



AMERICAN MUSEUM OF NATURAL HISTORY

# RTUNDA

Member Magazine  
Winter 2019 Vol. 44 No. 1

**T. REX:  
THE ULTIMATE PREDATOR  
OPENS MARCH 2019**



*DINOSAUR DIGS,  
PAST AND PRESENT*

# From the President

Ellen V. Futter



As the Museum prepares to commemorate its 150th anniversary in 2019, it seems apt that one of the centerpiece projects currently underway is the renovation, conservation, and reimagining of the Museum's first permanent gallery and first cultural hall, the iconic Northwest Coast Hall.

Developed by anthropologist Franz Boas, the Northwest Coast Hall was considered radical when it opened in 1899. It was the first cultural display in a museum to present indigenous cultures on their own terms, not in relation to Western culture. Nevertheless, much has changed in our thinking about cultural representation over the past century.

And so, we are honored now to be pursuing the restoration of the Hall in close collaboration with the native communities that it celebrates, to ensure that the presentations are not just

appropriate and respectful but that the new Hall more fully reflects the voices and experiences of these communities as living cultures.

To that end, the Museum has appointed an outside First Nations co-curator for the Hall. Nuuchah-nulth artist and cultural historian Haa'yuups (Ron Hamilton) will work with the Museum's North American Ethnology Curator Peter Whiteley to oversee the restoration.

We hope that the Northwest Coast project will provide an opportunity for institutional learning regarding cultural representation in our galleries. Most especially, as we prepare to celebrate our milestone anniversary, we are thrilled to be refreshing this gorgeous and iconic Hall in ways that reflect a heightened cultural sensitivity for the 21st century.

## Table of Contents

Close-Up	4
Fast and Furious	6
Fossil Field Journal	10
Jurassic Jackpot	12
Next	14
Night at the Museum, for Teachers	20
Whale Tales	22



## ROTUNDA

**American Museum of Natural History**  
Chairman Lewis W. Bernard  
President Ellen V. Futter  
Vice President of Development and Membership Laura Lacchia Rose  
Director of Membership Louise Adler

**Magazine**  
Editorial Director Eugenia Levenson  
Editor Alanna Ruse  
Contributors Joan Kelly Bernard, Jill Hamilton, Karen Miller, Elena Sansalone  
Design Hinterland, www.hinterlandstudio.com

ISSN 0194-6110  
USPS Permit #472-650  
Vol. 44, No. 1, Winter 2019  
Rotunda is published by the Membership Office of the American Museum of Natural History, Central Park West at 79th Street, New York, NY 10024-5192. Phone: 212-769-5606. Website: amnh.org. Museum membership of \$75 per year and higher includes a subscription to Rotunda. © 2019 American Museum of Natural History. Periodical postage paid at New York, NY and at additional mailing offices. Postmaster: please send address changes to Rotunda, Membership Office, AMNH, at the above address.

Please send questions, ideas, and feedback to [rotunda@amnh.org](mailto:rotunda@amnh.org).

D. Finnin/© AMNH, istock/ritcharey, © AMNH, M. Shanley/© AMNH, © AMNH

# Co-Curator Named for Northwest Coast Hall Restoration



Haa'yuups, pictured in the Museum's Objects Conservation Laboratory during a visit last summer, has been appointed as co-curator of the Northwest Coast Hall restoration project.

This fall, Nuuchah-nulth artist and cultural historian Haa'yuups (Ron Hamilton) was appointed as co-curator of the project to update, conserve, and restore the historic Northwest Coast Hall, joining Peter Whiteley, the Museum's curator of North American Ethnology.

"We are thrilled that Haa'yuups—one of today's most influential First Nations voices—is joining our efforts in updating and enriching the Museum's very first hall and its first cultural gallery," said Museum President Ellen Futter, who announced the appointment. "Close collaboration and ongoing, productive dialogue is absolutely critical in authentically presenting the cultural and artistic expression of our world's living and vibrant cultures. Haa'yuups will bring an important perspective for millions from all over the world who will visit the reimagined Northwest Coast Hall and its updated presentation of cultural treasures."

Haa'yuups is an artist, scholar, and historian as well as the Head of the House of Takiishtakamthlat-h of the Huupach'esat-h First Nation, Nuuchah-nulth. Over the past 50 years, he has collaborated with the Museo Nacional de Antropología in Mexico, the Musée de l'Homme in Paris, the British Museum in London, and the National Museum of the American Indian in Washington, D.C. "I am deeply honored for the opportunity to participate as a co-curator in the redesign of the Northwest Coast Hall," said Haa'yuups. "I am sure the job will be a daunting one, and I am ready for any and all challenges that we will face. I have great faith in Peter Whiteley and his entire crew."

"With the reimagining of the Hall, our goal is to present the art and material culture of the Pacific Northwest in a way that

highlights the ideas, voices, and perspectives past and present behind these wonderful historical pieces," said Whiteley. "I eagerly look forward to partnering with Haa'yuups to achieve that goal as we work to create a modern exhibition hall that can serve as a new exemplar and transcend the boundaries that have too often divided museums and Native communities."

The Museum is also consulting with a diverse group of core advisors that includes Native scholars, artists, and other authorities including David Boxley (Tsimshian of Metlakatla; master carver), Chief Ga'lastawikw (Trevor Isaac; Kwakwaka'wakw, Haxwa'mis tribe; collections and education assistant at U'mista Cultural Centre, Alert Bay), Jisgang (Nika Collison; Haida Nation, Ts'aahl clan; director of the Haida Gwaii Museum at Kay Lnagaay), Kaa-xoo-auxch (Garfield George; Angoon Tlingit, head of the Raven Beaver House/Dei Shu Hit "End of the Trail House"), Judith Daxootsu Ramos (Yakutat Tlingit, Kwaashki'kwaan clan; assistant professor for the Department of Alaska Native Studies and Rural Development, University of Alaska Fairbanks), secalenax (Morgan Guerin; Musqueam; councillor for the Musqueam First Nation, artist), Snxakila (Clyde Tallio; Nuxalk, orator, ceremonialist, and cultural researcher for the Nuxalk Nation), Chief Wigwilba Wákas (Harvey Humchitt; Heiltsuk, a community leader and the research liaison coordinator of the Heiltsuk Integrated Resource Management Department, Bella Bella) and Xsim Ganaa'w (Laurel Smith Wilson; Gitksan, Fireweed Clan, House of Guuxsan; former director and curator of the Ksan Historical Village and Museum, Hazelton).

D. Finnin/© AMNH



Hawksbill sea turtle

**CORAL CLEANERS**

Hawksbill sea turtles play an essential role in the life of coral reefs, plucking out sponges, their main food source, from the reef's surface. This in turn provides better access for reef fish to feed and may give the corals a favorable edge in the competition with the sponges for space.

**THREATS TO SURVIVAL**

Since 1996, the hawksbill sea turtle has been listed as critically endangered by the International Union for Conservation of Nature. Threats include habitat destruction, disease, pollution, and poaching for their prized and uniquely patterned tortoiseshell. Another huge threat is fishing gear, which entangles turtles and prevents them from surfacing for air.

**PLASTICS PERIL**

Researchers are turning increasing attention to the ingestion of plastic debris by sea turtles. More work is needed to assess the health risks, but one recent study estimated that more than half of all sea turtles from all seven species worldwide have eaten plastic, while another found that the two species most at risk are the hawksbill and the green sea turtles.

**NUMBERS GAME**

Here is another twist to the future survival of this species: the sex of the hatchlings is determined by the temperature of the developing eggs: below 81.86° F means male, above 87.8° F, female, and fluctuating temperatures, a mix. Warming nesting sites caused by climate change may result in a disastrous preponderance of females.

