmmakers and film subjects, and more.

### DECEMBER

12/25 The Museum is closed on Christmas Day.

12/29 A cultural festival commemorating the seven principles of **Kwanzaa** will include live performances, traditional crafts, and a bustling **Kwanzaa Marketplace**.

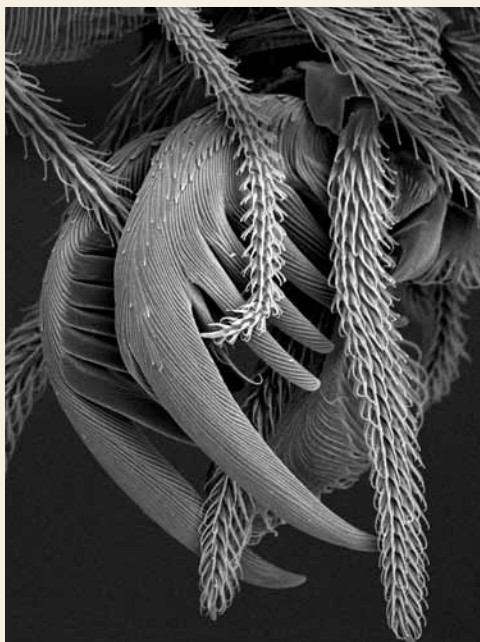


Central Park West at 79th Street  
New York, New York 10024-5192  
[amnh.org](http://amnh.org)



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This side view of the claws found at the tip of an Andean goblin spider's first pair of legs was taken using a scanning electron microscope. The two large claws have teeth on their inner and outer sides, along with narrow stiff bristles called setae. The claws, teeth, and setae help spiders grab and hang on to their insect prey. The new exhibition *Spiders Alive!* opens on July 28.

## General Information

### HOURS

Museum: Open daily, 10 am–5:45 pm;  
closed on Thanksgiving and Christmas.

### ENTRANCES

During Museum hours, Members may  
enter at Central Park West at 79th Street  
(second floor), the Rose Center/81st Street,  
and through the subway (lower level).

### RESTAURANTS

Museum Food Court, Café on One,  
Starlight Café, and Café on 4 offer  
Members a 15% discount. Hours are  
subject to change.




### MUSEUM SHOPS

The Museum Shop, DinoStore,  
Shop for Earth and Space,  
Cosmic Shop, Beyond Planet Earth Shop,  
Creatures of Light Shop,  
and Online Shop ([amnhshop.com](http://amnhshop.com))  
offer Members a 10% discount.

### PHONE NUMBERS

Central Reservations 212-769-5200  
Membership Office 212-769-5606  
Museum Information 212-769-5100  
Development 212-769-5151

### TRANSPORTATION AND PARKING

Subway:  (weekdays) or  to 81st Street;  
 to 79th Street, walk east to Museum  
Bus: M7, M10, M11, or M104 to 79th Street;  
M79 to Central Park West  
Parking Garage: Open daily, 8 am–11 pm;  
enter from West 81st Street. Members can park  
for a flat fee of \$10 if entering after 4 pm.  
To receive this rate, show your membership card  
or event ticket when exiting the garage.