

# ROTUNDA

 AMERICAN MUSEUM OF NATURAL HISTORY

Members' Magazine  
Winter 2011 Vol. 36 No. 1



*Spotting  
New Species*

## SCIENCE AT THE MUSEUM

.....  
FIELD WORK WORLDWIDE:  
A SNAPSHOT

.....  
BUILDING THE TREE  
OF LIFE

.....  
RESEARCH IN  
HIGH-RES

.....

# From the President

Ellen V. Futter



As we usher in 2011, the Museum is preparing a number of new ways for you to “enter” the Museum and more easily access everything it has to offer, whether your visit begins on Central Park West or at [amnh.org](http://amnh.org).

While the restoration of the Central Park West side of the Museum is under way, we are pleased to have already created a new path into the Museum—literally! The iconic *Barosaurus* mount in the Theodore Roosevelt Rotunda has long dominated this grand space, but with foot traffic diverted around it. Late last year, without disturbing or moving the beloved *Barosaurus*, her young one, or the attacking *Allosaurus*, we removed the center section of the exhibit’s platform so that visitors can walk straight into the Museum—and directly between and under the dueling dinosaurs. This 8-foot-wide opening becomes a new “welcome mat” to the Museum while offering

a fresh, exhilarating point of view on the largest freestanding dinosaur mount in the world.

In the age of the virtual, enhancing access to the Museum is not merely a matter of improving the physical entryway. The Museum is also increasingly using new media in pioneering ways to bring its science, exhibitions, and education to visitors—wherever, whenever. In addition to the recently launched *AMNH Explorer*, *Dinosaurs*, and *Cosmic Discoveries* iPhone apps, the Museum is preparing to unveil a spectacular new website about dinosaurs, which will bring the Museum’s world-renowned fossil collection to the public in a number of intriguing ways, including videos on fossil hunting, an interactive “Dinosaurs A-Z” encyclopedia, cladograms, and more. This exciting new website is just a glimpse of a completely redesigned [amnh.org](http://amnh.org) that is coming this spring. Stay tuned!

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## ROTUNDA

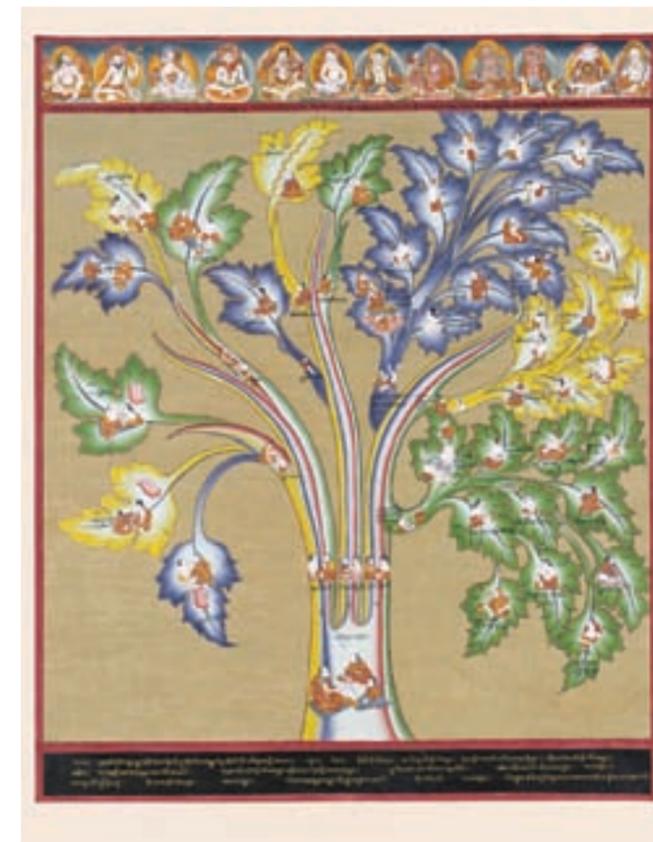
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# The Art of Medicine



The *Tree of Diagnosis* is one of 64 pieces in the new exhibition *Body and Spirit: Tibetan Medical Paintings*.

are the subject of a new special exhibition, *Body and Spirit: Tibetan Medical Paintings*, which opens January 25 in the Audubon Gallery on the Museum’s fourth floor. Curated by Laila Williamson, senior scientific assistant in the Division of Anthropology, with host curator Laurel Kendall, chair of the division, the exhibition will run through July 17.

In the 17th century, a series of paintings was commissioned for use as teaching aids in a medical school founded in Lhasa, Tibet, by Sangye Gyatso, regent to the Fifth Dalai Lama and author of the *Blue Beryl*, an important commentary on the classic Tibetan medical text *Four Tantras*. The fate of the original paintings, which were created between 1687 and 1703, is unknown. But in the late 1990s, Romio Shrestha, a Nepalese artist, and his students reproduced 79 paintings, painstakingly rendering their intricate details in vegetable and mineral dyes on canvas. These Tibetan Medical Paintings, acquired and conserved with the support of Emily H. Fisher and John Alexander and exhibited with the support of a generous gift from the Estate of Marian O. Naumburg, are believed to be among only a handful in existence, providing a unique and rich history of medicine in Tibet.

Among the paintings on display in the exhibition are depictions of human anatomy; the process of human development from conception to birth; 302 points of the body vulnerable to injury; and the origin of dreams and how they bring the sleeper to either the beautiful realm of the gods or the ugly realm of tormented spirits. A “tree of diagnosis” conveys how a doctor makes a diagnosis and treats diseases by observing, touching, and questioning the patient. Other paintings illustrate various Tibetan medical implements, therapies, and remedies—one of them, an elixir of many ingredients, including honey, yak butter, garlic, and flowers, that works through the healing power of the Buddha to give the patient “the body of a 16-year-old with the prowess of a lion, strength of an elephant, complexion of a peacock, speed of a trained horse, and the life span of the Sun and Moon.”

For details, visit [amnh.org](http://amnh.org).

Just as Western medical historians prize classic texts, whether Henry Gray’s 1858 *Anatomy Descriptive and Surgical* or Walter B. Cannon’s 1932 *The Wisdom of the Body*, students of Tibetan medicine value scroll paintings that illustrate traditional medical knowledge and procedures. Sixty-four modern copies of such medical paintings from the Museum’s collection

## Museum Separates Battling Dinosaurs

For 20 years, visitors entering the Museum’s majestic Theodore Roosevelt Rotunda have been greeted with a dramatic representation of an imagined prehistoric encounter: a *Barosaurus* rearing up to protect her young from an attacking *Allosaurus*.

Now visitors can become part of this scene by walking between the *Allosaurus* and the towering *Barosaurus*, the tallest freestanding dinosaur mount in the world. Last summer, the Museum separated the two long-time combatants by cutting an 8-foot-wide pathway through the fiberglass and steel platform they had shared since the mount was first installed in 1991.

In preparation for the task, a team from Research Casting International (RCI), the company that installed the original mount, secured the skeletons in part by lassoing the neck of the *Barosaurus* and tethering the supporting rope to the top of the vaulted ceiling, 100 feet above the floor.

Watch a video of the ceremonial first cut in the mount at [amnh.org/news](http://amnh.org/news).



The Museum separated the two dinosaurs late last summer.

Photo of painting © AMNH; photo of dinosaurs © AMNH/R. Mickens

**NOT THE BITING KIND**

Unlike the famous “very hungry caterpillar,” adult butterflies do not have mouths for chomping down on leaves. Instead, butterflies “eat” by using a long curled proboscis, much like a drinking straw, to suck up nectar and other liquids, and “taste” using chemical receptors on their feet and proboscides.

**BUTTERFLIES IN THE BELLY**

They were seen as the souls or spirits of the deceased in ancient Greece, bad omens in Europe in the Middle Ages, symbols of conjugal bliss in Korea, and metaphors for nervousness in Germany. All over the world, butterflies have figured in local superstitions, reflecting a range of societal anxieties and expectations.

**COMELY MOTHS**

Moths are often stereotyped as dull creatures of the night, a popular misconception that gives rise to another: that moths and butterflies are two separate groups of lepidopterans. In fact, butterflies are a small lineage of dayflying, gaudy moths. One such species is the African Peach Moth *Egybolis vaillantina*, which shows off its iridescent blue and orange wings during the day.

**DANGEROUS BEAUTY**

Caterpillars and butterflies use defense mechanisms such as mimicry and camouflage to thwart potential predators. Looks can be deceiving: the most attractive, brightly colored butterflies are usually poisonous or a mimic of poisonous species.

**LIVE FAST, DIE YOUNG**

Depending on the climate, diet, and species, butterflies can live from one week to as long as six to eight months. The average total lifespan of a butterfly, which includes time spent in the larval and pupal stages, is difficult to determine, however, since only a small fraction of caterpillars survive to adulthood in the wild.

**THE CONSTANT GARDENER**

In preparation for the Museum’s *Butterfly Conservatory: Tropical Butterflies Alive in Winter*, which features more than 130 different species from seven countries around the world, a team of gardeners spends over a month recreating the butterflies’ warm tropical habitats—with one important exception. Since females will lay their eggs on particular plants, called host plants, these are excluded from the conservatory to control the population.