## Radiant Reptile

In the special exhibition *Unseen Oceans*, visitors come upon a brilliant floor-to-ceiling spiral of models of underwater species biofluorescing just as they would in life. Among the catsharks, breams, and other fishes reflecting neon greens and reds is a glowing reptile: a hawksbill sea turtle.

Only three years ago, this species, *Eretmochelys imbricata*, wouldn't have made the cut. But on a night dive during a July 2015 expedition to the Solomon Islands in search of biofluorescent corals, Museum researchers discovered that the hawksbill sea turtle glows, too. They were using a special camera equipped with blue lights when, about 65 feet (20 meters) down, a bright-colored turtle suddenly popped into view like a "UFO...a bright red and green spaceship," recalls Museum Research Associate David Gruber. Scientists suspect that some, if not all, of the red glow might be produced by algae living on the turtles' shells—but more research is needed.

Meanwhile, another group of scientists at the Museum has spent more than a decade studying hawksbill sea turtles at the Palmyra Atoll National Wildlife Refuge, a remote ring of islets and associated marine habitats in the Pacific Ocean. When the research program began in 2005—run by the Museum's Center for Biodiversity and Conservation (CBC) along with scientists from the City University of New York, U.S. Geological Survey, and National Institute for Standards and Technology—very little was known about the highly migratory species and its life at the atoll. Since then, in-water habitat studies using acoustic and satellite telemetry have advanced understanding of these turtles—as well as that of Palmyra's green sea turtles (*Chelonia mydas*), their genetics, interactions with their habitats, feeding habits, and the health of both populations, including their distribution and movement around the atoll and the broader Pacific.

"By studying the ecology and behavior of the healthy turtles at this critical foraging ground, we are able to deepen understanding of these endangered species and also inform conservation management plans for the Atoll and across the Pacific," says Eleanor Sterling, Jaffe Chief Conservation Scientist at the CBC.

See a model of a glowing hawksbill sea turtle in *Unseen Oceans*, which is free for Members.

## Cotton Coat

This dark blue cotton coat with white appliques from the Museum's Anthropology Collection is an exquisite example of traditional clothing of the Ainu, the indigenous people of Hokkaido, Japan's second largest and northernmost island.

The coat is distinctive for being made primarily of cotton, which became more common after the Ainu (pronounced EYE-noo, and the word for "human" in the Ainu language) began trading with the Japanese during the Edo era (1615–1868). The Ainu are better known for materials used in the so-called "bark" clothes—robes made of *attush*, fibers spun from the inner bark of the elm tree, or *retarpe*, white fibers made from nettles.

While men gathered the raw materials, weaving, sewing, and decorating clothing was done by Ainu women. Basic designs were passed from mother to daughter, and young women were expected to combine and vary these to create their own patterns. Each garment was unique, crafted with the wearer in mind. The patterns themselves were not intended to represent anything, but the finished product was meant to protect the person wearing it and to please the gods the Ainu believe dwell in everything on Earth, from wind to water, animals to household implements. Some scholars have suggested the patterns might echo the tattoos, on their lips, hands, and arms, for which the Ainu women were once known.

As a minority group, the Ainu were forcibly assimilated and, beginning in the Meiji era (1868–1912), prohibited from hunting, fishing, and speaking their own language. They were also forced to use Japanese names. In recent years, efforts to preserve the Ainu language and culture gained momentum, and in 2008, a resolution of the Japanese parliament recognized the Ainu as a people with a "distinct language, religion, and culture."

For more from the Museum's ethnographic collection, visit the Division of Anthropology's database at [amnh.org/our-research/anthropology](http://amnh.org/our-research/anthropology).



Catalog no. 70/3954

**BEYOND BARK**

The Ainu, who historically lived by hunting, fishing, plant gathering, and some farming, also wore clothing made of "birdskin" and feathers from sea gulls, cormorants, and other birds; the hides of bear, deer, fox, and seal; and salmon and trout "fishskin." Of these, only "bark" clothing persists today.

**FANTASTIC FIBER**

Wooden fibers weren't just used to make robes. The traditional ceremonial headpieces, called *sapaunpe*, worn by Ainu men were made from wood fiber and often decorated with wooden carvings of bears, wolves, and other animals.

**MUSEUM POLYMATH**

This coat was collected in the Shiraoi subprefecture of Hokkaido in 1901 by Bashford Dean (1867–1928), the Museum's first curator of fishes, while he was in Japan on a zoological expedition. Dean was also a curator at the Metropolitan Museum of Art, where he assembled a collection of arms and armor that draws visitors to this day.

**AN AINU GIFT**

To mark President Barack Obama's 2014 visit to Japan, the Hokkaido Ainu Association sent him a traditional Ainu garment in hopes of bringing the Ainu people and culture to his attention. The dark robe featured red, white, and blue geometric patterns.

OPENING IN MARCH

T. REX: THE ULTIMATE PREDATOR



# FAST AND FURIOUS

TYRANNOSAURUS REX GREW AT RECORD SPEED. WHAT WAS IT LIKE BEFORE IT GOT HUGE?

**THERE'S STILL A LOT WE DON'T KNOW** about the Cretaceous Period's most famous predator, *Tyrannosaurus rex*. One thing is for sure: *T. rex* was a giant. Its size is one of the extinct dinosaur's most impressive features—along with its bone-crushing bite and disproportionately tiny arms, of course.

Getting a fuller understanding of *T. rex* the giant requires scientists to try to learn more about *T. rex* as a tyke—before it was a mega-predator and, when it was still something else's prey—as well as its lesser-known, lesser-sized relatives.

“When people think about *Tyrannosaurus rex*, they think that means all tyrannosaurs were big and mean,” says Mark Norell, Macaulay Curator in the Division of Paleontology, and curator of the new exhibition *T. rex: The Ultimate Predator*. “But that’s totally not true. Some of the earliest tyrannosaurs were quite small animals.”

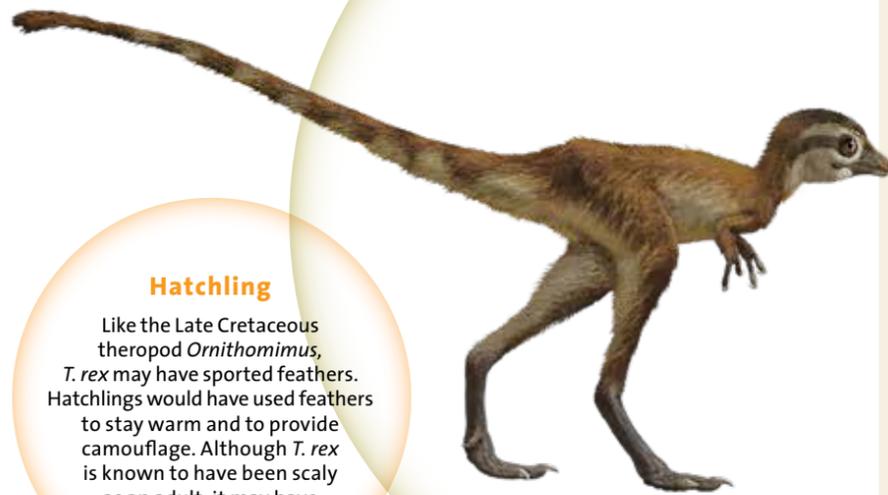
### GROWTH SPURT

Like many living species, *T. rex* hatchlings started out a fraction of the size of an adult dinosaur—which could weigh upward of 15,000 pounds, or about the same as five compact cars. But what the small theropods lacked in size, they made up for in speed: scientists think that *T. rex* gained up to 4.6 pounds a day, or an astonishing 1,690 pounds per year, until its early 20s.

