

150 YEARS

AMERICAN MUSEUM OF NATURAL HISTORY

ROTUNDA

Member Magazine
Fall 2019 Vol. 44 No. 4



NEW
SPACE
SHOW
OPENS
JANUARY
2020

SECRETS OF THE RINGED GIANT

From the President

Ellen V. Futter



Summer is usually a time for R&R, but this year, the Museum was exceptionally busy with activity, excitement, and important advances and milestones.

On June 12, on a beautiful morning, we broke ground on the new Richard Gilder Center for Science, Education, and Innovation in an uplifting and historic ceremony that brought together the lustrous constellation of people and organizations who are making the Gilder Center a reality—City officials, our award-winning architect and design team, our neighbors, the young people we serve, and the project’s benefactors including, of course, Dick Gilder. The event reflected the hope, potential, and ambition of the new building (see p. 4). Now, full steam ahead!

Also this summer, we opened *Addressing the Statue*, an exhibition providing important context for the Theodore Roosevelt statue that

sits on our front steps. The Mayor’s 2017 Advisory Commission on City Art, Monuments, and Markers recommended that the statue remain in place and that the Museum contextualize it. This work is part of the Museum’s increasing focus on cultural representation in our halls, including the addition of new label copy to contextualize the “Old New York” diorama last year.

And we celebrated the 50th anniversary of the Apollo 11 Moon landing with a day-long Spacefest program, including unveiling a beautifully refreshed and updated Arthur Ross Hall of Meteorites.

These and other 150th anniversary events reflect an enthusiasm to both celebrate and learn from our institutional past, to incorporate a fuller range of perspectives and voices in our work, and to set the stage for an even more glorious future of discovery and impact.

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ROTUNDA

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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,
Karen Miller, Elena Sansalone
Design Hinterland, www.hinterlandstudio.com

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Museum Curator Helps New York Science Teachers Bring Paleontology, Fossil Specimens to Students



MAT alumni (L to R) Kristina Gustovitch, Darby Young, Alejandro Mundo, and Lynsey Spaeth look for fossils during a summer excursion. Inset: Group with Associate Curator Melanie Hopkins, sixth from the right.

In a rocky outcrop on the side of a rural road in the New Jersey Highlands sits a unique geological phenomenon—if you know where to look.

Large slabs of dark metamorphic rock jut upwards from the ground. Then, suddenly, the rock changes into crumbling limestone. This type of formation, known as the Great Unconformity, represents “a huge chunk of missing time,” explains Melanie Hopkins, an associate curator in the Division of Paleontology, as she points it out to a group of New York middle and high school Earth science teachers who have gathered here on a hot morning in July. “An estimated 700 million years is missing here,” she says, pointing to a thin diagonal fissure. This boundary separates two distinct eras, and geologists can glimpse the change in sediment and the dramatic evolution of marine organisms in the rocks.

The teachers, all graduates of the Museum’s Master of Arts (MAT) in Teaching program—the first urban teacher residency program offered by a museum—are here to learn how to incorporate paleontology into their curricula. Soon, they’re swinging hammers to break rock in search of Cambrian-era fossils.

July’s field trip was just the first of many that Hopkins will be leading over the next five years. A trilobite specialist, Hopkins was awarded a CAREER grant from the National Science Foundation

(NSF), part of which will support a new program for teachers, the Earth-science Reciprocal Learning Year (EarLY), built around trips to local fossil dig sites to collect teaching specimens and fossil lab workshops at the Museum. “The goals are to provide teachers with resources and experiences that they can use to help deepen their students’ understanding of Earth science as well as the work of scientists in general,” says Hopkins.

The science teachers say they are excited to be in the field—and to bring their knowledge back to their schools.

“I teach 100 students, and it can be difficult to translate geology fieldwork into meaningful experiences,” says MAT alumna Jessica Sharoff, who teaches at Manhattan’s Washington Heights Expeditionary Learning School. “This is the kind of stuff my students would love.”

With deepest appreciation, the Museum acknowledges Kathryn W. Davis for her generous founding support of the Master of Arts in Science Teaching (MAT) Program. Leadership support for the MAT program is provided by The Shelby Cullom Davis Charitable Fund.

The MAT program is supported in part by the National Science Foundation under Grant Number DUE-1852787 and the U.S. Department of Education under Grant Number U336S140026.

Museum Breaks Ground on New Richard Gilder Center for Science, Education, and Innovation



Top: Museum leaders, City officials, community leaders, and New York City schoolchildren gathered at the June groundbreaking. Bottom: A rendering of the front façade of the Gilder Center.

Hard hats on heads and shovels in hand, Museum leadership and staff, New York City officials, and community leaders gathered June 12 to break ground on the Richard Gilder Center for Science, Education, and Innovation at the site on Columbus Avenue. Also participating were schoolchildren from P.S. 84, representing the thousands of young students who visit and learn at the Museum each year.

“The Museum was chartered by the State of New York in 1869 as an educational institution, and education is at the core of our being,” Chairman Lewis W. Bernard told the assembled crowd. “The Gilder Center will advance the way we conduct science and our collections are presented, in addition to housing a great library and offering new approaches to education.”

Featuring breathtaking architectural forms inspired by natural Earth processes, the spectacular new 250,000-square-foot Gilder Center will add exhibition galleries, a collections core, state-of-the-art classrooms, an immersive theater, and a redesigned library, in addition to linking 10 Museum buildings to improve visitor flow throughout the campus. The Gilder Center will introduce visitors of all ages to current research through cutting-edge exhibitions and innovative education programs in dedicated learning zones.

“This Museum’s science-based research and education, which

enhances the public understanding of how science works and what science can tell us, has never been more critical,” said Museum President Ellen V. Futter.

The urgency of scientific work and scientific literacy to civic life was also emphasized by Mayor Bill de Blasio in his remarks.

“I hope that this will be where a whole new generation learns a devotion to science, because we’re all responsible for saving this Earth right now, and the generation coming up will have even greater responsibility,” said de Blasio. “So, here at the Gilder Center, I think those connections will be made and those sparks will fly where young people will become devoted to the work of preserving our planet, protecting all of us.”

Manhattan Borough President Gale Brewer also spoke during the ceremony, underscoring that the Gilder Center’s learning zones will serve New York students and teachers. “It is about ensuring that New York City’s young people have access to the best facilities and technology and scientists and programs,” said Brewer.

Also joining in the celebration were Museum Trustee Richard Gilder, for whom the building is named; officials from many of the more than 10 City agencies involved with this project, including Commissioner of Cultural Affairs Tom Finkelpearl and Department of Parks and Recreation Commissioner Mitchell Silver; Museum

Trustee and Chair of the Buildings and Grounds Committee Valerie S. Peltier; architect Jeanne Gang of Studio Gang, who was named one of *TIME magazine*’s 100 most influential people of 2019; exhibit designer Ralph Appelbaum of Ralph Appelbaum Associates; and Ramon Pimentel, a graduate of the Museum’s Science Research Mentoring Program and a sophomore at SUNY College of Environmental Science and Forestry, who spoke about his immersion in science at the Museum.

Peltier took the opportunity to recognize the important work of the project architect, Studio Gang, led by Jeanne Gang. “Studio Gang takes an interdisciplinary and sustainable approach to design that prioritizes relationships among individuals, communities, and the environment. For all those reasons, we know our project is in the most excellent hands,” said Peltier.

“This Museum’s science-based research and education, which enhances the public understanding of how science works and what science can tell us, has never been more critical.”

ELLEN V. FUTTER, MUSEUM PRESIDENT

For her part, Gang underscored the building’s sustainable features as well as the sense of awe and discovery that her team has worked to create.

