

# CATALYST

DENVER MUSEUM OF NATURE & SCIENCE MAGAZINE

JUNE | JULY 2014

**INSIDE** /// ALL-NEW DISCOVERY ZONE  
THREE NEW IMAX 3D FILMS  
SUMMER NIGHTS @ THE MUSEUM





# SUMMER NIGHTS @THE MUSEUM

**FRIDAY NIGHTS** THROUGH AUGUST 22, 5-8 P.M.

**\$12/MUSEUM MEMBER | \$15/NONMEMBER CASH BAR**

Amplify your Friday nights this summer with local food, science fun, and more! Your all-access ticket includes admission to Maya: Hidden Worlds Revealed, Discovery Zone, IMAX films, and Laserium shows. Summer Nights not offered July 4 and 25. Tickets and schedule of special events @ [www.dmns.org/summernights](http://www.dmns.org/summernights).



Dear Members,

In late April, the Museum was pleased to collaborate with the Mexican Cultural Center and the Consulate General of Mexico in Denver to host a Día del Niño celebration during an SCFD Free Day. We welcomed 12,250 guests, including many first-time visitors. This event is an example of how the Museum is beginning a new phase in its legacy as an institution committed to serving the entire community.



For nearly 10 years, the Museum has been guided by a strategic plan that culminated with the opening of the Morgridge Family Exploration Center and the Rocky Mountain Science Collections Center in February. In recent months, Museum staff have been considering what's next. The years have raced by, and there is no sign the world around us will be slowing down anytime soon.

With this in mind, the Museum is more committed than ever to deepening our relationship with the community. Through a series of strategic initiatives, we plan to more closely consider how the Museum can be especially relevant to individual lives while continuing to be a leading resource for science education and research in the Rocky Mountain Region.

As a first step, the Board of Trustees approved a new mission and vision that will be the linchpin for our work in the coming years.

**Our Mission:** *Be a catalyst! Ignite our community's passion for nature and science.*

**Our Vision:** *We envision an empowered community that loves, understands, and protects our natural world.*

It is not a new idea for the Museum to be engaged with the Colorado community. We have been a part of Denver's cultural landscape for more than 113 years! But Denver has grown into a world-class city with a wonderfully diverse population, and the Museum must continually evolve as well.

As we begin shaping our new initiatives, we will build upon successes such as offering free admission to all school and youth programs and collaborating with community leaders like the Mexican Cultural Center and many others. We will strive to be a place that keeps the heart of the community in mind in all we do. I look forward to sharing more about our plans in the coming months.

Thank you for being a member and an important part of our collective voice in the community!

George Sparks  
President and CEO

You may contact George Sparks by e-mail at [president@dmns.org](mailto:president@dmns.org).

## CONTENTS

### 2 IN THE KNOW

Here's the latest about what's going on inside and outside the Museum.

### 4 FEATURED EXHIBITION

Go ahead and splash your little sister or crawl on the back of a dinosaur! It's all in the name of science in the brand-new Discovery Zone.

### 6 MUSEUM INSIDER

The Museum's paleontology team is dedicated to reconstructing a lost world buried deep in the rocks of the American West

### 8 MUSEUM TREASURES

Grizzly bears were thought to have disappeared from Colorado altogether until a hunting guide came face-to-face with one 35 years ago.

### 10 GET INVOLVED

Let's work together to be catalysts and ignite the community's passion for science and nature.

### 12 DISCOVER SCIENCE

The results are in, and Museum visitors helped contribute to science by participating in real research about taste sensitivity.

## FIND IT @ DMNS.ORG

- Print-at-home tickets for Maya: Hidden Worlds Revealed, Planetarium and IMAX shows, lectures, and programs
- Reservations for members events
- Hours and showtimes
- Calendar of events
- Museum Scientists
- Today's Weather at the Museum
- Heavens Above sky information
- Membership renewals and purchases

Join Our Community:



### ON THE COVER

From the zoology collections

Ladybird beetle  
*Coccinella septempunctata*  
ZE.35236  
Fremont County, Colorado,  
June 2008



Christopher Grinter



## BRING YOUR SUMMER VISITORS TO MAYA!

Maya: Hidden Worlds Revealed is a great way for people of all ages to learn about this fascinating culture. The exhibition is open daily, including until 8 p.m. on Fridays as part of Summer Nights @ the Museum.