A ferociously rapid growth rate was one of the things that set *T. rex* apart from its Mesozoic peers. It matured at an exceptionally quick clip for a dinosaur, leaping way ahead in size of other tyrannosaur species like *Albertosaurus* and *Gorgosaurus* around age 12. That gave this predator a distinct advantage: by growing out of its young and vulnerable phase quickly, *T. rex* could spend about 30 percent of its lifetime as one of the largest predators ever to walk the Earth. Compare that to modern crocodilians—close cousins that grow very slowly and, while reaching relatively massive sizes, attain only a fraction of the size and weight of an adult *T. rex*.

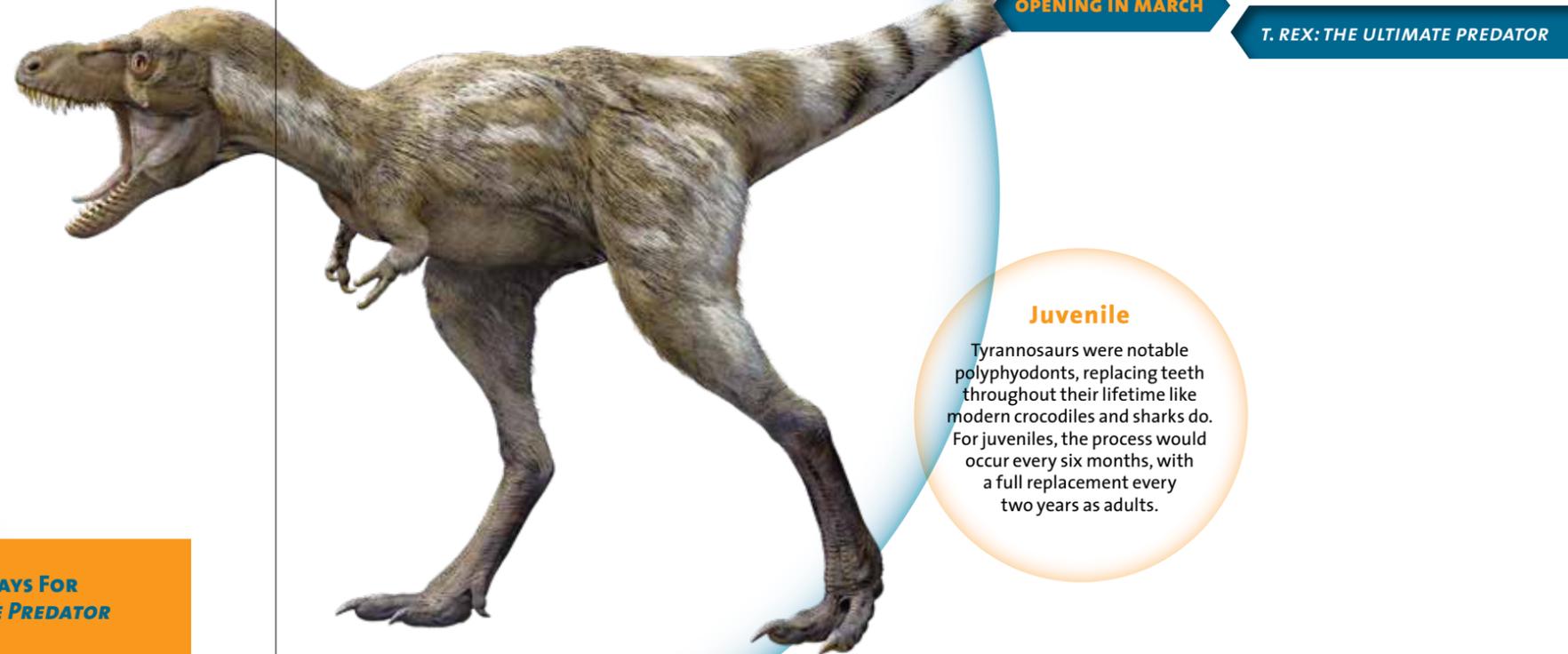
Paleontologists have derived *T. rex*'s stunning growth rate by examining a cross-section of fossilized bones for growth lines—markings that are similar to tree rings, and present in nearly all vertebrates. For dinosaurs like *T. rex*, researchers often sample the thigh bone (femur). Gregory Erickson, a biologist at Florida State University, has also found success sampling the pelvis, calf bone (fibula), ribs, gastralia, and skull bones. And as with trees, bone growth rings offer a glimpse into an organism's life history: in *T. rex*, wide gaps between lines record growth spurts at early ages, and lines that form closer together show a slowdown in growth as the animal approached adulthood.

"If you can figure out the growth curve of an animal, you can figure out how fast it grew, how it matured, how it became either a giant or a dwarf," says Erickson. "You can infer metabolic rates—and even at what size and age they typically died from the diversity of recovered skeletons."



### Hatchling

Like the Late Cretaceous theropod *Ornithomimus*, *T. rex* may have sported feathers. Hatchlings would have used feathers to stay warm and to provide camouflage. Although *T. rex* is known to have been scaly as an adult, it may have retained some feathers for display.



OPENING IN MARCH

T. REX: THE ULTIMATE PREDATOR

### Juvenile

Tyrannosaurs were notable polyphyodonts, replacing teeth throughout their lifetime like modern crocodiles and sharks do. For juveniles, the process would occur every six months, with a full replacement every two years as adults.

**MEMBER PREVIEW DAYS FOR  
T. REX: THE ULTIMATE PREDATOR**  
FRIDAY, MARCH 8  
SATURDAY, MARCH 9  
SUNDAY, MARCH 10  
10 AM–5 PM  
REGISTRATION REQUIRED  
CALL 212-769-5200

See *T. rex: The Ultimate Predator* before it opens to the public! A weekend of exclusive Member Preview Days begins on Friday, March 8.

Everyone knows *Tyrannosaurus rex*. But did you know how this mega-predator evolved to become the most fearsome carnivore of the Mesozoic? The Museum's Spring 2019 exhibition is curated by Mark Norell, Macaulay Curator in the Division of Paleontology, with consulting by Gregory Erickson, professor of anatomy and vertebrate paleontology at Florida State University. The exhibition will introduce you to the entire tyrannosaur family through fossils and life-sized models of hatchlings, juveniles, and a full-grown, towering *T. rex*, with engaging interactives and a VR experience that will reveal the amazing story of the most iconic dinosaur in the world. Warning: you may never think of *T. rex* the same way again.

*T. rex: The Ultimate Predator* is generously supported by Dana and Virginia Randt.

*T. rex: The Ultimate Predator* is generously supported by Chase Private Client.

Illustration by Zhao Chuang. Courtesy of Xi'an Yimiao Age Culture Media Co.

### FOLLOWING THE FAMILY TREE

Growth rates also allow scientists to peek back at an animal's early years. Scientists have yet to find a *T. rex* hatchling fossil. But recent studies based on the growth curve of *T. rex* suggest that these animals would have been around 2 feet long straight out of the egg, and as juveniles may have weighed as little as 10 pounds.

Erickson says these gangly dinosaurs would have had long legs and proportionally longer arms than adults (though not by much). They also would have had the ability to run quickly—a useful strategy for a defenseless animal trying to survive to adulthood. (For instance, about 60 percent likely died in their first year of life, according to Erickson.)

Along with growth curves, paleontologists have also looked to other tyrannosaurs—a group that's bigger, and better studied, today than ever before—for additional clues about how *T. rex* may have developed and behaved. "Over half the animals on the tyrannosaur family tree were unknown 20 years ago," says Norell.