“We at Studio Gang find this to be the most exciting project that we’ve ever done,” she said. “This building will be sparking everyone’s curiosity about science and nature as they walk through the doors.”

The American Museum of Natural History gratefully acknowledges Richard Gilder and the Gilder Foundation, Inc., whose leadership support has made the construction of The Richard Gilder Center for Science, Education, and Innovation possible.

The Richard Gilder Center for Science, Education, and Innovation is also made possible thanks to the generous support of the City of New York, the Council of the City of New York, the Manhattan Borough President, the State of New York, the New York State Assembly, and the New York State Senate.

Critical founding support has been provided by David S. and Ruth L. Gottesman; two anonymous donors; the Davis Family; the Bezos Family Foundation; the Susan and Peter J. Solomon Family; Judy and Josh Weston; the Macaulay Family Foundation; Kathryn C. Patterson and Thomas L. Kempner, Jr.; New York Life Foundation; the Seedlings Foundation in honor of Michael Vlock; the Susan S. and Kenneth L. Wallach Foundation; Valerie and Jeffrey Peltier; the Hearst Foundations; Nancy B. and Hart Fessenden; Keryn and Ted Mathas; and the Estate of Margaret D. Bishop.

D. Firmin/© AMNH, rendering by Studio Gang, 2019

GREEN COUSINS

The emerald swallowtail isn't the only species of green Lepidoptera. The dido longwing (*Philaethria dido*) is known for having bright translucent green patches on its black patterned wings. And while the malachite (*Siproeta stelenes*) closely resembles the dido from above, it sports alternate colors of olive green and light brown on its underside.

CLASSICAL ALLUSION

The genus name *Papilio* matches the Latin word for butterfly, *papilio*. The species name *palinurus* is derived from Palinurus, the name of the pilot of Aeneas' boat in Virgil's *Aeneid*. And while not all swallowtail butterflies have the distinctive appendages on the lower wings that recall the forked tails of the bird family of swallows, this species clearly does.

STATE STARS

Of the more than 550 species in the family Papilionidae worldwide, fewer than 30 live in North America. But they have a high profile. The Oregon swallowtail is the state insect of Oregon; the eastern tiger swallowtail is the state insect of Virginia and the state butterfly of Georgia, Delaware, and South Carolina; and the black swallowtail is the state butterfly of Oklahoma.

Quick-Change Artist

The emerald swallowtail (*Papilio palinurus*) is sometimes called a banded peacock, but it might just as easily be called a chameleon. Like the shade-shifting lizard, the emerald swallowtail changes color depending on the angle of the light, and it has a strikingly disparate appearance from one side to the other.

The bright bands on the butterfly's generally dark green upper side aren't caused by pigments but by the surface of unique microstructures in the scales on its wings. When the scales reflect blue and yellow light, their tight arrangement allows the colors to mix together and be perceived as the iridescent green bands from which the butterfly takes its common name.

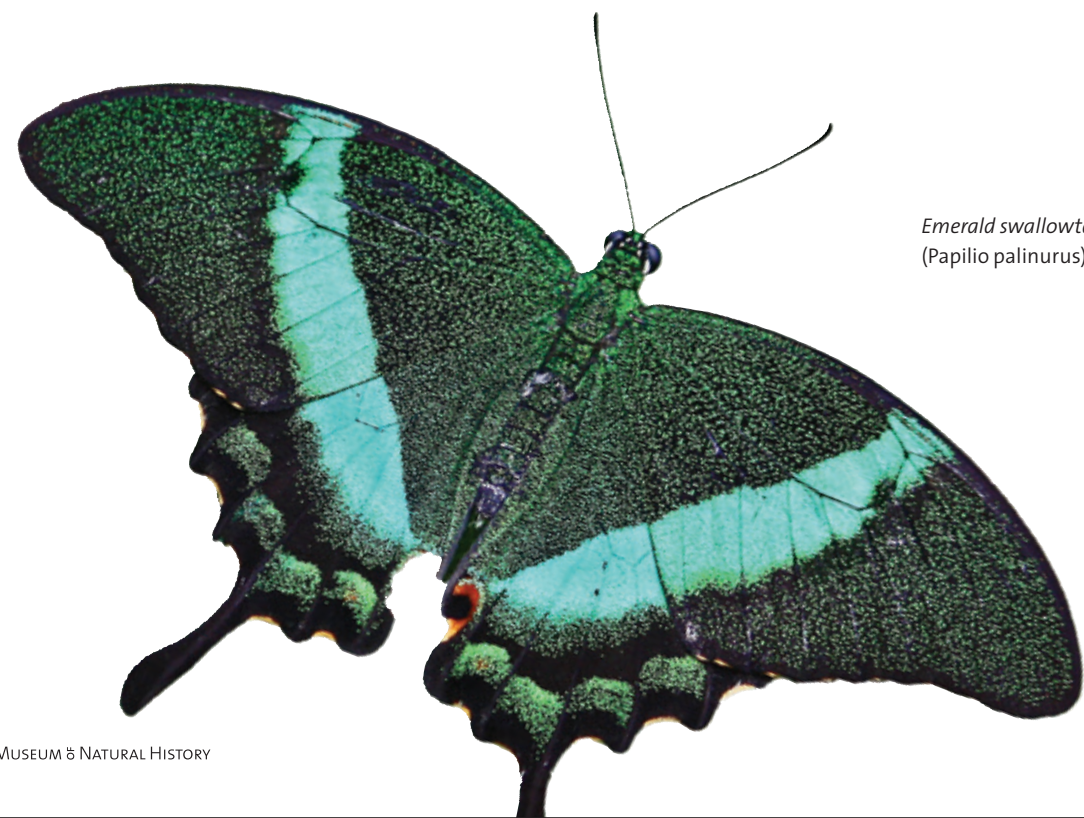
But when its wings are viewed from another angle, the human eye will see the bands as only yellow or blue, respectively. And viewed from below, an emerald swallowtail looks like a completely different butterfly. Its underwing or ventral side is black and gray with blue, orange, and white spots—coloration typical of the upper side of other swallowtail butterfly species, which likely helps the insect to camouflage itself from predators.

The emerald swallowtail has a wingspan of up to 4 inches (10 cm) and belongs to the family Papilionidae. These large, colorful, mostly tropical butterflies include the largest in the world, such as the birdwing butterflies of the genus *Ornithoptera*.

Native to Southeast Asia, the emerald swallowtail is found primarily in Burma, Peninsular Malaysia, Sumatra, Borneo, Indonesia, and the Philippines. The emerald swallowtail's caterpillars—like those of the tiger, spicebush, anise, giant, and black swallowtails—resemble bird droppings when small. These cleverly camouflaged larva, like all swallowtail caterpillars, have an osmeterium: a forked-shaped gland that emits a foul smell and can also be extended when it rears its head back in response to a threat. They feed on citrus trees, making the species unpopular with citrus growers.

But the emerald swallowtail is a perennial favorite in live butterfly displays—including ours, *The Butterfly Conservatory*, overseen by Curator David Grimaldi, and open seasonally each fall through spring.

Members enjoy free tickets for *The Butterfly Conservatory*, which reopens October 12.



Emerald swallowtail
(*Papilio palinurus*)

That_Bee/Flickr



Glass model of
Elatomma juniperinum

Small Wonders

Radiolarians have captivated scientists since these single-celled organisms were first observed under the microscope in the 19th century. Neither animals, plants, nor fungi, these soft-bodied organisms are protists and are notable for their ability to absorb silica from sea water to form elaborate skeletal structures. They are also incomparably beautiful, as seen in the glass model of the radiolarian *Elatomma juniperinum* from the Hall of Biodiversity pictured here.