## The Butterfly Brief: *Heliconius cydno*

Butterflies that belong to the *Heliconius* genus, known colloquially as longwings, have discovered the secret to butterfly longevity. Like most members of the order Lepidoptera, longwings sip nectar from flowers using a straw-like organ called a proboscis. What distinguishes them from fellow butterflies—and moths—is that longwings can broaden their diet beyond these sweet liquids—which, in turn, is thought to extend their life.

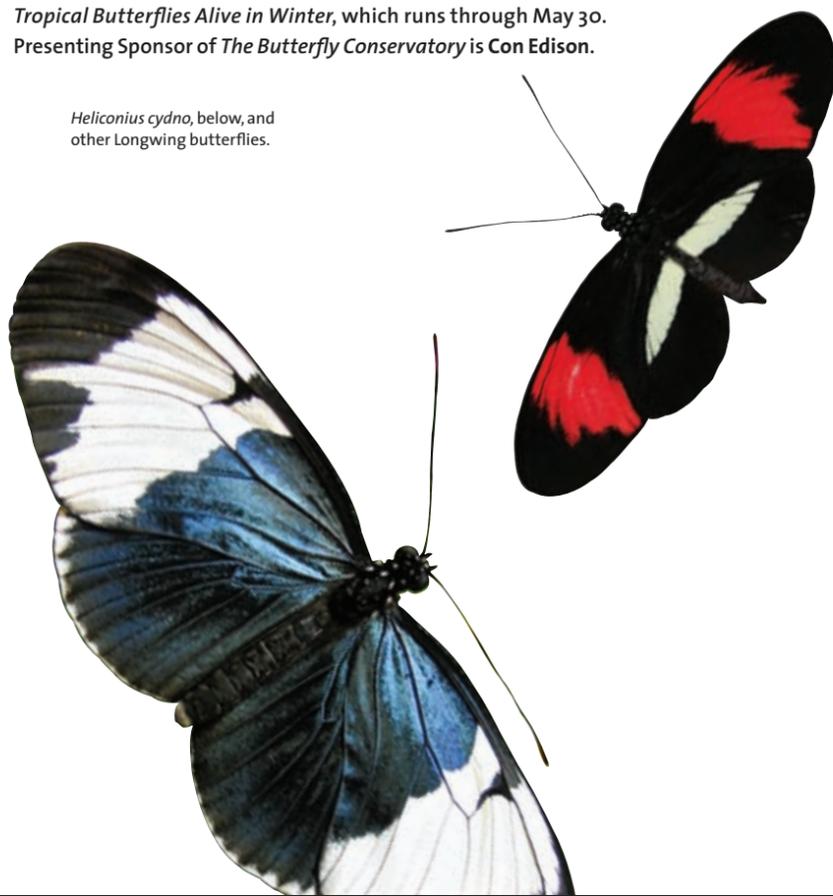
That’s because *Heliconius* butterflies are able to ingest pollen by secreting enzymes onto their proboscides. When these enzymes mix with pollen grains, they create a protein-rich liquid that the butterfly can absorb. Longwings spend hours collecting and processing pollen grains and depositing them at other stops along the way. The plants pay them back, big time: the amino acids found in pollen are thought to increase egg production and lifespan up to eight months, making longwings one of the longest-living groups of butterflies in the world.

Their lifespan isn’t what gives these butterflies their name, however; their elongated wings do. Longwings are also sometimes called passion flower butterflies because they favor the passion vine both as a place to lay eggs and as a source of food. The leaves of the passion flower give the longwings their characteristic toxicity: longwing caterpillars feed on the plant, acquiring toxins that they retain through adulthood as protection from predators throughout their lives.

*Cydno* longwings can be distinguished from other *Heliconius* butterflies by their coloring: they are mainly black with white or yellowish markings on their forewings and blue on the hindwings. To make matters more confusing, different *Heliconius* species often exhibit similar color patterns. This defense mechanism, known as Müllerian mimicry, is a form of interspecies imitation used to ward off natural enemies.

See more than 500 live butterflies in *The Butterfly Conservatory: Tropical Butterflies Alive in Winter*, which runs through May 30. Presenting Sponsor of *The Butterfly Conservatory* is Con Edison.

*Heliconius cydno*, below, and other Longwing butterflies.



Photos © AMNH/H. Davies



Catalog no. 70/2280

## Follow the Thread: A Mandarin Coat

In 1901, budding anthropologist Berthold Laufer sent a brilliant blue silk robe he had bought in Shanghai to the American Museum of Natural History with a simple note: “Coat of a mandarin, for the summer.”

Within a few years, fakes would flood the market, says Curator Laurel Kendall, chair of the Division of Anthropology, but the time and place of this purchase indicates that it is “the real thing,” a coat that could only have been worn by a scholar-advisor to the Imperial Court during the Qing dynasty, which lasted from 1644 to 1911.

Part of the Museum’s extensive collection of textiles, this coat exemplifies the rigidly defined rules of Imperial Court dress in which an elaborate system of colors and motifs telegraphed rank. The dragon, for example, is the ultimate “yang” or male symbol, and a sign of the Emperor’s power. The water represented at the bottom of the robe reflects the legendary role of dragons in East Asia’s traditional agrarian societies as denizens of lakes, rivers, and seas who once a year ascend to the heavens to bring on the rain. Overall, the decoration suggests a mandarin of the fourth to sixth rank.

Laufer, who would go on to become the premier Sinologist of his generation, was sent to China by Franz Boas, then director of the Museum’s Anthropology Division and the acknowledged father of the field in America. Boas had secured a grant of \$18,000 (about \$400,000 today) from New York banker Jacob H. Schiff to cover Laufer’s expenses for three years to gather “collections which illustrate the popular customs and beliefs of the Chinese, their industries, their mode of life.”

Laufer set about buying the stuff of everyday life, completing what is still the most extensive ethnographic collection from pre-revolutionary China in North America.

“Nobody was doing that kind of work at that time,” says Kendall. “He gave us a picture of daily life...And that’s us! We’re all about the time capsule, the trunk in the attic, trying to imagine how people lived.”

Go behind the scenes of the Division of Anthropology’s ethnographic collections on February 24 on a Members-only tour. See page 16 for more details.

Rotunda / Winter 2011 / AMNH.org

**NEVER FOLDED OR HUNG**

Storage of the textile collection was greatly improved with the help of a 2003 grant from the National Endowment for the Humanities. To store each piece effectively, old cabinets were retrofitted and new cabinets installed in an airy 10,000-square-foot space kept at 70° Fahrenheit and 45 percent relative humidity. “That’s the climate which works best for the greatest number of materials,” says Paul Beelitz, director of Collections and Archives in the Division of Anthropology. “It’s very comfortable for people, too.”

**PEST CONTROL**

Newly acquired textiles are frozen at -40° Fahrenheit for 48 hours to kill insects at all stages of life. Windows are double-glazed to keep insects out, and a seamless floor surface extends up the walls a few inches to eliminate cracks where they might live. Cabinets are raised for easy cleaning beneath. Sticky traps are checked, and should the rare insect appear, it is brought to the Museum’s entomologists for evaluation.

**SHARING THE TREASURE**

The 2003 NEH grant also helped fund the digital imaging of the Museum’s 10,500 ethnographic textiles and 4,200 Andean archeological textiles, now available on the Museum’s website at [research.amnh.org/anthropology](http://research.amnh.org/anthropology). Previously, less than 1 percent of the collection had been photographed, and the black and white prints were available only to researchers visiting the Division of Anthropology or the Museum Library’s Photo Archive.

**TEXTILES ON VIEW**

Museum textiles are often featured in special exhibitions, most recently in *Mythic Creatures*. Exquisite examples are also on permanent display. Beelitz offers this shorthand for finding them: “Go to any ‘People of...’ Hall, whether Africa, Asia, the Pacific, North America, or South America, and see beautiful textiles, mostly in the form of garments.”

**A SPECIAL RESOURCE**

Textiles are occasionally loaned to other museums accredited by the American Association of Museums, but generally the collection is studied in-house by staff scientists and researchers from colleges, universities, and other institutions. Students from such schools as the Bard Graduate Center, the Fashion Institute of Technology, and Parsons The New School for Design, are regular visitors. While they might find a fashion inspiration or two, they are usually learning about textile preservation.

# In the Field

THE MUSEUM HAS A LONG TRADITION OF EXPLORATION. TODAY, FIELD WORK IS STILL A CORE COMPONENT OF RESEARCH AND COLLECTION. BELOW IS JUST A SMALL SAMPLING OF 2010 FIELD EXPEDITIONS.

**BEN R. OPPENHEIMER**  
Associate Curator  
Division of Physical Sciences  
Dr. Oppenheimer worked at the Palomar Observatory in **California** on a survey of nearby stars of exoplanets and discovered objects orbiting several famous stars.

**DAVID HURST THOMAS**  
Curator  
Division of Anthropology  
Dr. Thomas continued archaeological survey and excavation on **St. Catherines Island**, documenting the earliest known human presence on the island.

**GEORGE HARLOW**  
Curator  
Division of Physical Sciences  
Dr. Harlow returned to the Motagua Valley in **Guatemala** to study the origin of jade.