Erickson has looked to *Tarbosaurus* to glean more clues about juvenile *T. rex*. As a youngster, *Tarbosaurus* had a short snout and teeth designed for slicing flesh—but not yet adequate for crushing bone. Young *Tarbosaurus* would have pursued smaller, perhaps faster prey until it grew into the body mass and bite force to go after larger game.

### TINY TYRANOSAUR OR TEENAGE T. REX?

Life expectancy for *T. rex* improved significantly as it grew, but juvenile fossil specimens are very rare. When a specimen is discovered, paleontologists run up against another problem: how to confirm that a fossil is of a young animal, not of an adult of a smaller, totally new species?

In 2003, scientists from the Burpee Museum of Natural History in Illinois discovered a nearly complete tyrannosaur skeleton in northwest Montana that measured 20 feet long and 7 feet tall. Whether "Jane," as the specimen is known, is a juvenile *T. rex* or a yet-to-be described smaller tyrannosaur species has experts divided to this day.

Erickson is squarely on the Jane-the-*T. rex*-juvenile side of the debate, putting the animal's age at 11. "We know from looking at other tyrannosaurs, such as the Late Cretaceous Asian species *Tarbosaurus*, there are similar characteristics suggesting Jane is a juvenile: the proportions of the skull, the bone fusions, how big the eye is, and the shape of the bone over the nose and eyes that change as they mature," he says. "My data suggest it's an animal still growing. It fits right on the *T. rex* growth curve."

### LIVING EVIDENCE

But even nearly complete fossils like Jane offer scientists an incomplete picture—small pieces of a large, complex puzzle. "One of the bigger challenges of paleontology is often we don't have much to work with," says Erickson. "We're like forensic scientists, except that we're looking at 65-million-year-old remains."

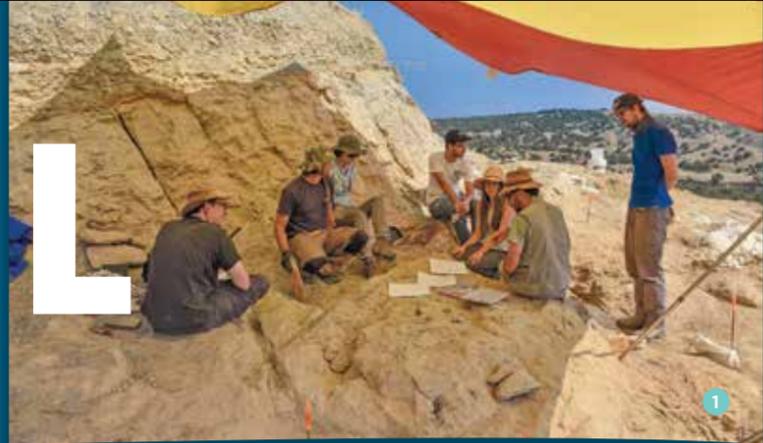
That's why researchers are increasingly going beyond fossils, looking to *T. rex*'s closest living relatives—crocodiles and birds—for clues about how it lived and what it looked like. For example, Erickson has studied the bite force of saltwater crocodiles—the strongest on record for a living animal, at 3,700 pounds—to arrive at a bite force estimate of nearly 8,000 pounds for *T. rex*. Researchers have also compared the musculature of birds to *T. rex* skulls to get a better sense of its facial shape.

And there's much more left to discover—fossils to unearth, clues to find in modern animals' anatomy and behavior. More than 100 years after Museum paleontologist Barnum Brown found the first fossilized skeletons of the world's ultimate predator, we know more about *T. rex* than ever before, and yet "we're just coming to grasp what it was really like," says Erickson. 

*T. Rex: The Ultimate Predator* opens in March and is free for Members.

# FOSSIL

# L FIELD JOURNAL



1

IN WYOMING, MUSEUM RESEARCHERS ARE EXCAVATING A RICH LATE-JURASSIC SITE.

# FIELD JOURNAL



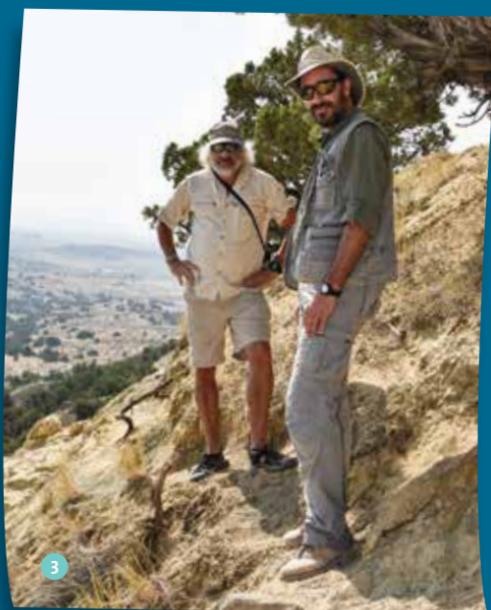
4



5



2



3

- 1. One of the two field sites, Cosm Quarry, is exposed on a cliff—adding a degree of difficulty.
- 2. Mateus and Norell confer about a fossil specimen.
- 3. Norell and Mateus expect that the site will be excavated for years to come.
- 4. Graduate student Alexandra Fernandes, who is also a Museum volunteer, works to expose a fossil.
- 5. Some field techniques haven't changed since the 1930s. Plaster fossil jackets like this one help protect fossils during transport.
- 6. Senior Museum Specialist Carl Mehling exposes part of a bone in a vertical wall.
- 7. A theropod tooth, possibly from an *Allosaurus*, was one of the finds.
- 8. The Cosm Quarry features particularly hard rock, requiring a jackhammer.



6

**THE MORRISON FORMATION** may not be a household name. But the dinosaur species that have been found in this late-Jurassic time capsule—beginning in the late 19th century, when railroad companies first disturbed it while laying tracks out West—certainly are. You know them as *Stegosaurus*, *Apatosaurus*, and *Allosaurus*.

“It’s one of the most iconic formations within paleontology, because it extends all the way from southern Canada to Mexico,” says Mark Norell, Macaulay Curator in the Division of Paleontology at the Museum. “It’s the place where the first great dinosaur discoveries were made in North America.”

Museum paleontologists made some of those famous early finds beginning in the 1890s, with excavations at sites like Bone Cabin Quarry and Como Bluff and, later, Howe Quarry (see p. 12). But there’s more to uncover in the Morrison Formation, especially in the relatively understudied northern portion, which is why a Museum team has been working there for the past three field

seasons, focusing on two locales in Wyoming in partnership with the Nova University of Lisbon, Portugal. The results, both in the scale and quality of fossil discoveries, are exciting.

“I have 20 years of experience in excavations, and I’ve never seen a site as rich as this one, with packs of skeletons one on top of the other,” says Octavio Mateus, a professor at Nova University and a Museum research associate. One hypothesis is that the area was once home to a wide river, which swept up and preserved a large number of animals.

Last summer, two teams tag-teamed on a six-week expedition, removing layers of rock, unearthing new specimens, and jacketing them in plaster for transport on their way to preparation, study and, eventually, a place in the Museum’s growing collection. Here is a quick glimpse into what goes on during a modern-day dinosaur dig. 📍

*This Constantine S. Niarchos Expedition was generously supported by the Stavros Niarchos Foundation.*



8



7

Expedition team members  
survey the fossil-rich  
site at Howe Quarry.

# jurassic jackpot

In the 1930s, Museum paleontologist Barnum Brown uncovered a treasure trove of dinosaur fossils on a Wyoming ranch.