While still poorly understood in many ways, radiolarians are thought to hold significant clues to the evolution of life on Earth, as well as insights into changing climactic conditions over time. They have existed for at least 550 million years and are found in all the world's oceans and other bodies of salt water, from the surface to the seafloor. They travel alone or in gelatinous colonies, some large enough to be seen with the naked eye. Along with other plankton, or free-floating organisms, they are a food source for other marine life. They themselves are known to feed by two methods: ingesting bacteria and other microbes they capture using arm-like extensions called axopods, and through the photosynthesis of symbiotic algae.

Of the reported 15,000 living and fossil species of radiolaria, some 800 to 1,000 species are currently known to inhabit the oceans, where they play an important role in Earth's carbon-oxygen cycle. Like diatoms, single-celled algae that also form silica skeletons, radiolarians sink after death, trapping atmospheric carbon in the sediment of the deep oceans. The composition and distribution of their fossils are used to estimate past water temperature and salinity in the oceans.

Still, mysteries about these single-celled organisms abound—from their life span to their method of reproduction to the exact nature of their relationship with their algal symbionts. New tools, such as DNA sequencing and increasingly refined imaging techniques, offer researchers the hope of a more complete understanding. But in the meantime, it may be enough for the rest of us to simply admire how, as Charles Darwin said in *On the Origin of Species*, “from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved.”

Visit amnh.org/pondlife for a three-part video series about local microorganisms.

D. Finnin/© AMNH

FOSSIL OR FIELD

Radiolarians have yet to be successfully cultured in the lab, so research is limited to study by micropaleontologists of fossilized remains or to the observation of specimens found in the wild. John Burns, a Museum research associate, studies extant radiolarians at two particularly rich sites near the Norwegian fjords and off the southern coast of France.

RAW MATERIAL

Did you know the white cliffs of Dover are mostly composed of the compressed limestone scales of marine microbes called coccolithophores? Similarly, sea sediments packed with radiolarian skeletons eventually emerged and formed a rock composed of amorphous silica called radiolarite. In eastern Europe, ancient humans used radiolarite to fashion sharp-edged tools, like those on display in the Museum's Spitzer Hall of Human Origins.

HISTORIC TREASURE

This glass model of *Elatomma juniperinum*, a species found in the Central Pacific, can be seen enlarged 400 times its diameter in life, along with other models of microbes, in the Spectrum of Life exhibit in the Museum's Hall of Biodiversity. The model was made by Museum glassblower Herman O. Mueller, who made some 1,000 models over 40 years in the early 20th century.

EATING “GLASS”

Spiky silica skeletons pose a special challenge for predators. But one organism has a solution: silica teeth! Microscopic crustaceans called copepods, whose main diet is diatoms and which have been observed eating radiolarians, have teeth made of silica. An elastic protein in their mandibles, called resilin, provides support to soften the blow of “glass” crushing through “glass.”

TO
SATURN

SATURN'S RINGS
REVEAL HOW OUR
SOLAR SYSTEM'S
WORLDS FORMED.

AND

BEYOND





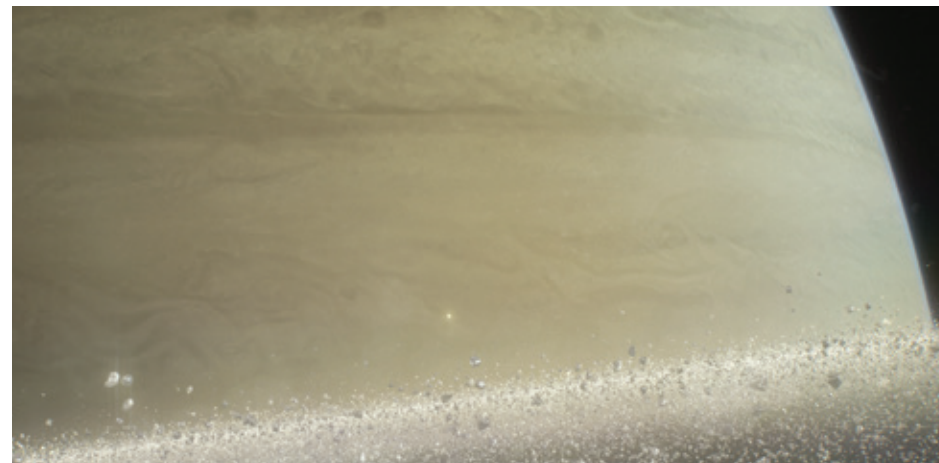
ON OCTOBER 15, 1997, THE CASSINI ORBITER carrying the European Space Agency (ESA)'s Huygens probe lifted off from Cape Canaveral aboard a Titan IVB/Centaur and began a nearly seven-year journey to Saturn.

Before reaching its destination, the spacecraft completed two flybys of the brightest planet in our Earth's sky, Venus, for gravity assists that helped accelerate its journey into the outer solar system. It passed the Earth and our Moon, whizzing by at 700 miles above the eastern South Pacific. It carved through the asteroid belt—only the seventh spacecraft to do so—and joined the Galileo spacecraft orbiting Jupiter on the other side for the first joint spacecraft study of the Jovian system. And before it ever reached Saturn, it beamed back to Earth the first of many new discoveries: two previously unknown moons—Methone and Pallene—orbiting the ringed giant.

For 15 years after its arrival at Saturn, Cassini orbited the planet, studying its magnetosphere and icy rings closely. It sent back more revelations about its sixth largest moon, confirming that Enceladus has active giant plumes that contain organic compounds and water ice fed by a subsurface ocean. Cassini also set new milestones for the exploration of alien worlds, including landing a probe on the most distant planetary body in our solar system to date—an achievement that may very well shape the future of space exploration for the next generation.

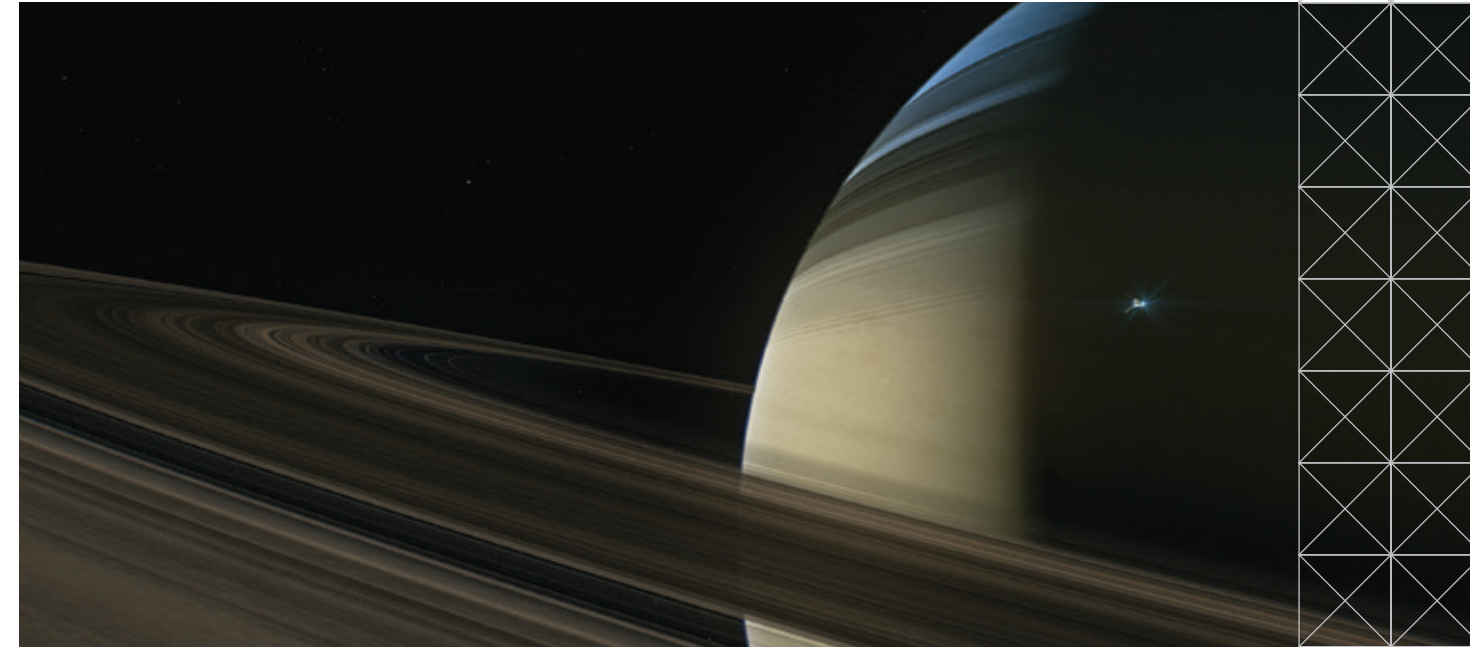
The Cassini mission arrives in the Hayden Planetarium dome in January 2020 as one of the many spectacular stories featured in the new Space Show, *Worlds Beyond Our Earth*. Viewers will fly along with Cassini for unprecedented views of Saturn's famous rings, which, the mission revealed, are a hot spot for studying the formation of new planetary bodies.