- Stand among replicas of massive stone monuments.
- Interpret glyphs and print your Maya name and your birth date.
- See the "Denver Panel," a stone carving from Mexico shrouded in mystery.
- Discover how the Maya ball game is reflected in team sports that are played today.
- Experience immersive environments, such as an underworld cave and a re-created tomb and its treasures.
- Conduct a virtual excavation and interpret your finds.
- Weave Maya patterns and build Maya arches.
- Admire more than 250 rarely seen artifacts, including several from our own collections.
- Find a keepsake and unique gifts in the Maya shop.
- Maximize your Maya experience and check out the show *Tales of the Maya Skies* in Gates Planetarium.

Members receive a deep discount on admission to Maya: Hidden Worlds Revealed. Buy tickets and find out more about the exhibition @ [www.dmns.org/maya](http://www.dmns.org/maya).



## THREE NEW IMAX 3D FILMS OPEN ON JUNE 6

Step into the cool comfort of Phipps IMAX Theater this summer and be transported to another time or place.

Members save on IMAX tickets every day! Buy tickets and find out more @ [www.dmns.org/imax](http://www.dmns.org/imax).



### D-DAY: NORMANDY 1944

June 6, 1944: The largest Allied operation of World War II began in Normandy, France. Yet few know in detail exactly why and how this monumental event changed the course of history. This new IMAX 3D film seamlessly blends stunning computer-generated images, live-action reenactments, and historic photos and film to recount this carefully planned mission. From those who lived through it to those who are hearing the story for the first time, all generations will receive a new perspective on this defining time.



### ISLAND OF LEMURS: MADAGASCAR

Millions of years ago, lemurs arrived as castaways on the remote island of Madagascar, and they have since evolved into one of nature's greatest explorers. Through the marvel of IMAX 3D you will travel to this wondrous world where you will follow a trailblazing scientist as she strives to help these strange and adorable creatures survive.



### PANDAS: THE JOURNEY HOME

Prepare to fall in love anew with this delightful iconic creature in this new IMAX 3D film from National Geographic. Featuring unprecedented access to the Wolong Panda Research Center in China, you will follow the story of Tao Tao and other pandas as they playfully prepare to be released into their lush mountain habitat to begin living wild.



## LASERIUM RETURNS!

Just hearing the words *laser show* makes many Denverites feel nostalgic. This summer, nostalgia turns into reality when Laserium: The Cosmic Laser Concert returns to Gates Planetarium! Celebrating its 40th anniversary in Denver, this blast from the past is set to the beats of such rock icons as Pink Floyd, the Beatles, Led Zeppelin, and U2. Laserium shows will run through the summer on Fridays and Saturdays.

Denver was the first city to host Laserium in 1974 after its successful launch in Los Angeles. Widely acknowledged a milestone in music visualization, Laserium continues to invent and create new laser effects and technology to bring patrons the best sound and visual experience possible. Live performances by creative laserists ensure a unique experience.

In today's state-of-the-art digital Gates Planetarium, the experience is sure to be bigger and brighter than ever for both longtime fans and new fans of the show.

Advance reservations are recommended. Members receive a discount on admission to Laserium. No passes accepted during this limited engagement. Buy tickets @ [www.dmns.org/planetarium](http://www.dmns.org/planetarium).

## SCI-FI FILM SERIES 2014

The Sci-Fi Film Series has become a summer tradition! The Museum is partnering with the Denver Film Society again this year to present the popular series.