In June 1935, Barnum Brown—the world-famous paleontologist who discovered *Tyrannosaurus rex* in 1902 and had collected thousands of fossils for the Museum starting in 1896—declared in *Natural History* magazine that he had made the fossil discovery of his lifetime.

“Never have I uncovered a more interesting deposit of prehistoric remains, or seen one where the story of their death and entombment could be read with such clarity,” he wrote about the previous year’s expedition at Howe Quarry, located on a ranch just outside of Shell, Wyoming. There, the paleontologist known as Mr. Bones and his team had uncovered approximately 4,000 fossil bones in just six months, all from a small, densely packed area measuring 45 by 65 feet—a mass graveyard for ancient, mysterious animals.

The sheer scale of the find was staggering—and completely surprising. Brown had first heard of the Barker Howe Ranch and its dinosaurs from a local collector while scouting for fossils in the Big Horn Basin in Wyoming and Montana in 1932. Several large sauropod leg bones lay partially exposed on the property’s hillside. Having already uncovered other dinosaur skeletons in nearby locales—including *Sauropelta* and *Tenontosaurus*, which are now on view in the Museum’s Hall of Ornithischian Dinosaurs—Brown was determined to dig at the ranch.

Work began on June 1, 1934, and it didn’t take long for the team to realize that they had stumbled onto something exceptional. “Instead of two sauropod skeletons, there was a veritable herd of dinosaurs, their skeletal remains crossed, crisscrossed, locked, and interlocked in a confused and almost inextricable manner,” wrote Brown in his account for *Natural History*.

He decided the best way to determine the relationships between individual dinosaurs was to study them on location. For two months, the team didn’t remove a single bone from the sand and mudstone bed. Instead, Brown accepted a suggestion from rookie expedition team member Roland T. Bird to create a quarry chart and draw a corresponding map, recording where each bone had been found. Now housed in the Museum’s Research Library, the map became integral to day-to-day operations and to deducing exactly how the mass grave came to be.

As Brown’s expedition team worked, they found more Jurassic-age sauropods and ornithischian dinosaurs; teeth belonging to several carnivorous dinosaurs, including some from *Allosaurus*; preserved sauropod skin tissues—the first ever found; sauropod

stomach stones; and more. A prehistoric scene slowly came into focus: a group of sauropods, spooked by stalking predators, rushed into a watering hole that turned out to be a sticky, muddy death trap.

The Howe Quarry material was packed into about 140 cases and shipped in a box car back to the Museum. Weighing a total of 69,000 pounds, it was the second-largest single shipment from any expedition in Brown’s long and storied career. But while Brown had hoped to describe several new species of non-avian dinosaurs from the find himself, only a few specimens from the expedition were ever prepared or placed on view. (The neck and skull of a *Kaatedocus siberi* from Howe Quarry can be seen in the *Sauropods at the Museum* exhibit on the fourth floor, and fossil casts from the same specimen have been integrated into the juvenile sauropod on view in the Theodore Roosevelt Rotunda.)

A series of unfortunate circumstances, and World War II, prevented Brown from returning to Howe Quarry or from properly examining his finds. And so, the Howe Quarry collection remained tucked away in crates for decades—until last year.

Enter paleontologist Emanuel Tschopp, a Theodore Roosevelt postdoctoral fellow at the Museum’s Richard Gilder Graduate School, who’s picking up where Brown left off. “Howe Quarry is the reason I became a paleontologist,” he says.

As a Ph.D.-degree candidate, Tschopp had discovered that a sauropod specimen collected at Howe Quarry by Switzerland’s Sauriermuseum Aathal (SMA) was a new species—*Kaatedocus siberi*. After conducting additional digs with SMA in the vicinity of the historic Howe Quarry site, Tschopp made his way to the Museum to work with the original Howe Quarry collection as a postdoctoral researcher with Mark Norell, Macaulay Curator in the Division of Paleontology.

With a team that includes Senior Museum Specialist Carl Mehling and Museum volunteers, Tschopp is diving into the collection to clean and prepare fossils, conduct CT scans of preserved braincases and chemical analysis of possible remains of soft tissues, and identify bones based on Bird’s original quarry map—a key document that provides researchers with context for reassessing the collection today.

“We’re trying to figure out which species of these enormous animals were living together at the same place during the same time period, and how they managed to exist alongside each other,” says Tschopp. 🦕

Postdoctoral fellow  
Emanuel Tschopp.



## A Prehistoric Puzzle

Interested in following along as the Museum’s team uncovers new finds from the historic Howe Quarry collection? Tschopp and colleagues are publishing updates on their progress, along with archival photos and historic documents, on the Museum’s Facebook Group “Dino Detectives.”

Here’s how to join: Look for “groups” on the Museum’s Facebook page at [facebook.com/naturalhistory](https://www.facebook.com/naturalhistory). Click on “Dino Detectives,” then “join.”

You’ll be asked to answer three questions about dinosaurs—and then you, too, can see what it takes to piece together a historic paleontological puzzle.

## Programs and Exhibits

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

For updates and reminders, sign up for monthly Calendar Highlights for Members by sending your membership number and request to subscribe to [members@amnh.org](mailto: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 canceled by the Museum.

Please check [amnh.org](http://amnh.org) for Member ticket prices for live animal exhibits and giant-screen 2D and 3D films.

Information about programs is current as of November 30, 2018. Please check [amnh.org/calendar](http://amnh.org/calendar) for updates.



### JANUARY

#### Hall Tour: Birds of the World

Saturday, January 12

10:30 am or 1:30 pm

Free

Registration required; call 212-769-5200

From the isolated regions of the high Alps to Argentina's pampas lowlands, see how birds around the world have adapted to their habitats when you join us for a guided tour in the Hall of Birds of the World.

#### Into The Deep: An Immersive Oceans Course

Five Tuesdays, January 15–February 12

6–8 pm

\$240

Join **Mercer Brugler** as he takes us on a deep dive into the science behind the *Unseen Oceans* exhibition during this five-part immersive course. Featured guest scientists and experts will offer a close look at into some of the oceans' most awe-inspiring characteristics—from bioluminescent organisms and giant squids to the unexplored depths of the oceans' most mysterious regions. This course takes place inside the *Unseen Oceans* exhibition.



#### The Art Of Diorama

Six Thursdays, January 24–February 28

7–9:30 pm

\$195

(Materials are included)

For adults 18+

Museum exhibition specialist **Tom Doncourt** leads an after-hours look at our legendary dioramas. Discover how the Museum's dioramas are made from start to finish and hear behind-the-scenes stories about how they were produced. In this six-part series, you'll travel the world through some of our most popular exhibits and create your own miniature replica to take home.

#### T. rex: The Ultimate Predator

Free

Everyone knows *Tyrannosaurus rex*. But do you know how this mega-predator evolved to become the most fearsome carnivore of the Mesozoic? The exhibition will introduce you to the entire tyrannosaur family through fossils and life-sized models of hatchlings, juveniles, and a full-grown *T. rex*, with engaging interactives and a VR experience.



#### Unseen Oceans

Free

*Unseen Oceans* explores our blue planet's defining feature—the world's oceans—as revealed through 21st-century technology. Meet the elusive giants of the sea, including whales, sharks, and giant squid; sink beneath the waves in a virtual submersible theater; and marvel at the vivid fluorescence displayed by marine animals but invisible to us...until now.



### FEBRUARY

#### The Terrain Of Venus

With **Martha Gilmore**  
Monday, February 4

7:30 pm

\$20

Explore the surface of Venus, the planet named for the Roman goddess of love. What can Venus' oldest rocks tell us about the history of water on this nearby world? Planetary geologist **Martha Gilmore** describes her research studying our neighboring planet's terrain using surface mapping and orbital spectroscopy.