"We absolutely had to tell the extraordinary story of the Cassini mission, which gave us invaluable insights into Saturn's entire system of worlds," says Denton Ebel, curator in the Department of Earth and Planetary Sciences, who is overseeing the new Space Show.



This page: A rendering of an up-close view of the planet's icy, rocky rings.

Opposite: At the end of its mission, Cassini descended through Saturn's atmosphere, sending back valuable data to NASA until it eventually broke apart.



RINGED GIANT

The sixth planet from our Sun, Saturn was first observed through a telescope by the Italian astronomer Galileo Galilei in 1610. The sight perplexed him. "Saturn is not a single star, but is a composite of three," he concluded at first, mistaking the planet's rings for satellite bodies. (We now know that Saturn has at least 62 moons.)

It wasn't until Dutch astronomer Christiaan Huygens made observations with a more advanced instrument in the 1650s that the iconic rings were described—though Huygens thought he was looking at a single, solid plane. Several decades later, Italian astronomer Giovanni Domenico Cassini observed a gap—known as the Cassini division—that questioned the solid plane. By 1785, French mathematician Pierre Simon Laplace put forward a theory that Saturn's rings were made up of small particles.

Two centuries later, the Cassini space mission gave us an even closer look. Observations showed that the structure of the rings was far more complex than previously thought. "What the images captured by Cassini showed us were the rings at a very specific time and date. Toward the end of the mission, Cassini went up and over the rings, and was able to capture the highest resolution images of ring features resembling propellers forming as slight gravitational wakes around tiny moonlets," says Carter Emmart, the Museum's director of astrovisualization, who serves as director of *Worlds Beyond Our Earth*.

Those moonlets tucked into the revolving disks of ice and rock that encircle Saturn are a veritable nursery of new worlds, forming and dissipating. Some of them formed very recently, cosmically speaking—between 10 million and 100 million years ago. "Saturn's rings are an analog for the evolution of the entire solar system," says Ebel. "What we now know about the disc structure tells us about how solid bodies grew into larger worlds in our own early solar system, and in solar systems around young stars."

WHAT CASSINI CARRIED

Cassini was equipped with 12 scientific instruments to probe Saturn and its orbiting bodies. The suite included cameras, instruments to calculate measurements at a distance, and particle sensors to analyze magnetic fields, mass, electrical charges and densities of atomic particles, quantity and composition of dust particles, and radio waves.

Then there were the high-tech cameras: a two-part imaging system for capturing wide views as well as high-resolution images of specific details at a range of wavelengths from ultraviolet to infrared, providing valuable information for interpretation back on Earth. The stunning visualizations of Saturn featured in the new Space Show are based in part on Cassini images.



Images courtesy NASA/JPL-Caltech

MEET THE SPACE SHOW TEAM

DENTON EBEL CURATOR

Ebel is a geologist specializing in meteorites, and the distant, resource-rich asteroid belt is his field area. He develops thermodynamic models describing the outcomes of condensation, evaporation, and crystallization processes.



CARTER EMMART DIRECTOR

Emmart, the Museum's director of astrovisualization, has been involved in all six of the Museum's Space Shows. He was one of the original Museum team members on the NASA-funded Digital Galaxy Project that helped redefine how a planetarium theater can present science to the public.



VIVIAN TRAKINSKI PRODUCER

Trakinski, the Museum's director of science visualization, focuses on leveraging scientific data across new media platforms to communicate current science. She also served as producer on *Dark Universe*.



ROSAMOND KINZLER EXECUTIVE PRODUCER

Kinzler, who has served as executive producer on three of the Museum's Space Shows, is senior director of science education and director of the National Center for Science Literacy, Education and Technology (NSCLET) at the Museum.



In the new Space Show, Saturn's rings are visualized as a dynamic crucible of planetary body formation, letting viewers glimpse a process that scientists think may be parallel to the one that led to the formation of the larger solar system.

"We can't go back in time to watch how our solar system formed," says Vivian Trakinski, producer of the Space Show and the Museum's director of science visualization and producer of the new Space Show. "But the patterns we see in Saturn's rings as the moonlets are taking shape, carving out lanes and gathering mass from debris around them, allow us to observe a similar system in formation."

WHOLE NEW WORLDS

One of Cassini's greatest successes came in 2005, when its Huygens probe successfully navigated the thick atmosphere of Titan, Saturn's largest moon, becoming the first spacecraft to land on a moon other than our own and sending back an uninterrupted datastream of information and images of the world's atmospheric and surface features upon descent.

"These scenes of Saturn and Titan will be delightful and fascinating to audiences."

CARTER EMMART
DIRECTOR OF ASTROVISUALIZATION

"With an extraordinary effort that I still frankly can't believe, the radio astronomers of the world...gathered together to look at the little telephone signal...coming from the other side of the solar system," said David Southwood, director of science for the ESA, of the historic event.

What scientists have learned from Huygens' landing surpassed every expectation. Titan's landscape terrain is similar to Earth's, with peaks and valleys and lakes and rivers. Its atmosphere produces weather such as rain, but instead of water, it rains methane. And its surface is strewn with seas filled with a liquified form of the greenhouse gas. It's far too cold to be habitable by us, but its atmosphere strongly resembles what Earth was like before it evolved to host life.