Every Wednesday, from July 9 to August 6, a science fiction film will be screened, followed by a discussion hosted by a Museum scientist and Vincent Piturro, English and film professor at Metropolitan State University of Denver. These post-screening discussions will break down the science behind these alternative possibilities and separate fact from fiction. This year's selections are *Upstream Color*, *Journey to the Center of the Earth*, *Europa Report*, *Alien*, and *Gravity*. The locations for the films alternate between Phipps IMAX Theater and the Sie FilmCenter on Colfax.

Find out more about the schedule and buy tickets @ [www.dmns.org/scififilmseries](http://www.dmns.org/scififilmseries).

## HEAVENS ABOVE

The summer solstice is upon us in the northern hemisphere, this year falling on Saturday, June 21, at 4:51 a.m. (mountain daylight time).

The word *solstice* is from the Latin *solstitium*, from *sol* meaning "sun" and *stitium*, "to stop." On the day of summer solstice, the sun takes its longest and highest path across the sky and its northward progression comes to a halt. Likewise, on the day of winter solstice, the sun takes its shortest and lowest path across the sky and its southward progression ceases, the sun reverses its course, and the cycle begins again.

The path the sun follows across the sky is called the ecliptic. The ecliptic is inclined, or tilted, in relation to Earth's equatorial plane. Because of this inclination, the sun's movement on the ecliptic carries it north and south of the equator during the year. The sun's declination (angular distance) varies from +23.5 degrees north of the equator to -23.5 south of the equator. The sun spends about half the year in the northern hemisphere and half in the southern hemisphere, equinox to equinox.

In many early cultures, such as the Maya, solstices and equinoxes were important in guiding people as they developed calendars and planned their growing and harvesting seasons. Over the centuries, and even today, the June solstice is a time for rituals, festivals, feasts, and other celebrations.

Find sky information for June and July @ [www.dmns.org/heavensabove](http://www.dmns.org/heavensabove).



Sunrise from the International Space Station



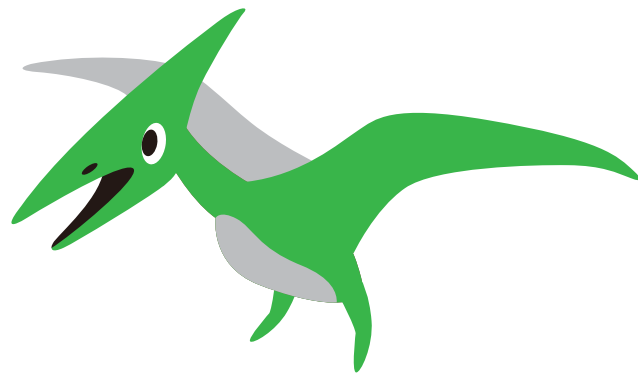
## ALL-NEW DISCOVERY ZONE OPENS SATURDAY, JUNE 7

*Look, ask, discover, make, and share!*

Welcome to the completely reimagined Discovery Zone, made possible by Kaiser Permanente, which opens to the public on Saturday, June 7. Discovery Zone has moved from its former home to a new location on Level 2 in the Morgridge Family Exploration Center.

After opening 12 years ago as a play-and-learn area, families with young children made the Discovery Zone one of their primary destinations during Museum visits. In recent years, a new concept and location for the Discovery Zone emerged as part of the Museum's strategic plan. The result is a welcoming, dynamic gallery nearly twice as large as the previous one.

The Discovery Zone features six primary environments that incorporate immersive exhibits, multisensory activities, and dynamic programming focused on science process skills, such as observing, quantifying, inquiring, analyzing, creating, and communicating.



**Dinosaur Gulch (pictured below):** A life-size, climbable *Parasaurolophus* dinosaur greets children as they enter the Discovery Zone. In Dinosaur Gulch, children “excavate” fossils and uncover skulls, jaws, and teeth in dig pits set within a faux-rock outcrop based on the famous Kaiparowits site in Utah. A photomural of Museum paleontologists and volunteers at work and a mural of dinosaurs in a prehistoric scene provide the backdrop.