#### Lunchtime Bird Walks In Central Park

Six Tuesdays,

February 5–March 12

Noon–1:30 pm

\$50

Glimpse owls and woodpeckers in the woods, finches and sparrows in the fields, and ducks and gulls in the lakes as ornithologist **Paul Sweet** guides you through three Central Park habitats to observe the various bird species that call New York City home.

#### SciCafe: The Science of Love

Wednesday, February 6

Doors open at 6:30 pm

Program begins at 7 pm

Free

For adults 21+ with ID

What is love? Turns out, it's all in your head. Join neuroscientist **Bianca J. Marlin** as she discusses her research on the strong emotional bonds that can exist between humans, like those between parents and children. Marlin's work investigates the use of neurochemicals like oxytocin (the "love drug") as a potential treatment to strengthen fragile and broken relationships.



#### Hall Tour: Akeley Hall of African Mammals

Saturday, February 9

10:30 am

Free

Registration required; call 212-769-5200

This guided tour of the Akeley Hall of African Mammals takes visitors across the diverse topography of Africa, from the Serengeti Plain to the waters of the Upper Nile, to spot giraffes, zebras, and gazelles in their natural habitats.



#### Milstein Science Series

Sunday, February 17

11 am–5 pm

Milstein Hall of Ocean Life

Free

This weekend series presents afternoon programs that give visitors a chance to interact with scientists, discover amazing animals, and celebrate science under the iconic blue whale.

## Accessibility Programs

To learn more, email [accessibility@amnh.org](mailto:accessibility@amnh.org) or call 212-313-7565.

Visitors who are blind or partially sighted are invited to attend tours highlighting exhibits through verbal descriptions and touchable objects. The Museum also offers tours for both deaf and hearing audiences that are simultaneously signed and spoken. And our Discovery Squad Tours were developed specifically for families affected by autism spectrum disorders.

## Discovery Room

Free

Monday–Thursday, 1:30–5:30 pm

Saturday, Sunday, and public school holidays, 10:30 am–1:25 pm and 2:15–5:10 pm

The Discovery Room offers families, and especially children ages 5–12, an interactive gateway to the wonders of the Museum and a hands-on, behind-the-scenes look at its science.

## Gateway Storytime

Free

On Friday mornings during the school year, children ages 2–5 are invited to the Discovery Room for storytime. Space is limited and tickets are distributed on a first-come, first-served basis.

#### The Butterfly Conservatory

Free

This popular live-animal exhibition features up to 500 free-flying tropical butterflies from the Americas, Africa, Asia, and Australia. See iridescent blue morphos, striking scarlet swallowtails, and more, housed in a tropical vivarium with flowering plants.



#### Backyard Wilderness

Members enjoy special benefits

Discover the unexpected wonders of nature that are in our own neighborhoods and communities. See animal inhabitants in rare and breathtaking detail, moving along forest floors and pond bottoms, captured by cameras mounted inside dens and nests. Captioning devices and audio description devices are available.



**Animal Encounter: Reptiles**  
Saturday, February 23

11 am (recommended for younger children), 1 pm, 3 pm (all ages welcome)

\$15

Join us for an exclusive animal encounter with Museum scientists **Lauren Vonnahme** and **Arianna Kuhn** from the Department of Herpetology. Get an up-close introduction to extraordinary and colorful live snakes, tortoises, lizards, and frogs from all over the world, including your own backyard! Learn more about the role these amazing critters play within their respective ecosystems and what conservation biologists at the Museum are doing to help protect similar species in the wild.



**Exoplanets And The Search For Water In The Universe**

Tuesday, February 26

7 pm

\$12

**Jackie Faherty**, **Mark Popinchalk**, and **Steve Beyer** embark on a journey in search of water in our solar system and beyond. Visit some of the more likely candidates for finding the precious liquid in our galaxy, such as Enceladus, Europa, and Mars, and learn about the latest discoveries in the search for life in space.

**MARCH**

**SciCafe: The Raw Truth About Cooking**

Wednesday, March 6

Doors open at 6:30 pm

Program begins at 7 pm

Free

For adults 21+ with ID

All human cultures use cooking and other means to process food. Why is food processing so universal? And why might it threaten our health today? **Rachel Carmody** explains how processing increases the calories we extract from food, ways this practice has given humans an evolutionary edge, and why it may present challenges for our present and future.



**Animal Drawing**

Eight Thursdays, March 7–April 25

7 pm

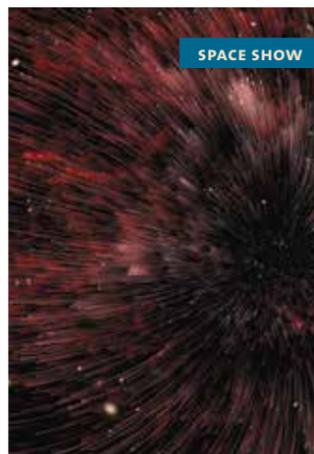
\$160 (Materials not included)

For adults 18+

Illustrator and naturalist **Patricia Wynne** leads an intensive after-hours drawing course using the Museum's celebrated dioramas, dinosaur skeletons, and other iconic exhibitions as a backdrop. Sketch subjects in their "natural" environments as you learn about the gifted artists who created our world-class dioramas.

**Dark Universe**

Narrated by Neil deGrasse Tyson, Frederick P. Rose Director of the Hayden Planetarium, this Space Show celebrates pivotal discoveries and the cosmic mysteries that remain. Gaze up at the Milky Way from Mt. Wilson Observatory in California, plunge into Jupiter's atmosphere with a NASA probe, and find out what scientists are learning about dark matter and dark energy. Captioning devices are available.



SPACE SHOW

**Northwest Coast Hall Restoration**

The Museum gratefully recognizes the **Eugene V. and Clare E. Thaw Charitable Trust** and **Lewis Bernard**, whose leadership support has made the restoration of the Northwest Coast Hall possible.

The **Andrew W. Mellon Foundation** has provided critical planning support, including for consultation with First Nations communities.

The conservation of painted totem poles has been made possible by the **Institute of Museum and Library Services** under grant number MA-30-17-0260-17.

Additional support has been provided by the **Gilbert & Ildiko Butler Family Foundation** and the **Stockman Family Foundation Trust**.

**Member Preview Days: T. rex: The Ultimate Predator**  
Friday–Sunday, March 8–10

10 am–5 pm

Registration required

call 212-769-5200  
See the new *T. rex: The Ultimate Predator* before it opens to the public! A weekend of exclusive Member Preview Days begins on Friday, March 8.

Everyone knows *Tyrannosaurus rex*. But did you know how this mega-predator evolved to become the most fearsome carnivore of the Mesozoic? This exhibition will introduce you to the entire tyrannosaur family through fossils and life-sized models of hatchlings, juveniles, and a full-grown, towering *T. rex*, with engaging interactives and a VR experience that will reveal the amazing story of the most iconic dinosaur in the world. Warning: you may never think of *T. rex* the same way again.



**Hall Tour: David S. And Ruth L. Gottesman Hall Of Planet Earth**  
Saturday, March 9

10:30 am

Free

Registration required; call 212-769-5200

Follow a Museum tour guide on an exploration around the globe and back in time in our Gottesman Hall of Planet Earth. See new highlights featured within the exhibition, including an updated section on climate change, to gain a deeper understanding of our planet's past, present, and future.

**Amy Mainzer, Asteroid Hunter**  
Monday, March 11

7:30 pm

\$12

Join astronomer **Amy Mainzer** to learn about the asteroid-hunting NEOWISE Project, which has taken millions of images of more than 150,000 solar system objects. Mainzer explains the relationship between asteroid hunting and planetary origin stories, starting with Earth.