**LORENZO PRENDINI**  
Associate Curator  
Division of Invertebrate Zoology  
Dr. Prendini, who studies scorpions, carried out field work in Namibia, **Puerto Rico**, US Virgin Islands, Mona Island, South Africa, Venezuela, Australia, Chile and Mexico.

**MARK SIDDALL**  
Curator  
Division of Invertebrate Zoology  
Dr. Siddall carried out fieldwork in the **Peruvian Amazon**, where he described a new leech.

**CHARLES SPENCER**  
Curator  
Division of Anthropology  
Dr. Spencer continued the excavation and analysis of a Zapotec ceremonial precinct dating to 300-100 BC in **Oaxaca, Mexico**.

**JOHN FLYNN**  
Curator  
Division of Paleontology  
Dean  
Richard Gilder Graduate School  
Dr. Flynn, who researches the evolution of mammals and Mesozoic vertebrates, carried out field work in western Madagascar and the **Peruvian Amazon**.

**JOHN MAISEY**  
Curator  
Division of Paleontology  
Dr. Maisey carried out fieldwork in **Arkansas**, where he collected a fossil shark from the Fayetteville Shale.

**ROSS MACPHEE**  
Curator  
Division of Vertebrate Zoology  
Dr. MacPhee, who curated *Race to the End of the Earth*, continued his field work in west **Antarctica**.

**MARK NORELL**  
Curator  
Division of Paleontology  
Dr. Norell traveled to **Romania** to describe a new and unusual dromaeosaur.

**ALEX DE VOOGT**  
Assistant Curator  
Division of Anthropology  
Dr. de Voogt traveled to Nubia as part of his research of mancala and mancala-like games in the **Middle East**.

**MELANIE L. J. STIASSNY**  
Curator  
Division of Vertebrate Zoology  
Dr. Stiassny traveled to the Congo, continuing survey work on the fishes of the **Congo River Basin**.

**EDMOND MATHEZ**  
Curator  
Division of Physical Sciences  
Dr. Mathez studied the Bushveld Complex, an enormous fossil magma body in **South Africa** and the world's major source of several important metals.

**MICHAEL NOVACEK**  
Curator  
Division of Paleontology  
Dr. Novacek is one of the team leaders of the annual American Museum of Natural History/Mongolian Academy of Sciences expeditions to the **Gobi Desert**.

**CHRISTOPHER RAXWORTHY**  
Associate Curator  
Division of Vertebrate Zoology  
Dr. Raxworthy traveled to **Madagascar**, Mauritius, and the Seychelles to continue his studies of endemic chameleons.

**JIN MENG**  
Associate Curator  
Division of Paleontology  
Field work took Dr. Meng to remote parts of **China** as he continued research on the evolution of rodents and rabbits.

**JOHN SPARKS**  
Associate Curator  
Division of Vertebrate Zoology  
Dr. Sparks's work included surveys of marine fishes in **Vietnam** to continue research on bioluminescence and the evolution of hearing.

**LAUREL KENDALL**  
Curator  
Division of Anthropology  
Dr. Kendall visited **Borneo** to explore prospects for a work of *ikat* weaving and documentation of its manufacturing process.

# Branching Out

MUSEUM SCIENTISTS PLAYED A CENTRAL ROLE

IN BUILDING THE CASE FOR CLADISTICS.

TODAY, THEY ARE STILL AT WORK BUILDING TREES OF LIFE.

To walk the fourth floor of the Museum—peering at the jagged “teeth” of armored fish *Dunkleosteus*, ducking under the 23-foot wingspan of the flying reptile *Pteranodon*, studying the long curved tusks of the elephant relative *Mammuthus*—is, in a sense, to walk the tree of life.

Each branching point represents the arrival of an evolutionary innovation—jaws, water-tight eggs, hooves, respectively—that unites one group of animals and distinguishes them from lineages that lack the feature. Known as synapomorphies, or shared traits derived from a common ancestor, these are the tracks of evolution.

Scientists have used trees to order life since before Charles Darwin first scribbled a spiky diagram in his notebook. In the 1950s, German biologist Willi Hennig formally proposed that trees of life should reflect evolutionary relationships among organisms, founding cladistics: a method for grouping organisms into ancestor-descendent clades, from the Greek word for “branch,” based on shared, derived features. But it took a Museum scientist, ichthyologist Gareth Nelson, to disseminate the idea among English-language biologists. Together with students and colleagues at the Museum—including another ichthyologist, Donn Rosen, paleontologists Eugene Gaffney and Niles Eldridge, ornithologist Joel Cracraft, and invertebrate specialists Norman Platnick and Randall T. Schuh—Nelson steadfastly argued the case for cladistics as the tool to test classification during academic talks, in research papers, and even on napkins over meals.

So began the “cladistics wars” of the 1960s and 1970s that pitted those who build trees with clades against biologists who favored competing schools of taxonomy: phenetics, which does not use evolutionary relationships and instead relies on an expert to determine groupings using observable traits; and evolutionary systematics, which considers evolutionary relatedness in a less rigorous way.

“The Museum was the hub of the taxonomy universe during the 1970s and 1980s,” says Curator Ward Wheeler. “Cladistics changed everything and brought true hypothesis testing that maps evolutionary paths onto the Tree of Life.”

Seminal work that applied cladistics to classification during this time included Gaffney’s paper on fossil turtles, which was published by the Museum.

“I was a grad student in Arizona when Gene Gaffney’s 1975 *Bulletin of the American Museum of Natural History* was published,” says Curator Darrel Frost, a herpetologist. “It blew everything out of the water.”

Cladistics is now the commonly used taxonomic system, and many Museum scientists have spent their careers using evolutionary relationships to refine the Tree of Life, from trunk to the twigs (see sidebar). While cladistics was initially limited to analyzing morphological, or observable, characteristics, two recent technological leaps—DNA sequencing and the power of supercomputing—have allowed scientists to produce ever-more intricate and testable cladograms, with significant applications that include drug development and conservation initiatives.

“We couldn’t design drugs or vaccines for pathogens without understanding the relationships of organisms and the evolutionary process that produced the tree,” says Curator Rob DeSalle.

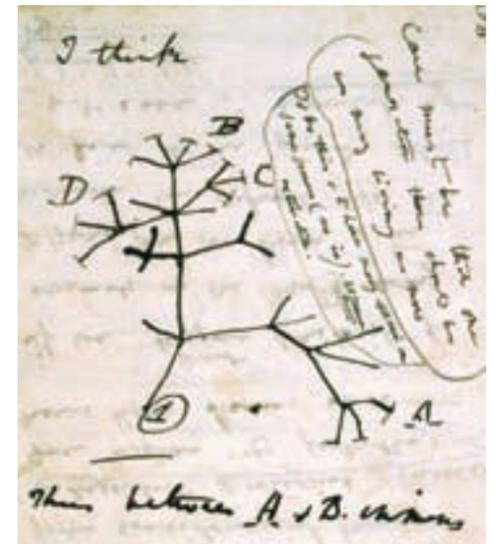
New streams of funding from federal initiatives such as the Assembling the Tree of Life (AToL) project from the National Science Foundation, secured in part by the efforts of Museum scientists, is furthering these research efforts.

“Building trees is now a big enterprise,” says Cracraft. “It is also spawning a huge amount of work in comparative behavior, community evolution, and comparative biology. The ink was barely dry on our tree for South American birds last year when ecologists asked us for help to address key questions in environmental science.”

For more about research at the Museum, visit [amnh.org/science](http://amnh.org/science).

Opposite: Walk a Tree of Life starting in the Hall of Vertebrate Origins.

Photo of Hall of Vertebrate Origins © AMNH/D. Finnin; photo of Darwin's notebook © By permission of the Syndics of Cambridge University Library



First-known sketch by Darwin of an evolutionary tree

## Building the Tree of Life

More than a century ago, Charles Darwin described the Tree of Life in *On the Origin of Species*:

...the green and budding twigs may represent existing species; and those produced during former years may represent the long succession of extinct species. Of the many twigs which flourished when the tree was a mere bush, only two or three...survive and bear the other branches; so with the species which lived during long-past geological periods, very few have left living and modified descendants.

Today, Museum scientists continue the work of building and revising trees of life using cladistics and drawing on the latest available technology, which includes genetic analysis and supercomputing. Some examples from curators and their colleagues include:

Ward Wheeler and Rob DeSalle found in different studies that sponges are not at the root of the animal tree; there are other candidates, such as comb jellies;

John Flynn’s molecular research on carnivores found that seals moved from land to water independently of sea lions and walrus;

Jin Meng described surprising mammal fossils, including one that ate small dinosaurs, that changed the early mammal tree;

Darrel Frost analyzed amphibian evolutionary relationships in what is still the largest phylogenetic study of vertebrates ever undertaken;

John Maisey used molecular and some anatomical traits to show that rays may be the sister group to, rather than descendent from, all modern sharks.

# Spotting New Species

A tawny bat peers down its leafy nose from a photo taped to the wall over Curator Nancy Simmons' desk. She thinks it is an unknown species. "Colleagues in Belize sent me this photo," she says. "I keep it as a reminder of the species still waiting to be discovered."