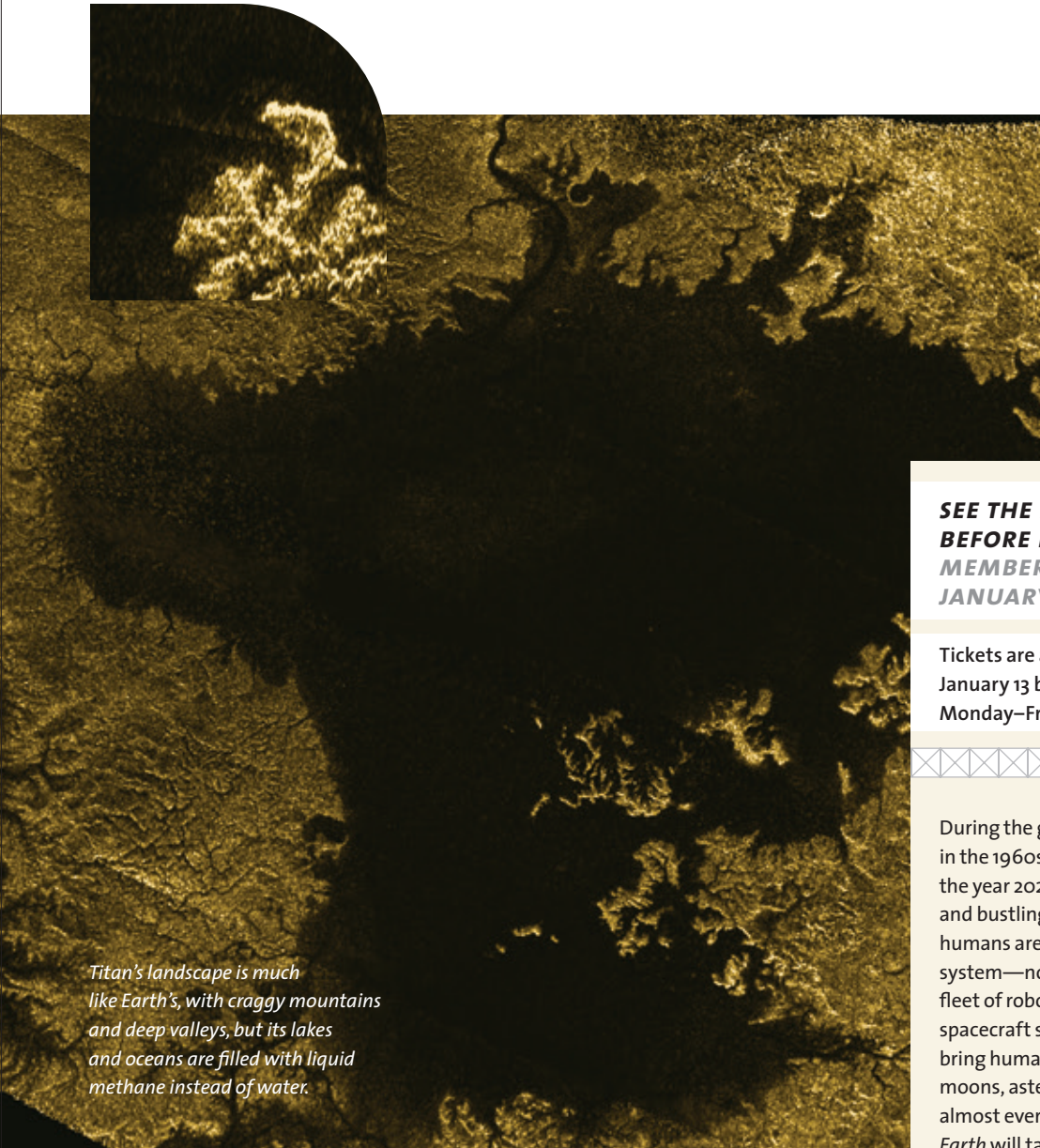
Titan's landscape is much like Earth's, with craggy mountains and deep valleys, but its lakes and oceans are filled with liquid methane instead of water.

"These are all our extended family of worlds that evolved in the same system alongside of us," says Trakinski. "There's a lot that our planet has in common with these worlds, but only Earth brings together all of the necessary ingredients and conditions that has enabled it to turn into this thriving biosphere."

So what do Cassini's discoveries mean for our understanding of our own solar system? For one, we'll never look at Saturn in the same way again. "These scenes of Saturn and Titan will be delightful and fascinating to audiences," says Carter Emmart. "We are looking at the structures in Saturn's rings as they resemble what our models of planetary formation show us, which shows we are likely on the right track to understanding the basics of how the worlds of the solar system formed."

Cassini has reshaped our understanding of the distant planet, which we now understand as a complex ecosystem of many orbiting bodies. The mission has also expanded our knowledge of the still-mysterious, neighboring worlds in our own solar system—and reminded us how much there is still to explore. 🌌

Titan images: NASA/JPL-Caltech
Headshots: D. Finnin/© AMNH and R. Mickens/© AMNH



SEE THE NEW SPACE SHOW BEFORE IT OPENS TO THE PUBLIC! MEMBER PREVIEW DAYS JANUARY 18–20, 2020.

Tickets are available starting January 13 by phone at 212-769-5200, Monday–Friday, 9 am–5 pm.

During the golden age of the Apollo program in the 1960s, many people assumed that by the year 2020 there would be colonies on Mars and bustling interplanetary travel. Today, humans are actively traversing the solar system—not in person, but through a growing fleet of robotic explorers like Cassini. These spacecraft send back incredible details that bring humans ever closer to distant planets, moons, asteroids, and comets—and upend almost every prediction! *Worlds Beyond Our Earth* will take viewers on a virtual expedition through the solar system, from our own blue planet to far beyond the habitable zone, to marvel at the latest discoveries, and to tackle the big questions: Has our solar system always been like this? How will it change? And what makes Earth special? As viewers will find out, there really is no place like home—at least not within our solar system.

Worlds Beyond Our Earth is dedicated to the memory of Charles Hayden in celebration of the 150th anniversary of his birth and made possible by the generous support of the Charles Hayden Foundation.

Programs and Exhibits

For more programs and to purchase tickets, visit 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. 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. 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.

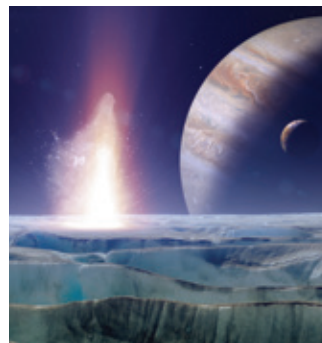
Please check amnh.org for Member ticket prices for live animal exhibits and giant-screen 2D and 3D films.

Information about programs is current as of August 30, 2019. Please check amnh.org/calendar for updates.

OCTOBER

SciCafe: Research Library Collections Unleashed!

Wednesday, October 2
Doors at 6:30 pm, program starts at 7 pm
Free with RSVP, cash bar adults 21+
The Museum was founded as a Museum and Library 150 years ago, and the Library's collections have grown steadily ever since. Join the Library's Harold Boeschstein Director **Tom Baione** to learn about some of the amazing stories unearthed in its extensive archives and photography, film, art, and memorabilia collections through the years—and to find out what the future has in store for this vital scholarly and community resource.



The Ancient Volcanoes of Mercury

Monday, October 7
7 pm
\$12

How do scientists know there were ancient volcanoes on Mercury? NASA's MESSENGER spacecraft orbited Mercury with the goal of better understanding the planet's ancient geologic history. Planetary geologist **Brett Denevi** discusses her role on the MESSENGER mission and her studies surrounding the origin, composition, and evolution of planetary surfaces.

Field Trip to the Moon

Monday, October 14
6–6:30 pm,
6:45–7:15 pm
\$8 for children;
\$13.50 for adults

Join us for a virtual trip to the Moon in the immersive Hayden Planetarium. Feel the ground shake beneath you as you experience a thrilling NASA rocket launch. Take a tour of the cosmos guided by a live presenter and orbit the Earth to get an astronaut's view of a sunrise in space!



Member Entrances

Members and their guests are welcome use one of two Member entrances.

The Member entrance located on Central Park West (ground level, via the driveway) at 79th Street is open seven days a week. On Saturdays and Sundays, the weekend Member entrance located at 77th Street (between Columbus Avenue and Central Park West) is also open.

Both entrances have digital ticketing kiosks and are accessible by wheelchair and stroller.