**New Science, New Solutions**  
Wednesday, March 20

7 pm

\$12

New Solutions takes a closer look at societal problems through the lens of science, inviting experts in diverse fields to offer new perspectives and potential innovative solutions. For more information, please visit [amnh.org](http://amnh.org).



**Identification Day**  
Saturday, March 23

Noon–5 pm

Free

The Museum celebrates natural history collections by inviting visitors to bring in their own specimens for our annual Identification Day. Get an up-close look at specimens from the Museum's rarely seen collections while scientists attempt to identify your discoveries.

**Exhibition Credits**

*T. rex: The Ultimate Predator* is generously supported by **Dana and Virginia Randt**.

*T. rex: The Ultimate Predator* is generously supported by **Chase Private Client**.

Lead funding for *Unseen Oceans* and its educational resources is provided by **OceanX**, an initiative of the **Dalio Foundation**.

The **American Museum of Natural History** gratefully acknowledges the **Richard and Karen LeFrak Exhibition and Education Fund**.

*Unseen Oceans* is generously supported by **Chase Private Client**.

Generous support for The **Butterfly Conservatory** has been provided by the **Eileen P. Bernard Exhibition Fund**.

*Dark Universe* was created by the **American Museum of Natural History**, the **Frederick Phineas and Sandra Priest Rose Center for Earth and Space**, and the **Hayden Planetarium**.

The Museum also gratefully acknowledges major funding from the **Charles Hayden Foundation**.

Presented with special thanks to **NASA** and the **National Science Foundation**.

*Dark Universe* was developed by the **American Museum of Natural History, New York** ([www.amnh.org](http://www.amnh.org)) in collaboration with the **California Academy of Sciences, San Francisco**, and **GOTO INC, Tokyo, Japan**.

**APRIL**

**The Spring Lunch: Science, Society, and Our Environment**  
Tuesday, April 16

Noon–2 pm

For more information or to purchase tickets, contact Jodi Doherty at 212-769-5932 or email [jdoherty1@amnh.org](mailto:jdoherty1@amnh.org). The Spring Lunch highlights, celebrates, and advances the Museum's longstanding commitment to environmental research, conservation, and education. Hear from experts on the latest topics in science and share ideas and conversation under the blue whale.

**Program Credits:**

*Into the Deep: An Immersive Oceans Course* is made possible by **OceanX**, an initiative of the **Dalio Foundation**, as part of its generous support of the special exhibition *Unseen Oceans* and its related educational activities and public programs.

*SciCafe: The Raw Truth About Cooking* and related activities are generously supported by the **Science Education Partnership Award (SEPA)** program of the **National Institutes of Health (NIH)**.

The Museum gratefully acknowledges **The Mortimer D. Sackler Foundation, Inc.** for its support to establish the **Sackler Brain Bench**, part of the Museum's **Sackler Educational Laboratory for Comparative Genomics and Human Origins**, in the **Spitzer Hall of Human Origins**, offering ongoing programs and resources for adults, teachers, and students to illuminate the extraordinary workings of the human brain.

Support for **Hayden Planetarium Programs** is provided by the **Horace W. Goldsmith Endowment Fund**.

Selected **Hayden Planetarium Programs** are sponsored by **JetBlue**.

*The Annual IRIS/SSA Lecture Series* is presented in collaboration with the **Incorporated Research Institutions for Seismology** and the **Seismological Society of America**.

*New Science, New Solutions* is presented in collaboration with the **New York University Institute on the Arts and Civic Dialogue**.

*New Science, New Solutions* is generously supported by the **Abel Shafer Public Program Fund**, a fund created by the **Arlene B. Coffey Trust** to honor the memory of **Abel Shafer**.

The **Milstein Science Series** is proudly sponsored by the **Irma and Paul Milstein Family**.

Support for accessibility initiatives at the **American Museum of Natural History** has been provided by the **Filomen M. D'Agostino Foundation**.

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

Additional support has been provided by the **Ralph M. Cestone Foundation**, the **Louis and Virginia Clemente Foundation**, the **Ducommun and Gross Family Foundation**, the **Larkin Family**, the **V. and L. Marx Foundation**, and the **Jane and Frances Stein Foundation**.

Page 14–15: D. Finnin/© AMNH, R. Mickens/© AMNH, D. Finnin/© AMNH, Illustration by Zhao Chuang; Courtesy of Xian Yinia Age Culture Media Co., R. Mickens/© AMNH, © AMNH/M. Shanley, D. Finnin/© AMNH, © AMNH. Page 16–17: R. Mickens/© AMNH, © AMNH, C. Cheseck/© AMNH, HBO, SK Films, D. Finnin/© AMNH, R. Mickens/© AMNH

**JANUARY**

**12**

**SATURDAY**  
Hall Tour: Birds of the World  
Member Program

**15**

**TUESDAY**  
Into the Deep:  
An Immersive Oceans Course  
Adult Course begins

**24**

**THURSDAY**  
The Art of the Diorama  
Adult Course begins

**FEBRUARY**

**4**

**MONDAY**  
The Terrain of Venus  
with Martha Gilmore  
Frontiers Lecture

**6**

**WEDNESDAY**  
Science of Love  
SciCafe

**17**

**SUNDAY**  
Milstein Science Series  
Family Festival

**26**

**TUESDAY**  
Exoplanets and the Search  
for Water in the Universe  
Astronomy Live

**5**

**TUESDAY**  
Lunchtime Bird Walks  
in Central Park  
Adult Program begins

**9**

**SATURDAY**  
Hall Tour: Akeley Hall  
of African Mammals  
Member Program

**23**

**SATURDAY**  
Animal Encounter:  
Reptiles with Lauren Vonnahme  
and Arianna Kuhn  
Member Program

**MARCH**

**6**

**WEDNESDAY**  
The Raw Truth About Cooking  
SciCafe

**8–10**

**FRIDAY–SUNDAY**  
Member Preview Days:  
*T. rex: The Ultimate Predator*  
Member Program

**11**

**MONDAY**  
Amy Mainzer, Asteroid Hunter  
Frontiers Lecture

**20**

**WEDNESDAY**  
New Science, New Solutions  
Special Program

**7**

**THURSDAY**  
Animal Drawing  
Adult Course begins

**9**

**SATURDAY**  
Hall Tour: David S.  
and Ruth L. Gottesman  
Hall of Planet Earth  
Member Program

**14**

**THURSDAY**  
Neuroscience Night:  
Wild, Wild Brains  
Special Program

**23**

**SATURDAY**  
Identification Day  
Family Festival



# SAVE THE DATE



## 150<sup>TH</sup> ANNIVERSARY CELEBRATION



### SATURDAY, APRIL 13



Join us for an exciting all-day program to celebrate the Museum's 150th Anniversary. To mark the month of the Museum's creation, enjoy a festival of family-friendly activities. Get a look at rare collections items, meet with scientists, and more.

For more information, please visit [amnh.org](http://amnh.org)

# Night at the Museum, for Teachers

## Educator Evenings Offer an All-Access Pass



Teachers explored the special exhibition *Unseen Oceans* during the Museum's Educator's Evening in November.

It's 4 pm on a Friday in November, and Zoe Brown is just arriving at the Museum after a busy week of teaching students at Bushwick Leaders' High School in Brooklyn. She's here to attend one of the Museum's Educator Evenings, which tonight is built around after-hours access to the special exhibition *Unseen Oceans*.

Brown, who is licensed to teach both Earth science and biology, has been bringing her classes to the Museum for years. "I come to find out about new research and to see specimens and artifacts that I can't find in a textbook," she says. Now, she is back to hear about how the latest exhibition could spark her students' interest in marine biology.