Many Museum scientists spend their careers cataloging new life. In recent years, this work has gained new urgency because of the increasingly rapid disappearance of species around the world, termed the sixth mass extinction.

"Life is slipping through our fingers almost before we have time to document it," says Provost of Science Michael Novacek.

Finding species takes special focus and dedication. These animals tend to be from relatively inaccessible areas, overlooked by previous generations, or just very good at looking like their closest relatives. The list below is a mere fraction of the hundreds of new species described by Museum scientists and their colleagues since 2004.

## ASTEIA VANUAENSIS

### Vanua Levu Floating Fly

Vanua Levu, Fiji

Curator David Grimaldi, Division of Invertebrate Zoology



Often found rolled in banana and wild ginger leaves, this small fly's broad shiny face and black and yellow body seem to float when it runs across a surface. It is found in the ruggedly tropical island for which it is named, Fiji's second largest.

## PHREATOBIUS SANGUIJUELA

### Sanguijuela Catfish

Comunidad de Porvenir, Bolivia

Curator Scott Schaefer, Division of Vertebrate Zoology



Blood-red and blind, this catfish popped up in a 20-foot well dug to draw water from an underground spring. Its closest relative is 6,000 miles down the Amazon River, so the discovery hints at undescribed subterranean diversity that is probably highly endangered because of its shrinking habitat.

## HADOGENES SOUTPANSBERGENSIS

### Soutpansberg Flat Rock Scorpion

Soutpansberg range, South Africa

Associate Curator Lorenzo Prendini, Division of Invertebrate Zoology



With bodies flat as pancakes, these seldom-seen scorpions squeeze into deep crevices made when sandstone weathers. The species has an elongated tail with a venomous sting and narrow pinching pedipalps—the second pair of limbs—to capture prey in confined spaces.

## PLASMODIUM GEMINI

### Twinned Malaria Parasite

Sandaun Province, Papua New Guinea

Associate Curator Susan Perkins, Division of Invertebrate Zoology



Detected in blood smears drawn from lizards, this simple single-cell parasite is one of 200 species of malaria parasites that have been found in birds, mammals, and squamates. This species tends to "twin" in the cells of its host, the modest forest dragon.

## ANTIPODACTIS SCOTIAE

### Rayed Sea Anemone

Southern Ocean near Antarctica

Assistant Curator Estefania Rodríguez, Division of Invertebrate Zoology



Of an ancient lineage yet morphologically simple, this sea anemone snatches food from the water column using salmon-colored tentacles that fade to white. This new species—also creating a new family—was collected from a depth of 6,000 feet in frigid polar seas.

## CURALIUM CRONINI

### Ruby Bug

Gainesville, Florida

Curator Randall T. Schuh, Division of Invertebrate Zoology



So different that its description required the creation of a new family as well as a new genus and species, this true bug is ruby red. It is native to the southeastern U.S. and probably evaded detection because it is only slightly larger than the period at the end of this sentence.

## PEROPTERYX PALLIDOPTERA

### Pale-winged Doglike Bat

Lowland Ecuador and Peru

Curator Nancy Simmons, Division of Vertebrate Zoology



With wings clear as windows and soft brown fur, this insect-eating bat lives in the rainforests of Amazonia. The agile flyer belongs to a group of bats that often evades survey nets because of their sensitive echolocation system.

## CALUMMA PELTIERORUM

### Peltiers' Chameleon

Tsaranana Massif, Madagascar

Associate Curator Christopher Raxworthy, Division of Vertebrate Zoology



Roughly bearded by tiny spines lining its chin, this shape-shifting chameleon can raise lobes behind its eyes to threaten competition or predators. It is found holding onto slim branches with pincer-like feet in the rainforest atop Madagascar's tallest mountains.

## MICRALESTES SCHELLY

### Schelly's Tetra

Democratic Republic of the Congo

Curator Melanie L. J. Stiassny, Division of Vertebrate Zoology



When plucked from the rapids of the lower Congo River, an iridescent band of blue-green makes this dwarf alestid shine. Relatives include tigerfish and tetras, and its teeth are rife with tiny serrated cusps.

## EUSTENOGASTER NIGRA

### Black Hover Wasp

Northern Vietnam

Curator James Carpenter, Division of Invertebrate Zoology



Suited completely in black, this hover wasp is part of the most basal social wasps. The fine brown nests of this species—used by adults for winter protection—look like inverted flasks hanging from fibers or wires and have fewer than 20 cells for offspring.

## OSTEOAEMUS OSBORNI

### Central African Dwarf Crocodile

Congo Basin, Central Africa

George Amato, Director of Sackler Institute for Comparative Genomics



Once considered a single species, dwarf crocodiles have split into three because of new genetic research. All look remarkably similar and max out at 5 feet. *O. osborni*—like its relatives—is routinely hunted for bushmeat and has a vulnerable conservation status.

## MARMOSOPS CREIGHTONI

### Creighton's Slender Opossum

Valle de Zongo, Bolivia

Curator Robert Voss, Division of Vertebrate Zoology



Collected near a hydroelectric dam in an extremely steep and misty cloud forest, this mouse opossum weighs an ounce. Its relatives—other didelphid opossums—are the most basal group (from the earliest branch) of marsupials living today.

## TYRANNOBELLA REX

### Tyrant King Leech

Provincia de Chanchamayo, Peru

Curator Mark Siddall, Division of Invertebrate Zoology



With enormous teeth lining one jaw, this pinky-sized leech was plucked from the nose of a girl bathing in the Amazon's headwaters. This tiny "*T. rex*" and relatives span the world's tropics; their last common ancestor hails from a time when the continents were still attached.

## DENDRAGAPUS HOWARDI

### Mt. Pinos Sooty Grouse

Los Padres National Forest, California

Associate Curator George Barrowclough, Division of Vertebrate Zoology



This grouse has not been seen at Mt. Pinos since the 1940s but was thought to have a more northeastern population in the Sierra Nevada. However, new genetic research on Museum skins shows that *D. howardi* is extinct: the Sierra population is a different species, *D. fuliginosus*.

## ESCAPIELLA GIGANTEA

### Giant Taco Spider

Tayrona-Park, Colombia

Curator Emeritus Norman Platnick, Division of Invertebrate Zoology



A giant among goblin spiders at one-tenth of an inch, this arachnid is taco-shaped and salsa-hued. This species and more than 40 of its petite relatives were discovered by meticulously sorting the leaf litter in which they reside.

## PARETROPLUS LAMENABE

### Giant Red Fish

Mahajamba River, Madagascar

Associate Curator John Sparks, Division of Vertebrate Zoology



Canary-yellow with a tinge of red outlining its tail fin, this cichlid fish is limited to shallow, muddy streams of a single basin. It is toothier and larger than its close relatives and probably has good hearing because of the unusual position of its gas bladder.

A  
STATE-OF-THE-ART  
CT SCANNER  
IS LETTING MUSEUM  
SCIENTISTS  
ANALYZE SPECIMENS  
LIKE NEVER  
BEFORE.



## The Heart of the Matter

Images of bat skull and *Nautilus pompilius* © AMNH/R. Rudolph; image of lizard © AMNH/E. Stanley



Delicate, with the eerie beauty of a 19th-century engraving, the gray-and-white cross-section of *Nautilus pompilius*—an object of ongoing research by Museum paleontologist Neil Landman—is the product of a cutting-edge, high resolution, computed tomography (CT) scanner. Acquired by the Museum this summer with a grant from the National Science Foundation, the GE Phoenix V/tome/x Dual-Tube CT Scanner is one of only four of its kind in the country and allows researchers to look deep inside both small and large specimens without destroying them in the process.

“We can see spatial detail not available in dissection, and some parts are so delicate they would be otherwise missed,” says Dr. Landman, curator in the Division of Paleontology who, with geologist Denton Ebel, associate curator in the Division of Physical Sciences, and Curator Darrel Frost, a herpetologist, wrote the successful grant application for the scanner. “Three-dimensional visualization is such an important part of our thinking now—you can put your arms around the object you are studying.”

For each image, the scanner, as a rule, takes 1,500 to 1,700 x-ray images as the sample is rotated in the x-ray beam, at a level of resolution 100 times that of a typical medical scanner used on humans. These images are then used to create a 3D image of the entire specimen—in essence, a stack of virtual dissection slices—that can be manipulated, rotated, and studied from every angle, revealing unprecedented details of its internal structure. “We can only capture so much of the morphology from the surface,” explains Landman. “You want to get insights into the interior.”

In the case of the *Nautilus pompilius* pictured above—a newly hatched specimen recovered in Fiji in the 1950s—Landman is interested in what the interior chambers can tell him about the animal’s buoyancy, a key factor in its survival after birth. Little is known about nautiloids, a group whose ancestors are so old—400 million years—that the extant creatures are called “living fossils.” No one even knows where these invertebrates lay their eggs, which develop slowly to hatch at the largest size of all invertebrates and then take 15 years to reach reproductive maturity. (Landman recently gave a presentation at a Convention on International Trade in Endangered Species of Wild Fauna and Flora [CITES] conference in France, where he cautioned that due to its slow development and rate of growth, “this is an animal that you don’t want to overfish because it may never recover.”)