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? Meet the entire tyrannosaur family through fossil casts and life-sized models of hatchlings, juveniles, and a full-grown, towering *T. rex*, with engaging interactives that will reveal the amazing story of this iconic dinosaur.



The 2019 Margaret Mead Film Festival

Thursday, October 17–
Sunday, October 20
Members receive a discount on tickets.

The Margaret Mead Film Festival features documentary films, shorts, and other media that increase our understanding of the complexity and diversity of peoples and cultures around the world. Inspired by anthropologist Margaret Mead's groundbreaking use of film and photography, the Mead celebrates ever-changing modes of storytelling, new technologies, and increased access to communities near and far while presenting the best in non-fiction film and hybrid works.



Highlights:



Opening Night Film

Freedom Fields

Thursday, October 17
LeFrak Theater
\$13

Mead Dialogue Collaborations in Cultural Storytelling: Renovating the Northwest Coast Hall
Saturday, October 19
4:30 pm
Free with any Mead ticket or festival pass; RSVP required

VR Lounge: Awavena
Friday, October 18–
Sunday, October 20
Starlight Café
Free with any Mead ticket or festival pass; RSVP required

For tickets and additional information visit amnh.org/mead.

Curator Lecture: Denton Ebel

Tuesday, October 22
Lecture from 6:30–7 pm
Hall viewing from 7–8 pm

Free for Members at the Adventurer level and above
Registration required; call 212-769-5606 or email members@amnh.org.
Seating is limited.
Please join us for an evening with **Denton Ebel**, curator in the Department of Earth and Planetary Sciences. Ebel will discuss the science that informed the revitalization of our Arthur Ross Hall of Meteorites and will introduce you to the exciting new data, graphics, and media presented in this iconic hall. The evening will conclude with an opportunity to view the exhibit with new insights fresh in your mind.

Accessibility Programs

To learn more, email 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

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



Addressing the Statue

Free

Now on view in the Akeley Gallery, this exhibition provides context about the historic equestrian Theodore Roosevelt statue on the Museum's front steps and how it is interpreted today.



Family Party
Wednesday, October 23
 5–7:30 pm
 For more information or to purchase tickets, please call 212-769-5167, or visit our website at amnh.org/familyparty
 The Family Party—one of the Museum’s most beloved traditions and the best family party in New York City—features fascinating educational activities and spectacular entertainment for children of all ages.

Halloween Celebration
Saturday, October 26
 2–6 pm
 \$13
 More than 30 of the Museum’s popular halls will be open for trick-or-treating, arts and crafts, fun with roaming cartoon characters, and live performances. Past performers and characters have included Curious George® and Clifford the Big Red Dog®, a magician, stilt walkers, and performers from the Big Apple Circus. Come in your Halloween costume!

Spooky Space
Tuesday, October 29
 7 pm
 \$12
 Monstrous stars, devilish explosions, and frightful collisions! Get in the Halloween spirit and join astrophysicist **Jackie Faherty** for a virtual tour in the Hayden Planetarium Space Theater highlighting the universe’s scariest phenomena.

NOVEMBER

Weekends to ReMember
Month of November
 Members will receive special added benefits on Saturdays and Sundays throughout the month of November! Enjoy free access to your favorite special exhibitions, including *The Butterfly Conservatory* and *Trex: The Ultimate Predator*, the 2D/3D giant-screen film, and the Space Show. Stop by any Membership Desk to pick up complimentary collectibles from the Museum’s 150th anniversary. Get a head start on your holiday shopping and enjoy double discounts at all Museum retail shops from November 10–17.

Take Flight: An Evening Owl Encounter and Reception
Friday, November 1
 6:30–8 pm
 \$35
 21+ with ID
 Join zoologist **Jarod Miller** for an exciting evening celebration of nocturnal birds of prey. Meet spectacular owls from around the world to learn more about the science and folklore that surrounds these magnificent animals.

Día de Muertos JC Member Exclusive Pre-party and Guided Altar Preview
Friday, November 1
 7–8:30 pm
 To RSVP, please call 212-769-5256 or email jcmembership@amnh.org.
 Junior Council (JC) members will be among the first to see the Museum’s *Día de Muertos* extinct animal species altars during this exclusive pre-party that includes an open bar, appetizers, as well as presentation and guided altar tour with Ana Luz Porzecanski, director of the Center for Biodiversity and Conservation, before joining the public for the grand fiesta. Must be a JC member to attend.

Día de Muertos Party
Friday, November 1
 8–11 pm
 \$45
 Celebrate *Día de Muertos*, Oaxacan-style, at the Museum. Join us for a Mexican verbená featuring a night full of traditional Oaxacan music and drinks.

Día de Muertos (Day of The Dead)
Saturday, November 2
 11 am–5 pm
 Free
 Immerse yourself in the traditions of *Día de Muertos* in this family-friendly, full-day festival featuring altars dedicated to extinct animal species, performances by Mexican folklore musicians and dance troupes, hands-on artisanal workshops, and a craft marketplace.

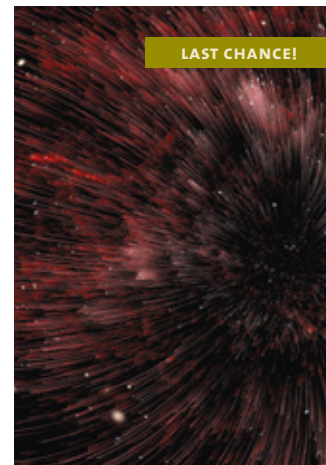


Oceans: Our Blue Planet
Free
 In this giant-screen film, embark on a global odyssey to discover the largest and least explored habitat on Earth. New ocean science and technology has allowed us to go further into the unknown than we ever thought possible. From the coastal shallows to deeper, more mysterious worlds, hear untold stories of the oceans’ most astonishing animals. Captioning and audio devices are available.



IN 2D AND 3D

Dark Universe
Free
 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.



LAST CHANCE!



Animal Encounter: Owls With Jarod Miller
Saturday, November 2
 11 am (recommended for families with younger children), 1 pm and 3 pm
 \$15
 Join zoologist **Jarod Miller** for this unforgettable presentation featuring owls from around the world. Learn about the diversity, evolution, anatomy, and behavior of these majestic creatures to gain a better understanding of the vital roles they play within their respective ecosystems.

The First Seconds of the Universe
Monday, November 4
 7 pm
 \$12
 Theoretical astrophysicist **Dan Hooper** explores what scientists know and what they are still struggling to understand about the very first seconds—and fractions of a second—after the Big Bang. Hooper proposes in his new book *At the Edge of Time* that it is in studying these initial moments that we will unlock great truths about the universe. A book signing follows.

SciCafe: Climate Change and Rising Sea Levels
Wednesday, November 6
 Doors at 6:30 pm, program starts at 7 pm
 Free with RSVP, cash bar adults 21+
 How fast climate changes in the future will depend on our collective actions as individuals, families, communities, and governments. In this presentation, paleoclimatologist **Maureen Raymo** will review evidence for climate change, natural and manmade, and explore how ice sheets and sea levels have changed in the past.

A Night at the Museum Sleepover—Special Member Pricing for Weekends to ReMember!
Fridays, November 8 and November 15
 6 pm–9 am (recommended for families with children 6–13 years old)
 \$115
 Registration required; call 212-769-5200
 Head out with flashlights in search of adventure. Meet your relatives in the Hall of Human Origins. Climb the stairs and enter the age of dinosaurs, standing beneath a fearsome *T. rex*. Settle down beneath the 94-foot-long blue whale, next to African elephants, or at the base of a striking volcanic formation, and fall asleep in the halls of one of the world’s most beloved museums.