The Museum's outreach to educators dates back to 1880, when Museum founder Albert Bickmore launched a series of Saturday zoology lectures for 30 public school teachers. The reaction exceeded expectations, and the teachers proved their enthusiasm with "constant attendance in the severest weather," according to the Museum's annual report. Within a year, additional courses were added, and the Museum redoubled its commitment to working with teachers as "one of the best means...to reach every family in our city which has a child in the public schools."

Those efforts have only grown over the past few decades. Today, more than 4,300 educators participate in the Museum's professional development programs each year, including workshops, professional learning days that can provide continuing education credit (CTLE), and online courses. An average of

M. Stanley © AMNH

500 teachers attend each Educator Evening, the most informal offerings of the set. These after-hours programs orient teachers to current Museum exhibitions and research, as well as provide opportunities for networking with other educators from across the five boroughs.

As Brown makes her way through the packed crowd in the Milstein Hall of Ocean Life, she walks by a table staffed by Museum postdoctoral researcher Sally Warring, who's talking to teachers about her work exploring single-celled organisms found in New York City pond water, and another staff member describing the latest research from the Museum's Center for Biodiversity and Conservation. Other scientific organizations, like the New York Microscopical Society and U.S. Science Support Program, also have a presence, helping to round out the evening's focus on local marine science.

**"I come to find out about new research and to see specimens and artifacts that I can't find in a textbook."**

**ZOE BROWN**  
BUSHWICK LEADERS' HIGH SCHOOL



At 5 pm, Curator John Sparks takes the stage to introduce key themes of the exhibition and to share a bit about his own research on marine biofluorescence. Museum staff distribute an Educator Guide, with an exhibition map, tips for self-guided exploration, background content, and essential questions to help guide students. "The Museum really caters to teachers. The Educator's Guides give us a good overview of the special exhibitions and help me to generate a lesson plan. That way, I can figure out exactly what I want to show students when we come, giving us time to enjoy more of what the Museum has to offer," says Brown.

Then, the main event: teachers are invited to see *Unseen Oceans* for themselves. "It makes a difference hearing from the curators directly and getting to explore the exhibition with teachers," says Thomas Anderson, a teacher from P.S. 87, a K-5 school on the Upper West Side who has been attending the Museum's Educator Evenings for 15 years. "These evenings help so I can be better prepared to anticipate students' questions. And bouncing ideas off other teachers is fun, too."



Resource tables featured materials about Museum research and programs, and information about other scientific organizations

## More for Educators

### Educator Guides

Guides for K-12 teachers, as well as grade-specific activity sets aligned to Common Core and New York State standards, are available on [amnh.org](http://amnh.org) for all special exhibitions and 17 permanent halls.

### Seminars on Science

More than 10,000 educators from around the world have participated in the Museum's online professional learning program since it began in 2000. With six-week online graduate courses in the life, Earth, and physical sciences, students connect directly with Museum scientists and educators to engage on current science topics.

### Urban Advantage

This pioneering Museum partnership with the Department of Education and seven other cultural institutions across New York City is famous for its annual Science Expo, but Urban Advantage also offers professional development for teachers. More than 1,800 middle school teachers have participated, and in 2016, Urban Advantage launched an elementary school pilot program serving 56 teachers in grades 3–5.

Public support for the Urban Advantage program is provided by the Speaker and Council of the City of New York, and the New York City Department of Education.

## LeFrak Class of the Month Essay Contest

Each month, New York City public school students in Grades K–8 visit the special exhibition *Unseen Oceans*—and are invited to submit essays about what they learned about a scientific phenomenon. Budding science writers have a chance to win a prize for their class: certificates of achievement, a classroom library set of nonfiction books worth \$1,000, and an invitation to a special end-of-year celebration for students and families. Read select winning essays from past contest winners on [amnh.org](http://amnh.org).

The American Museum of Natural History gratefully acknowledges the LeFrak family's commitment to supporting scientific and cultural understanding among the school children, educators, and families of New York City through the Richard and Karen LeFrak Charitable Foundation, Inc.

# Whale Tales

As the Museum approaches the celebration of its 150th anniversary, each issue of *Rotunda* will bring you some little-known facts about the Museum's best-known exhibits.

First up: a few surprising stories behind the beloved blue whale, the iconic 21,000-pound model at the center of the Milstein Family Hall of Ocean Life.

## SOURCE MATERIAL

When the Museum redesigned the Hall of Ocean Life in anticipation of its 100th anniversary in 1969, artist Richard Ellis received one of the biggest assignments: designing the new life-sized blue whale model. But the first photographs of living whales underwater weren't taken until the mid-1970s. So Ellis had to rely on eyewitness descriptions—and extrapolate from photos or casts of whale corpses.

## GONE TO PIECES

This model replaced a 76-foot-long papier-mâché model of a blue whale created in 1907 for what was then the Hall of the Biology of Mammals on the fourth floor. Some of the old model's pieces were sold as memorabilia at auction in 1974. A woman who bid \$530 for a glass eye said, "Once you look in the eye of a whale, you never forget it."

## TRUE TO LIFE

The very last detail added to the model were 28 tiny hairs on the whale's chin. To determine their placement, the preparators consulted the *Discovery Reports*, dispatches by a British Museum expedition on whaling in the Antarctic. But they forgot about the belly button. That wasn't added until the hall was renovated in 2003 and became the Milstein Hall of Ocean Life.

## SAVE THE DATE

THE MUSEUM CELEBRATES 150 YEARS ON APRIL 13

## WHOOSH!

During the planning phase, Richard van Gelder, then chair of the Mammalogy Department, refused suggestions to depict the blue whale with its mouth open. He argued it would be scientifically inaccurate for a whale that was poised to dive—and also too tempting as a target for "potential basketball stars."

## CUTTING ROOM FLOOR

Other scrapped plans? Depicting a beached whale, accompanied by a soundscape of scavenging birds and faux phosphorescent bacteria. Propping it atop a 3-foot-diameter pedestal on its belly. Surrounding it with artificial water and three killer whales in a walk-in habitat group. Floating a rubber model filled with helium (van Gelder thought it "too much like the Macy's Thanksgiving parade.")

## RECORD SETTER

On November 1968, the whale's body was lifted up to the ceiling as two halves: the 66-foot-long front section and the 28-foot-long tail. The Hall of Ocean Life and Biology of Fishes opened on Wednesday, February 26, 1969—Members got a sneak peek the day before—and the next Sunday, more than 35,000 people came to see the whale—setting a new attendance record for the Museum.

## HEAVY WEIGHT

The model ended up being 10 tons, including the weight of the polyurethane plastic, the fiberglass coating, and 600 pounds of paint. After x-raying the welded joints, engineers concluded the margin of safety built into the design would handle it.



Illustration by Zhao Chuang; Courtesy of Xian Yinhao Age Culture Media Co.



Find out how *Tyrannosaurus rex* evolved to become fiercest predator on Earth in the new special exhibition *T. rex: The Ultimate Predator*. Members see it first during Member Preview Days, starting Friday, March 8.

## 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,  
the Rose Center/81st Street,  
and through the subway (lower level).

### RESTAURANTS

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

### MUSEUM SHOPS

The Museum Shop, Dino Store,  
Planetarium Shop, Cosmic Shop,  
*T. rex* Shop *Unseen Oceans* Shop,  
and Online Shop ([shop.amnh.org](http://shop.amnh.org))  
offer Members a 10-percent 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 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.

### ACCESSIBILITY



For information on accessibility,  
email [accessibility@amnh.org](mailto:accessibility@amnh.org)  
or call 212-313-7565.