Since its installation, the dual-tube CT scanner has lent itself to the study of a host of diverse specimens: meteorites by Ebel; rare bat skulls by Nancy Simmons, chair of the Division of Vertebrate Zoology; an early 20th-century knife from Egypt by Alex de Voogt, assistant curator in the Division of Anthropology; the reproductive systems of female spiders by Matthias Burger, a postdoctoral researcher; and the gut contents of a termite entombed in amber by David Grimaldi, curator in the Division of Invertebrate Zoology. The scanner is also accessible to researchers from other institutions, including art conservators who use it to assess fine cracks in antiquities.

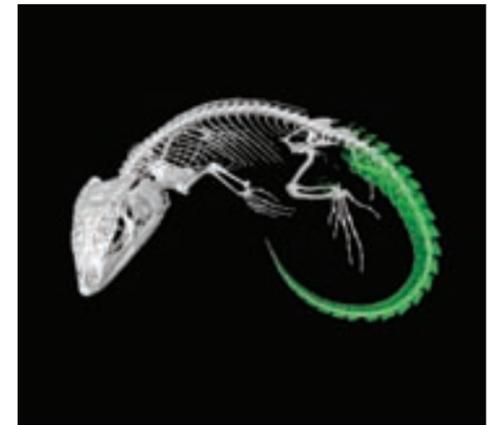
Rebecca Rudolph, laboratory manager for the Museum’s Microscopy and Imaging Facility, notes that previously, Museum scientists were forced to go off-site for CT scanning, either to a hospital to use a medical scanner or to a facility such as the University of Texas.

For researchers who intend to cut into a specimen eventually, the CT scanner allows them to zero in on the most promising areas for physical analysis, as well as capture a 3D image of the interior while it’s still intact.

“It takes a lot of guesswork out of the equation,” says Landman.

And those antique engravings and the early naturalists whose discoveries inspired them? Landman said he was thinking only recently about what would happen if someone from another era were suddenly dropped into a 21st-century imaging lab. “They would think it was magic,” he said. “Absolute magic.”

Opposite: An image of a rare bat skull, taken using the new CT scanner



This image of a *Pseudocordylus subviridis* highlights its tail armor.

### A Defensive Discovery

Edward Stanley, a doctoral candidate in comparative biology at the Museum’s Richard Gilder Graduate School, made a surprising discovery using the new state-of-the-art CT scanner: the presence of tiny osteoderms, or bony plates, along the legs of the crag lizard *Pseudocordylus subviridis*. This particular lizard was thought to have such plates, which are believed to serve as protective armor, only on its head and tail.

A graduate of the University of St. Andrews in Scotland with a master’s degree from Villanova, Stanley is aiming to tease apart the evolutionary history of a family of African “girdled lizards” (Cordylidae). Osteoderms are embedded in the skin and not attached to the skeleton, exactly the kind of evidence that can be disturbed in dissection. Seeing these features in place using the CT scanner gives him a set of clearly defined characteristics for sorting out the relationships among species. This technique, says Stanley, “allows you to see traits and patterns that were simply not observable before.”

Girdled lizards are vulnerable to predators from the air and on the ground. It appears that the slower-moving species, the more heavily they are armored, presumably protecting them from attacks by mongooses, snakes, and other land predators. The less-armored species seem to have evolved a quickness needed to evade dive-bombing birds. While it is too early to say for certain, Stanley’s research, which focuses on the correlation between amount of armor and speed, suggests that *Pseudocordylus subviridis* fits the latter category. Several members of this lizard family live high up in the mountains where avian predators are common, and this lightly armored form has evolved multiple times independently in these environments.

**Programs and Events**

**JANUARY**

**SciCafe**

**Wednesday, January 5**  
Doors open at **7 pm**  
Free admission, cash bar  
21+ with ID  
An informal evening of science, cocktails, and conversation. Visit [amnh.org/scicafe](http://amnh.org/scicafe) for details.

**How I Killed Pluto with Mike Brown**

**Monday, January 10**  
**7:30 pm**  
\$13.50 Members  
Hear the dramatic account of the most tumultuous year in modern astronomy.

**Twinkling Stars: Mythic Creatures in the Sky**

**Tuesdays, January 11 and January 18**  
**4:30–6 pm**  
For grades 1 and 2, one adult per child has option to attend \$60 for a child with one adult  
This introduction to the night sky was developed for budding astronomers.

**Adventures in the Global Kitchen: Wine and Aging**  
**Wednesday, January 12**  
**6:30 pm**

\$25  
**Dr. Joseph Maroon** discusses resveratrol, an enzyme found in red wine that has been shown to slow the effects of aging.

**Kingdom Under Glass with Jay Kirk**

**Thursday, January 13**  
**6:30–8 pm**  
\$12  
**Jay Kirk** will discuss *Kingdom Under Glass: A Tale of Obsession, Adventure, and One Man's Quest to Preserve the World's Great Animals*, his sweeping biography of explorer and taxidermist Carl Akeley, for whom the Museum's Akeley Hall of African Mammals is named.

**One Step Beyond**

**Friday, January 14**  
**9 pm–1 am**  
\$25  
21+ with ID  
Enjoy a night of drinks and dancing in the Rose Center for Earth and Space and a complimentary screening of a Space Show.

**BrainFEST!**

**Saturday, January 15**  
**1–5 pm**  
Free  
Learn about the brain with puzzles and games for the whole family.

**Members-Only Highlights Tour**

**Saturday, January 15**  
**3–4:30 pm**  
Free (registration required)  
An insider's introduction to all the Museum has to offer. The tour meets in the Portrait Room.

**Windows on Nature: Akeley Hall of African Mammals**

**Wednesday, January 19**  
**6–7:30 pm**  
\$35 per person  
Author of *Windows on Nature: The Great Habitat Dioramas of the American Museum of Natural History* **Stephen C. Quinn** leads this tour of the masterpieces in the Akeley Hall of African Mammals.

**Neuroeconomics: Decision Making and the Brain**

**Thursday, January 20**  
**6:30 pm**  
\$13.50 Members  
New York University's **Paul Glimcher** and Curator **Rob DeSalle** will discuss neuroeconomics.

**A Night at the Museum Sleepover**

**Friday, January 21**  
Members' price \$119 per person  
This unique after-hours opportunity will thrill kids ages 7 to 13 and their caregivers.

**Wild, Wild World: Wolves**

**Saturday, January 22**  
**11 am–noon, 1–2 pm**  
Members' tickets are \$8 children, \$10 adults  
Learn about the vital role wolves play in sustaining a healthy ecosystem.

**Evolution of the Brain Hall Tour**

**Sunday, January 23**  
**3–4:30 pm**  
Free (registration required)  
Join guide **Eileen Flood** on a tour that focuses on brain development and evolution.

**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.

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

**Exhibitions and Attractions**

*Admission is by timed entry only.*

**Brain: The Inside Story**

Through **Sunday, August 14**  
Free for Members  
Step into the amazing, changing brain! This exhibition explores how the brain—a product of millions of years of evolution—produces and process thoughts, senses, and feelings.

**Body and Spirit: Tibetan Medical Paintings**

Opens **Tuesday, January 25**  
Free with Museum admission  
These traditional Tibetan scroll paintings provide a rare look at early medical knowledge and reveal a unique and rich history of medicine in Tibet.

**The Butterfly Conservatory: Tropical Butterflies Alive in Winter!**

Through **Monday, May 30**  
Members' tickets are \$12 adults, \$7.50 children  
This annual favorite returns with up to 500 live, free-flying tropical butterflies housed in a vivarium that approximates their natural habitat.

**FEBRUARY**

**SciCafe**

**Wednesday, February 2**  
Doors open at **7 pm**  
Free admission, cash bar  
21+ with ID  
An informal evening of science, cocktails, and conversation. Visit [amnh.org/scicafe](http://amnh.org/scicafe) for details.

**ArcheoAstronomy**

**Thursdays, February 3 and 10**  
(For grades 7 and 8)  
**Thursdays, February 17 and 24**  
(For grades 5 and 6)  
**4:30–6 pm**  
\$60  
Discover the roles of celestial bodies and events in the cultures of ancient peoples.

**Meet the Scientist**

**Saturday, February 5**  
Free with Museum Admission  
Visitors ages 7 and up can meet a scientist in the Discovery Room. Call 212-315-7105 for details.

**Lunchtime Winter Bird Walks**

**Thursdays, February 3, 10, and 17**  
**Noon–1:30 pm**  
\$75  
Ornithologist **Paul Sweet** leads walks through three Central Park habitats.

**Winter Wildlife Weekend**

**Saturday, February 5–Sunday, February 6**  
\$350 per person, double occupancy  
\$400 single occupancy  
Please register by January 19 by calling 212-769-5606  
Join ornithologist **Paul Sweet** on this two-day birding and wildlife expedition to Long Island's Montauk Point. Flocks of sea ducks gather to forage on these rocky shores; gannets plunge for fish off the point; and other winter visitors include Bonaparte's Gulls, loons, and grebes. Price includes transportation by private coach, one night at the Born Free Motel (rooms include private bath and kitchenette), and dinner at Shagwong Restaurant on Saturday night.