Hall Tour: Natural History of New York City
Saturday, November 9
 10:30 am and 1:30 pm
 Free
 Registration required; call 212-769-5200
 Examine New York City’s ecology and geology with an expert guide to gain a deeper understanding of the origins and diversity of species found in your own backyard. Learn how the common city pigeon traded the cliffs of New Delhi for the façades of Manhattan’s tallest skyscrapers.

Double Discount Dates
Sunday, November 10–
Sunday, November 17
Sunday, December 1–
Sunday, December 8
 Get out in front of holiday shopping with twice your regular Member discount! For a week in November, Members save 20 percent on purchases in the Museum’s retail shops and online store. Just have your membership card handy at checkout.

Exhibition Credits
 Major funding for *T. rex: The Ultimate Predator* provided by the **Lila Wallace-Reader’s Digest Endowment Fund**.
 Generous support also provided by: **Dana and Virginia Randt Chase Private Client**
 Virtual reality experience created in collaboration with **HTC VIVE**.

Generous support for The *Butterfly Conservatory* has been provided by the **Eileen P. Bernard Exhibition Fund**.
 Generous support for the revitalization of the **Arthur Ross Hall of Meteorites** has been provided by the **Arthur Ross Foundation**.

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**.

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

IRIS Lecture: Past Earthquakes, Present Hazards

Tuesday, November 12

6:30 pm

Free; RSVP required

How do scientists understand earthquakes that occurred before modern seismometers? Join geophysicist **Susan Hough** as she describes the science of past tremors and what they can teach us about present-day earthquake hazards.



Member Night: T. rex

Saturday, November 16

6–8 pm

\$15 per person

Join us for a special evening viewing, exclusively for Members, of our special exhibition, *T. rex: The Ultimate Predator*. Explore life-sized models and interactive exhibits to find out how *T. rex*—once a fluffy little critter—grew to become a massive killing machine. Guests are invited to attend a post-gallery viewing reception, which includes wine, light refreshments, and hands-on activities with Museum experts and educators.

Traveling the Neighborhood

Tuesday, November 26

7 pm

\$12

Explore the worlds within our local galactic neighborhood with presenters **Brian Levine** and **Jana Grcevic**. How about a vacation to Europa, an expedition to study science on Saturn, or a mining mission on Mars?

DECEMBER

X-ray Astronomy

Monday, December 2

7 pm

\$12

Since its launch on July 23, 1999, the Chandra X-ray Observatory has been NASA's flagship mission for X-ray astronomy. **David Helfand** describes his work on X-ray observations of astronomical objects ranging from nearby stars to the most distant quasars.

SciCafe: Hacking the Stars

Wednesday, December 4

Doors at 6:30 pm,

program starts at 7 pm

Free with RSVP, cash bar adults 21+

Can hacking advance astrophysics? Find out how **Hakeem M. Oluseyi**, an astrophysicist, inventor, science communicator, and humanitarian and his team at the Florida Institute of Technology have harnessed hacking to process massive amounts of data and fast-track new research and technologies.

Winter Solstice and the Year Ahead

Thursday, December 9

7 pm

\$12

Celebrate the solstice and get ready for the cosmic year ahead. **Ted Williams** and **Irene Pease** conduct this tour around the Sun and preview important astronomical and scientific happenings you won't want to miss.



Animal Drawing

Eight Thursdays,

December 12–January 30

7–9 pm

\$160 (Materials not included)

The Museum's celebrated dioramas, dinosaur skeletons, and other iconic exhibits serve as the setting for an intensive after-hours drawing course with illustrator and naturalist **Patricia Wynne**.

Kwanzaa

Saturday, December 28

Noon–5 pm

Free

Join us for the Museum's annual Kwanzaa event, a celebration of African-American heritage that is rooted in seven principles known as *Nguzo Saba*, which promote unity, culture, and community development.

Program Credits:

The Margaret Mead Film Festival is supported in part by the National Endowment for the Arts.

The Margaret Mead Film Festival is made possible by the New York State Council on the Arts with the support of Governor Andrew M. Cuomo and the New York State Legislature.

Special support provided by the Academy of Motion Picture Arts and Sciences.

Support for the Margaret Mead Film Festival is provided, in part, by the May and Samuel Rudin Family Foundation, Inc. and the family of Frederick H. Leonhardt.

The Museum's Día de Muertos Festival is presented in collaboration with the Mexican State of Oaxaca, an invited cultural partner.

Support for Día de Muertos is provided, in part, by the May and Samuel Rudin Family Foundation, Inc. and the family of Frederick H. Leonhardt.

Kwanzaa 2019 is provided, in part, by the May and Samuel Rudin Family Foundation, Inc. and the family of Frederick H. Leonhardt.

Kwanzaa 2019 is co-presented by Community Works and New Heritage Theatre Group.

The Kwanzaa marketplace is organized by the Harlem Arts Alliance.

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

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

Select Hayden Planetarium Programs are sponsored by JetBlue.

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.

T. rex illustration by Zhao Chuang; Courtesy of PNISO; Mead film stills courtesy of Joseph Mayers and courtesy of Wide House; Oceans Our Blue Planet photograph by Alex Vail © BBC NHU 2017; all other images C. Chesek, D. Finnin, R. Mickens, and M. Shanley © AMNH

OCTOBER

2

WEDNESDAY

SciCafe: Research Library Collections Unleashed! SciCafe

7

MONDAY

The Ancient Volcanoes of Mercury Hayden Program

12

SATURDAY

The Butterfly Conservatory opens Exhibition

NOVEMBER

ALL MONTH

Weekends to ReMember Member Program

1

FRIDAY

Take Flight: An Evening Owl Encounter and Reception Member Program

Día de Muertos

JC Member Pre-Party Member Program

Día de Muertos Party

Special Event

2

SATURDAY

Día de Muertos (Day of the Dead) Family Program

Animal Encounter:

Owls with Jarod Miller Member Program

DECEMBER

1–8

SUNDAY–SUNDAY

Double Discount Dates Member Program

2

MONDAY

X-ray Astronomy Hayden Program

14

MONDAY

Field Trip to the Moon Hayden Program

17–20

THURSDAY–SUNDAY

The 2019 Margaret Mead Film Festival Family Festival

4

MONDAY

The First Seconds of the Universe Hayden Program

6

WEDNESDAY

SciCafe: Climate Change and Rising Sea Levels SciCafe

8

FRIDAY

A Night at the Museum Weekends to ReMember Member Program

9

SATURDAY

Hall Tour: Natural History of New York City Member Program

22

TUESDAY

Curator Lecture: Denton Ebel Member Program

23

WEDNESDAY

Family Party Special Event

26

SATURDAY

Halloween Celebration Family Festival

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TUESDAY

Spooky Space Hayden Program

10–17

SUNDAY–SUNDAY

Double Discount Dates Member Program

12

TUESDAY

Past Earthquakes, Present Hazards IRIS Lecture

15

FRIDAY

A Night at the Museum Weekends to ReMember Member Program

16

SATURDAY

Member Night: *T. rex* Member Program

25

MONDAY

Origami Holiday Tree opens Exhibition

26

TUESDAY

Traveling the Neighborhood Hayden Program

12

THURSDAY

Animal Drawing Adult Course begins

28

SATURDAY

Kwanzaa Family Festival

Meeting Tomanowos

Museum internship brings Grande Ronde youth to New York City



On any given day, visitors to the Museum's Dorothy and Lewis B. Cullman Hall of the Universe are invariably drawn to the impressively large monolith in the southwest corner: the 15.5-ton Willamette meteorite. But for visitors who happen to come to the Museum during the last week of June each summer, there is a special opportunity: to hear about the meteorite from young people from the Confederated Tribes of the Grand Ronde in Oregon, for whom the iconic specimen is not just a remnant from space but an object of special cultural, spiritual, and historical significance known as Tomanowos.