**Global Weekends Living in America: Brain and the Tibetan Creative Mind**

**Tuesday, January 25–Sunday, January 30**  
Free with Museum admission  
Experience meditation, watch monastic dances, and learn about the latest research on Tibetan meditation's impact on the brain. Free meditation session for Members is offered January 25 at 8 am.

**Astronomy and Vision with Emily Rice**

**Tuesday, January 25**  
**6:30 pm**  
\$13.50 Members  
Learn how the human brain interprets visible light, discerns brightness and color, and senses patterns.

**Tibetan Meditation, Brain, and the Arts**

**Thursday, January 27**  
**6:30 pm** (Visit *Brain: The Inside Story*)  
**7:30 pm** (Panel Discussion)  
\$18 Members  
An expert panel will discuss the training of Tibetan monks, recent brain research on long-term meditators, and more.

**IMAX Movie**

**SEA REX: JOURNEY TO A PREHISTORIC WORLD**  
Opens **Monday, January 10**  
Members' tickets are \$12 adults, \$7.50 children  
Travel from a modern-day aquarium to the Triassic, Jurassic, and Cretaceous periods to discover an amazing underwater universe.

**Hayden Planetarium Space Show**

**JOURNEY TO THE STARS**  
Members' tickets are \$12 adults, \$7.50 children  
*Journey to the Stars* launches viewers through time and space to experience the life and death of the stars in our night sky.

**Credits**

*Brain: The Inside Story is organized by the American Museum of Natural History, New York, (www.amnh.org) in collaboration with Codice. Idee per la cultura, Torino, Italy in association with Comune di Milano - Assessorato Cultura, Italy; Guangdong Science Center, Guangzhou, China; and Parque de las Ciencias, Granada, Spain.*

**Generous support for Brain: The Inside Story has been provided by**

*The Eileen P. Bernard Exhibition Fund Susan W. Dryfoos and the JRS Dryfoos Charitable Lead Trust Virginia Hearst Randt and Dana Randt The Mortimer D. Sackler Foundation, Inc. Mary and David Solomon*

*Additional support for Brain: The Inside Story and its related educational programming has been provided by Roche.*

**The Hidden Reality: Parallel Universes and the Deep Laws of the Cosmos with Brian Greene**

**Monday, February 7 7:30 pm**  
**\$13.50 Members**  
 Theoretical physicist Brian Greene will discuss models of parallel universes.

**From the Field: Revisiting Akeley's Gorillas**

**Wednesday, February 9 6:30 pm**  
**Free** to the first 75 Members (registration required)  
**Stephen C. Quinn** will share works, including a panoramic plein-air painting, completed on a recent trip to the eastern Congo basin.

**Windows on Nature: Birds**

**Thursday, February 10 6-7:30 pm**  
**\$35 per person**  
 Author of *Windows on Nature: The Great Habitat Dioramas of the American Museum of Natural History* **Stephen C. Quinn** leads this tour of masterpiece dioramas featuring birds.

*The Museum is deeply grateful to Emily H. Fisher and John Alexander, whose vision and generosity supported the acquisition and conservation of this collection of Tibetan Medical Paintings.*

*Body and Spirit is made possible by a very generous gift from the Estate of Marian O. Naumburg.*

**One Step Beyond**

**Friday, February 11 9 pm-1 am**  
**\$25**  
 Enjoy a night of drinks and dancing in the Rose Center for Earth and Space and a complimentary screening of a Space Show.

**Wild, Wild World: A Dog's Mind**

**Saturday, February 12 11 am-noon, 1-2 pm**  
 Members' tickets are **\$8 children, \$10 adults**  
 Cognitive scientist **Alexandra Horowitz** will lead live, interactive demonstrations.

**Members-Only Highlights Tour**

**Sunday, February 13 3-4:30 pm**  
**Free** (registration required)  
 An insider's introduction to all the Museum has to offer. Tour meets in the Portrait Room.

*The Presenting Sponsor of The Butterfly Conservatory is **ConEdison**.*

*Journey to the Stars was produced by the American Museum of Natural History, the Rose Center for Earth and Space, and the Hayden Planetarium.*

**Romance Under the Stars**

**Monday, February 14 6:30-8 pm**  
**\$75 per person** (includes one hour of open bar and appetizers)  
 Celebrate Valentine's Day in the Hayden Planetarium. The evening will begin with a cocktail hour, followed by a view of the night sky and some of the greatest romance stories of all time.

**A Night at the Museum Sleepover**

**Friday, February 18**  
 Members' price is **\$119 per person**  
 This unique after-hours opportunity will thrill kids ages 7 to 15 and their caregivers.

**Global Weekends Saluting Our Jazz Elders**

**Saturday, February 19 1-5 pm**  
**Free** with Museum admission  
 Enjoy performances by renowned jazz artists at this celebration of African-American History Month.

*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.*

**Insights from the Hubble Telescope with Jackie Faherty**

**Tuesday, February 22 6:30-8 pm**  
**\$13.50 Members**  
 Explore some of Hubble's most exciting discoveries through the Hayden Planetarium's Digital Universe.

**Adventures in the Global Kitchen: Smell (and Taste) the Roses**

**Wednesday, February 23 6:30 pm**  
**\$25**  
 Learn how scents are encoded in the brain and how memory influences eating habits.

**Behind the Scenes in Anthropology: Ethnographic Collections**

**Thursday, February 24 6:30-8 pm**  
**7-8:30 pm**  
**7:30-9 pm**  
**\$35 per person**  
 Join the Division of Anthropology's collections staff for a rare look at this world-class ethnographic collections, which includes over 500,000 objects.

*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.*

**Brain: A 21st Century Look at a 400 Million Year Old Organ**

**Saturday, February 26 10:30 am-noon**  
**\$12 adults; \$7.50 children**  
 Recommended for kids ages 10 and up  
 Join Curator **Rob DeSalle** and illustrator **Patricia J. Wynne** for a discussion of their new children's book.

**MARCH AND BEYOND**

**Philadelphia International Flower Show**

**Sunday, March 6 9 am-6 pm**  
**\$110**  
 (Includes transportation by private coach and garden tea)  
 Please register by February 21  
 Join fellow Members on a visit to the 2011 Philadelphia International Flower Show, which celebrates the City of Life with full-scale garden and floral displays.

**Field Trip to the Moon**

**Friday, March 18 6-6:30 pm**  
**\$12 adults; \$7.50 children**  
 Feel the ground shake as your rocket launches at this Members-only showing in the Hayden Planetarium.

**Members-Only Highlights Tour**

**Saturday, March 19 3-4:30 pm**  
**Free** (registration required)  
 An insider's introduction to all the Museum has to offer. The tour meets in the Portrait Room.

**Windows on Nature: Milstein Hall of Ocean Life**

**Tuesday, March 22 6-7:30 pm**  
**\$35**  
 Author of *Windows on Nature: The Great Habitat Dioramas of the American Museum of Natural History* **Stephen C. Quinn** leads this tour of the masterpiece dioramas.

**Behind the Scenes in Earth and Planetary Sciences**

**Thursday, March 24 6:30-8 pm**  
**7-8:30 pm**  
**7:30-9 pm**  
 Go behind the scenes in this evening exploration of terrestrial and planetary processes.

**Brooklyn Bridge to Brooklyn Heights**

**Saturday, March 26 10 am-noon**  
**1-3 pm**  
**Sidney Horenstein** leads this walking tour about the history and the science behind the Brooklyn Bridge.

**A Night at the Museum Sleepover**

**Saturday, March 26 3-4:30 pm**  
**Members' price is \$119 per person**  
 This unique after-hours opportunity will thrill kids ages 7 to 15 and their caregivers.

**The Land of Painted Caves with Jean M. Auel**

**Wednesday, March 30 6:30 pm**  
**\$12 Members**  
 Bestselling author **Jean M. Auel** will read at this special launch event of the final book in her Earth Children series, *The Land of Painted Caves*.

**Explore the Great Swamp**

**Saturday, May 14 9 am-4 pm**  
**\$90**  
 (Includes transportation by private coach; bring your lunch)  
 Please register by April 28  
 Ornithologist **Paul Sweet** and herpetologist **David Kizirian** lead a trip to New Jersey's Great Swamp Refuge, which consists of 7,600 acres of varied habitats and has become a resting and feeding area for more than 244 species of birds.

**Credits**

*Public programs are made possible, in part, by the Rita and Frits Markus Fund for the Public Understanding of Science.*

*Living in America: Brain and the Tibetan Creative Mind is made possible with public funds from the New York State Council on the Arts, celebrating 50 years of building strong, creative communities in New York State's 62 counties. Logistical advice provided by The Tibet Fund, New York, NY.*

*Saluting Our Jazz Elders is co-produced with Community Works and New Heritage Theatre Group.*

*Support for Global Weekends is made possible, in part, by the Ford Foundation, the May and Samuel Rudin Family Foundation, Inc., the Tolan Family, and the family of Frederick H. Leonhardt.*

*SciCafe is proudly sponsored by Judy and Josh Weston.*

*SciCafe is made possible in part by a Science Education Partnership Award (SEPA) grant from the National Center for Research Resources (NCRR), a component of the National Institutes of Health (NIH).*

*Popular Science is the media partner for Hayden Planetarium monthly astronomy programs and lectures.*

*The Museum's Youth Initiatives programming is generously supported by the leadership contribution of the **New York Life Foundation**.*

## Going To Graduate School At The Museum

For an extraordinary group of New York City students, going to class means passing a Neanderthal skeleton, a 94-foot-long model of a blue whale, and a family of brown bears—and that's just on the first floor.

These are the 15 students now enrolled in the Richard Gilder Graduate School at the American Museum of Natural History, which in 2006 became the only American museum—and the first museum in the Western Hemisphere—with the authority to grant the Ph.D. degree. In 2008, the Museum made history by enrolling its first class. Just last year, the New York State Board of Regents granted full institutional accreditation to the Richard Gilder Graduate School, a landmark decision that recognized the strength of the new program and the Museum's long track record of training graduate students in partnership with leading institutions that include Columbia University, New York University, Cornell University, City University of New York, and Stony Brook University.

The Museum's inaugural doctoral program is in comparative biology, with an interdisciplinary emphasis spanning the origins, history, and diversity of life on Earth. Here, the Richard Gilder Graduate School students—who come to study from all over the world (see sidebar)—have several distinct advantages. The Museum's internationally recognized staff of curators and other scientists are their faculty. The Museum's world-renowned collections of more than 32 million specimens and cultural artifacts are available for their research projects. The Museum's active field work program offers students the

opportunity to conduct research all over the globe. And some of the most advanced, state-of-the-art scientific facilities in the world are available on site at the Museum.

"We can offer our students exceptional research opportunities and support to help them succeed in our accelerated Ph.D. program," says John Flynn, dean of the Richard Gilder Graduate School who is also a curator in the Division of Paleontology. "This includes our unique academic strengths in faculty, collections and laboratories, as well as the resources and assistance provided by the entire Museum-wide community."

With all that the program has to offer, graduate students have a broad range of training opportunities to carry out original research. Edward Stanley, who studies African "girdled lizards" (Cordylidae), draws on the Museum's world-class collection of squamate reptiles, frozen tissues in the Ambrose Monell Cryo Collection, and state-of-the-art CT machine (see page 15.) Shaena Montanari has access to an unparalleled collection of specimens from the Museum's paleontology collections and uses advanced fossil preparation methods in her study of the diet and metabolism of dinosaurs. And for the last two years, she has traveled to the Gobi desert on field expeditions with Museum faculty—just another example of how coming to school at the Museum is, in fact, a gateway to an exciting, bigger world.

For more about the Richard Gilder Graduate School at the Museum, visit [rggs.amnh.org](http://rggs.amnh.org).

### Students In the Field

Here is a sampling of how some students in the Comparative Biology Ph.D. program at the Richard Gilder Graduate School spent the past year:

John Denton helped identify uncatalogued deep sea myctophid fishes (lanternfishes) in collaboration with Bruce Mundy of National Oceanic and Atmospheric Administration

at the Pacific Island Fisheries Science Center in Honolulu.

Isabelle Veà attended a summer course on the biodiversity of "true bugs" (Hemiptera) which was organized by Museum Curator and Richard Gilder Graduate School Professor Randall T. Schuh and colleagues and held at La Selva and Palo Verde biological stations

in Costa Rica. Isabelle also collected scale insect specimens at the Museum's Southwestern Research Station in Arizona.

Zach Baldwin served as a taxonomist specialist for a deep-sea research cruise that sampled mid-water organisms from the Peru-Chile Trench, which reaches several thousand meters in depth.



### World Class

Richard Gilder Graduate School students come to study at the Museum from all over the world.

#### Class Entering 2008

- **Zachary Baldwin**  
*Plymouth, New Hampshire*  
Advisor: John Sparks
- **Bryan Falk**  
*Boise, Idaho*  
Advisor: Susan Perkins
- **Antonia Florio**  
*Flushing, New York*  
Advisor: Christopher Raxworthy
- **Sebastian Kvist**  
*Helsingborg, Sweden*  
Advisor: Mark Siddall
- **Shaena Montanari**  
*Ridgefield, Connecticut*  
Advisor: Mark Norell

#### Class Entering 2009

- **John Denton**  
*Gainesville, Florida*  
Advisor: Melanie L.J. Stiassny
- **Alejandro Grajales**  
*Bogota, Colombia*  
Advisor: Estefanía Rodríguez
- **Edward Stanley**  
*Dorset, England*  
Advisor: Darrel Frost
- **Isabelle Veà**  
*Paris, France*  
Advisor: David Grimaldi

#### Class Entering 2010

- **Phil Barden**  
*Phoenix, Arizona*  
Advisor: David Grimaldi
- **Ansel Payne**  
*Walton, West Virginia*  
Advisor: James Carpenter
- **Pedro Peloso**  
*Belém, Brazil*  
Advisor: Darrel Frost
- **Dawn Roje**  
*Los Angeles, California*  
Advisor: John Sparks

## Build Your Brain With OLogy

By the time a baby is a few months old, almost all the neurons of the brain are in place. But millions of new connections form as people go through life, especially during childhood and adolescence—as many as 100 trillion in all. The synapses you use the most grow stronger, while unused connections weaken and fade away. So your brain is shaped not only by your body chemistry, but by everything you think, feel, and do. It's what allows us to compensate for injury or disease. Scientists call this ability of the brain to change in response to experience plasticity.

Learn more in the current exhibition, *Brain: The Inside Story*, or on **Brain OLogy**, the latest addition to OLogy, the Museum's website for kids. It's packed with games, puzzles, and science, including three activities that explore brain plasticity:

**Brain games.** Mental and physical exercise helps the brain stay healthy longer. Developed to help us process visual signals more quickly, games like Jewel Diver, Sweep Seeker, and Bird Safari may help people over 50 with complex tasks like driving (and work on kids' brains too). The games get harder as you

get better—and they're not easy to start with!

**Read With Your Fingers.** Scientists who studied the brains of blind people have discovered that the area of the brain normally used for seeing, the visual cortex, may be "reassigned" to sense touch. Use thumbtacks and a Braille key to create a message, then "see" what it's like to read with your eyes closed.

**Slipping Away.** You can't improve your reflexes because they're hardwired into your system. But you can improve your response by doing something over and over again. Test your reaction time and compare it with a friend's. Who can catch the ruler the fastest? How do your reaction times change?

For more from Brain OLogy, visit [amnh.org/ology](http://amnh.org/ology).

Major support for OLogy has been provided by the Verizon Foundation. The initial development of OLogy was made possible by a generous grant from The Louis Calder Foundation.

SEE IT NOW

Member tickets to *Brain: The Inside Story* are free.

### 10.10.10 Celebration of the Rose Center for Earth and Space



1. Some festivities to commemorate the 10th anniversary of the Frederick Phineas and Sandra Priest Rose Center for Earth and Space were held on the Arthur Ross Terrace.

2. Activities in the Rose Center included planet model-making and "Meet the Scientist" sessions with members of the Division of Physical Sciences.

3. Astronaut Michael Massimino, a veteran of the fourth Hubble Space Telescope servicing mission, signed autographs for visitors.

### Cosmic Discoveries

Have you downloaded the Museum's latest app yet?

Launched this fall as part of the commemoration of the 10th anniversary of the Museum's Rose Center for Earth and Space, *Cosmic Discoveries* features nearly 1,000 stunning astronomical images, from the pockmarked surface of Mercury to the majestic Horsehead Nebula, culled from the Museum's archives and Science Bulletins as well as from dozens of space agencies and observatories around the world.

The app also features eight stories on a range of subjects, including comets and galaxy clusters. Additional stories are on the way—so when you're not watching the skies, keep an eye out for more cosmic adventures! *Cosmic Discoveries* follows up on the successes of the Museum's *Dinosaurs* app and *AMNH Explorer*, which Gizmodo called "nothing less than state-of-the-art."

## Grandfather and Grandson Set Record for Sleepovers



Gregory Cox and Shane Drucker are regulars at the Museum's sleepovers.

When Gregory Cox was a teenager attending the Food and Maritime Trades School in the 1960s, he sometimes took advantage of a midday switch from the East Side campus to the West Side to skip school and head to the American Museum of Natural History.

"I didn't take the [school] bus, I took the subway," he recalls over the phone from his home in Brooklyn. "They never caught me!"

Cox, who lives in Brooklyn, went on to a career in ship repair, like his father, grandfather, and great-grandfather before him. Now retired and a Family-level Member, he loves sharing his longstanding affection for the Museum with his

grandchildren, Shannon Gonsalves and Shane and Shamus Drucker of Staten Island.

Contrary to Cox's playing hooky, Shane, who is 11, uses extra schoolwork as an excuse to get his grandfather to take him to the Museum. "Every time he has a school project, he has to go there to research it first," Cox says. "He loves it."

Moreover, since the Museum inaugurated its Night at the Museum Sleepovers program four years ago, it is a matter of special pride for Cox that he and Shane have spent six nights camping out under the blue whale in the Milstein Hall of Ocean Life.

"My grandson is bound and determined to have the record for most times," Cox says.

So far, he has succeeded. "No one has come close," says Leslie Martinez, who manages the program.