This past summer, Kailiyah Krehbiel, 17, and Isabelle Grout, 15, welcomed visitors and engaged them in conversation about Tomanowos, which is revered as a purifying, cleansing, and healing source through the rainwater that once collected in its many crevices.

"It's more than just a space rock," Grout, wearing an "Ask Me" button, explained to a visitor.

"The warriors cleaned their arrowheads in it," Krehbiel said in response to a visitor's question. "People washed their faces with water from it because it was powerful. Being around it is very cleansing. It's a good feeling."

Grout and Krehbiel were in New York as part of an internship program, which runs each summer and invites students from Grand Ronde to spend three weeks at the Museum with a chaperone (this year's class was accompanied by Cristina Lara, who was part of the inaugural class of interns, and Teal Reibach of the Chachalu Museum and Cultural Center in Grand Ronde). The program was established in 2000 as part of a historic agreement between the Museum and Grand Ronde to maintain the meteorite in New York, where it would be seen by millions of visitors each year and continue to be revered by the Confederated Tribes of the Grand Ronde in an annual ceremonial visit.

Each year, interns from the Grand Ronde travel to New York

City for the program, which immerses them in the Museum. In the first week, they learn about the institution itself and how the Museum studies meteorites and space. During the second week, they explore the history of the Willamette agreement, why the internship was created, and what is involved in the study of anthropology at the Museum. Their third week is devoted to interacting with visitors and engaging them in discussions about the multiple meanings of the meteorite. On their last day, the interns make a final presentation to members of the Museum's Education Department and invited guests to share what they gained from the experience and what living in Grand Ronde is like today. Throughout, the teens also manage to fit in some sightseeing in New York, visiting the Museum of the City of New York, the Metropolitan Museum of Art, and the National Museum of the American Indian.

But the centerpiece of the program is establishing and renewing a new generation's connection with Tomanowos. As Kathryn Harrison, who was chair of the Grand Ronde Tribal Council in 2000 when the agreement was made and is now a Museum Trustee, has explained, it is important to feel a palpable link to her ancestors in the presence of Tomanowos. "Here we are and have that same honor and privilege," she says.

Echoing that sentiment is Lara, who recalled her own experience as part of the first group of students to participate in the program in 2001. "My strongest memory absolutely was meeting Tomanowos," she says. "That's what I took away, that feeling of connection and belonging."

It was a "beginning hook," she says, for things she is still learning even now as an adult, reading, attending ceremonies, and hearing stories about ancestors. She enjoyed seeing this year's interns make their own connection to Tomanowos. "I love being able to witness that," she said.

For more about the history of the Willamette meteorite, see p. 22.



Opposite, inset: Kailiyah Krehbiel, left, and Isabelle Grout, right, pictured explaining the meaning of Tomanowos to visitors. This page: The meteorite is the centerpiece of the Cullman Hall of the Universe.

D. Finnin and R. Mickens/© AMNH

Magnificent Meteorite

As the Museum celebrates its 150th anniversary, each issue of *Rotunda* will bring you stories about the Museum's iconic exhibits.

At 15.5 tons, the Willamette meteorite, which is located in the Dorothy and Lewis B. Cullman Hall of the Universe, is the largest iron meteorite found in the United States and one of the largest in the world. Here are a few fascinating facts from its more than 100-year history at the Museum.

OUT OF THIS WORLD

Most metallic meteorites, including the Museum's "big irons"—Willamette and Ahnighito, which is located in the Arthur Ross Hall of Meteorites—have a quality not found in any metals crystallized on Earth: distinct intergrowths of the iron-nickel minerals called "Widmanstätten patterns" that appear naturally, if rarely, or when the polished surface is etched with a solution of nitric acid. Some have called these patterns "an invisible writing or a language from space."

ROUTE TO NEW YORK

After the Clackamas were relocated to a reservation in the 1850s, the tribe's ancestral lands on which Tomanowos rested were owned by the Oregon Iron and Steel Company, which exhibited the meteorite at the Lewis and Clark Exposition in Portland, Oregon, in 1905. A New York philanthropist who visited the fair purchased it and gave it to the Museum, where it was displayed beginning in 1906.

FORGED IN A PLANET

This meteorite's unique composition—part iron, part nickel—leads scientists to think that it was once part of an iron core of a planet orbiting our Sun that broke apart billions of years ago. There is evidence it sustained two more shocks before crashing into Earth thousands of years ago, traveling at an estimated 30,000 to 50,000 miles an hour.

DELIVERED BY GLACIER

There is no impact crater in Oregon's Upper Willamette Valley, where the meteorite was located when it first gained widespread attention in 1904. The meteorite likely touched down in an entirely different location—perhaps on an ice cap near what is now the Idaho-Canada border—and was brought to Oregon by melting glaciers from 15,000 to 18,000 years ago.

SPIRITUAL SIGNIFICANCE

The Native peoples of Oregon's Willamette Valley, the Clackamas, call the meteorite Tomanowos, or a representative of the Sky People. According to Clackamas tradition, Tomanowos sparked a union of sky, Earth, and water when it landed in the valley to collect rainwater in its crevices, endowing the water with healing powers.

SHARED TRADITION

On June 22, 2000, the Museum signed an agreement with the Confederated Tribes of Grand Ronde of Oregon, which includes the Clackamas, to maintain the meteorite in the Museum for scientific and educational use while ensuring access for religious, historic, and cultural purposes. For a story about the annual Grande Ronde internship at the Museum, see p. 20.



Museum President Ellen V. Futter with Grand Ronde Tribal Council Chair Kathryn Harrison at the 2000 signing. Harrison now serves as a Museum Trustee.

HIGH-TECH REPLICA

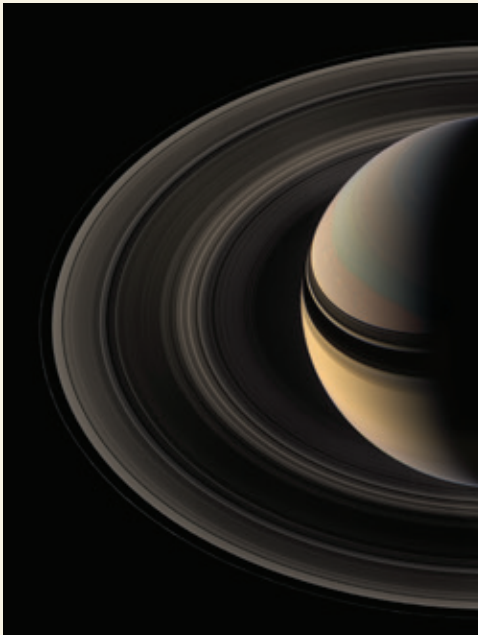
A faithful, to-scale reproduction of the meteorite was fabricated out of white plastic foam through a process called computer numerical control milling. It was based on a 3D-printed model made from hundreds of photos taken at the Museum last year by Clackamas students working with artist Garrick Imatani.



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Courtesy NASA/JPL-Caltech



"We absolutely had to tell the extraordinary story of the Cassini mission, which gave us invaluable insights into Saturn's entire system of worlds," says Curator Denton Ebel about the new Space Show, opening in 2020. For more, see p. 8.

General Information

HOURS

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

ENTRANCES

During Museum hours, Members may use the Member entrance on Central Park West (ground level via the driveway), the 81st entrance, and the subway entrance (lower level). On weekends, the 77th Street entrance is also designated for Members.

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, and Online Shop (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
or call 212-313-7565.