Cox is so keen on the sleepover experience that he carries around descriptions of the program he printed from the Museum's website to hand out in doctors' offices and elsewhere, encouraging others to experience the sleepovers for themselves. "I appreciate that he tells everyone about it," says Martinez. "He's a great support."

At age 5, Cox's youngest grandchild Shamus is still too young for a sleepover. Shannon, 16, was too old when the program began four years ago for kids 8 to 12 (the age range has since been expanded to 7 to 15), and although Cox says he saw her through an avid dinosaur phase when she was younger, she is now more likely to visit the Museum with a boyfriend. "She outgrew me," he says, noting that, on the other hand, at Shane's age "grandparents are everything."

And even though Shane will outgrow the program in a few years, Cox still foresees many, many years of Museum visits and even sleepovers ahead. "By the time Shane outgrows me, I'll have the little guy!" he says.

**Members receive a discount for Night at the Museum Sleepovers. For more information, visit [amnh.org/sleepovers](http://amnh.org/sleepovers).**

### Reminders for Members

**Members Open House**  
Thursday, February 17  
6–8:30 pm  
For Contributor and Higher-Level Members  
Kindly RSVP before February 14  
by calling 212-769-5606

Explore the halls at your leisure at this Members-only evening that includes a wine reception.

**Members Star Party**  
Wednesday, March 16  
6:30–9 pm  
For Supporter and Higher-Level Members  
Kindly RSVP before March 2  
by calling 212-769-5606

This celestial evening in the Rose Center for Earth and Space includes cocktails, star gazing, and more.

**Walk on the Wild Side**  
Wednesdays,  
January 5–March 30  
8–9:30 am  
Free for Members at the Contributor level and up  
Space is limited; call 212-769-5606 to register

Enjoy fitness walks followed by breakfast in the Akeley Hall of African Mammals.

### Don't Miss

**Philadelphia International Flower Show**  
Sunday, March 6  
9 am–6 pm  
\$110 (Includes transportation by private coach and garden tea)  
Please register by February 21

Join fellow Members on a visit to the 2011 Philadelphia International Flower Show—"Springtime in Paris"—which celebrates the City of Light with full-scale garden and floral displays that recreate scenes from Left Bank cafes, walks along the Seine, and more.



Members photo © AMNH/D. Finnin, Hibiscus photo © iStockphoto.com/rlsing-Wen Hsu

## Learning as They Lead

"Batman! Superman! Spiderman!" shouted a crowd of young campers, eager to share the names of their favorite superheroes, as guide Michael Malave kicked off his "super power" tour through the Milstein Hall of Ocean Life and the Akeley Hall of African Mammals.

"When you look around the hall, you can see many animals, and each of them has an ability that helps them to succeed and survive," explained Malave to the pack of superhero enthusiasts. "This is much like how superheroes use their powers to win and beat the bad guys."

Malave, who studies applied math at Marist College, was one of 52 students selected for last year's Museum Education and Employment Program (MEEP), a summer internship that trains college-age students from the New York City area to develop and lead free themed tours for camp groups who flock to the Museum's halls each weekday. In 2010, MEEPers, as the student guides are affectionately known, led more than 580 tours in a span of six weeks—an average of more than 20 tours a day.

Part of the Museum's science education pipeline, a slate of programming that extends from early childhood courses to programs for undergraduates, MEEP is also one of many youth initiatives supported by New York Life Foundation. "The Museum is a leader in providing science education, and MEEP offers college students a valuable opportunity to both learn about and get work experience in this important field," says Christine Park, president of the New York Life Foundation.

**Our young campers also see MEEPers as role models, as they explain complicated ideas in ways that inspire children of all ages.**

— MARGARET JACOBS,  
Director of Youth Initiatives

MEEPers spend their first month training with Museum staff to learn the content of the Museum's halls while crafting original 45-minute tours based on personal or academic interests. Once staff and supervisors approve the tours, which cover topics that range from deep-sea creatures to shamanic practices, MEEPers have the rest of the summer to perfect their presentation. Their challenge: to be ready to improvise on the spot depending on their audience, which could be three-year-olds one day and college or even graduate students the next.

MEEPers also work in pairs behind touch-carts—portable stations stocked with artifacts and specimens placed throughout the Museum—to demonstrate objects to visitors during the summer rush in the halls or in the Discovery Room.

"MEEPers not only gain extensive knowledge of science and culture at the Museum that support their academic and career goals, they also sharpen their leadership and communications skills," says Margaret Jacobs, director of youth initiatives at the Museum. "Our young campers also see them as role models, as they explain complicated ideas in ways that inspire children of all ages."



MEEPer Hannah Sherman and Member Gabrielle Dolinsky, age 10, in the Discovery Room

The variety of tours each year reflects the diversity of the MEEPers' interests. Hannah Sherman, a bioanthropology major at Skidmore College, led tours through the "alien worlds" on Earth and beyond that took campers from the Rose Center for Earth and Space to the Milstein Hall of Ocean Life. Sherman says working as a MEEPer—specifically, making science accessible to the general public—has inspired her to pursue a career in science and the media.

"I was obsessed with the Museum as a kid, so I've come full circle," she says. "I love communicating science to people, but you need a Ph.D. to understand most science magazines. The Museum and other channels can bridge that gap."

On Frieda Benun's popular tour of the David H. Koch Dinosaur Wing, campers examined the long, graceful neck of the *Barosaurus* and the terrifying teeth of the *Tyrannosaurus rex* while learning about how physical form relates to anatomical function. Like most MEEPers, Benun, a biology major at Brooklyn College, at times struggled to explain certain terms to younger campers.

"These are complex concepts, and the first day a lot went out the door," Benun says. "The kids wander off, some absorb with their ears, some with their eyes. I realized I shouldn't be offended."

Alix Cotumaccio, assistant director of youth initiatives, points out that along with gaining confidence and communication skills, MEEPers also get to know scientists and other staff—and leave with a renewed enthusiasm for the institution.

For Benun, who grew up in New York, the internship reaffirmed her connection to the Museum. Her dream now: "to work here forever."

**Applications for the summer 2011 program are due April 18. Email [meeper@amnh.org](mailto:meeper@amnh.org) for more information.**

*MEEP is generously supported by the leadership contribution of New York Life Foundation.*



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1. Sir Elton John, who performed at the Museum Gala on November 19, with Museum President Ellen V. Futter.  
2. Alec Baldwin, Steve Martin, and Gala Chair John Eastman share a laugh at the Museum Gala.  
3. Howard and Allison Lutnick with Henri Barguidjian of Graff, 2010 Museum Gala co-sponsor.

4. Museum Gala Chair Lorne Michaels enjoyed the evening with Jimmy Fallon and Alice Michaels.  
5. Ron Spurga, Marie Colwell, Mayke and Jeroen Rijpkema, Humphrey Valenbreder, and Edzard Enschede of ABN AMRO, co-sponsor of the 2010 Museum Gala.

Photos 1, 2, 5 © AMNH/D. Finnin; photo 3 © David Patrick Columbia; photo 4 © AMNH/R. Mickens.



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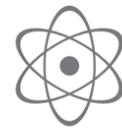
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Photos © AMNH/D. Finnin.

1. Family Party Committee Member Zibby Right attended the October 19 event with her husband Andrew Right and their children.  
2. Donya Bommer and children stopped by the Milstein Hall of Ocean Life.  
3. Chairmen of the Family Party posed for

a photograph shortly before the event began.  
4. The Family Party offered guests opportunities to interact with live animals, including scorpions.  
5. Family Party guests Steward Lane, Bonnie Comley, and their children took time to enjoy the Akeley Hall of African Mammals.

**Save the Date!**  
Upcoming Events at the Museum



**MARCH**  
The annual Isaac Asimov Memorial Debate will explore "The Theory of Everything... Still Searching?"

**APRIL**  
4/12 Join us for the 21st Annual Environmental Lecture and Luncheon.



4/15 Members will have the first chance to see the exciting new exhibition *The World's Largest Dinosaurs* at this exclusive preview. Free for Members.

4/16 *The World's Largest Dinosaurs* opens to the public.



4/28 Dance the night away at the annual **Museum Dance**, the social event of the season.



**MAY**  
5/12 The Museum holds its annual **Corporate Dinner**.

5/28 *Frogs: A Chorus of Colors* returns with more than 200 live frogs representing 25 species from Argentina to Vietnam.



**JUNE**  
6/15 Get an astronaut's view of a sunrise from space on **Field Trip to the Moon**, a virtual trip guided by a live presenter.

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



© AMNH/D. Finnin



*Papilio blumei*, above, is a butterfly of the swallowtail family. See more than 500 free-flying tropical butterflies in the Museum's *Butterfly Conservatory*, a vivarium that approximates their natural habitat.

*The Butterfly Conservatory: Tropical Butterflies Alive in Winter* runs through May 30. Presenting Sponsor of *The Butterfly Conservatory* is Con Edison.

## 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, The Shop for Earth & Space, Cosmic Shop, Brain 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: **B** (weekdays) or **C** to 81st Street; **1** 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 receive a discounted rate of \$10 if entering after 4 pm. To receive this rate, you must show your membership card or event ticket when exiting the garage.