**Water Way (pictured bottom, facing page):** Children enjoy the fun and physics of water as they pour, fill, and propel a variety of objects downstream at a multilevel water table. Laminar jets are reminiscent of City Park's interactive fountain. At another station, children use spray bottles to pump water over chilled plates to create ice and fog, and colorful tubes with bubbles offer observation and prediction experiences.



Discovery  
Zone

Discovery Zone made possible by  
KAISER PERMANENTE®



**Construction Corner:** Beneath a scaled version of the iconic tensile roof at Denver International Airport, the Construction Corner features opportunities for children to practice both gross-motor and fine-motor challenges. A dynamic wall installation allows children to create their own ball course with movable track sections. There are also free-form building projects with a variety of materials.

**Science Kitchen:** Just as the kitchen is the heart of a home, the Science Kitchen is a welcoming area for group and individual science and art activities. From science demonstrations at the “kitchen counter” to table-based activities such as exploring the properties of color through hands-on painting projects, this area will continually offer new and different activities.

**Big Backyard (pictured above):** Entered through a low gate, the Big Backyard is a safe, inviting space for infants and toddlers to practice motor and emotional development skills and take on confidence-building challenges. Caregivers stay close by as the little ones explore and experience this multisensory kid-sized reconstruction of the natural world on their own. The backyard includes a reading nook and a semiprivate nursing area.

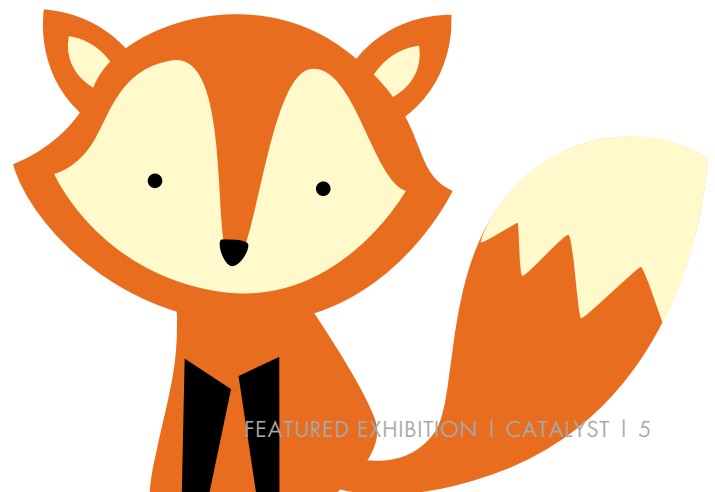
**Explorers Playhouse:** An outdoor clubhouse-themed performance area, Explorer’s Playhouse, is the setting for action-packed science, culture, and dramatic play programs and performances offered throughout the day. Between shows, children may participate in dramatic play or explore using real objects from the Museum’s education collections.

We look forward to seeing you and your little scientists in the new Discovery Zone, where it’s more fun than ever to explore the world.

## EXPLORE

The all-new Discovery Zone is a permanent exhibition that will be open daily at 9 a.m. It is free for members and included with general admission for nonmember guests.

The environments, programs, and activities in the Discovery Zone are targeted to children ages three through five, with the Big Backyard especially designed for children from birth through age two. Extension activities are appropriate through ages seven or eight, so that families with young children can visit together.







## THE LARAMIDIA PROJECT: RESURRECTING AMERICA'S LOST WORLD OF DINOSAURS

BY JOE SERTICH, PhD, IAN MILLER, PhD, AND SCOTT SAMPSON, PhD

Ten million years before the iconic *Tyrannosaurus rex* and *Triceratops* dominated the American West, the Cretaceous world of dinosaurs was peaking in western North America. Evolving in isolation from the rest of the world, new archetypal dinosaurs appeared on the scene, such as the plant-loving duckbills, the fantastic horned ceratopsians, and the ferocious tyrant kings. Evolution played out amid dense gallery forests and tannin-filled meandering rivers, teeming with life and inhabited by unfamiliar plants and animals. The window into this ancient world is preserved in the rocks of the American West, and it has become the primary focus of paleontologists at our Museum.



Approximately 95 million years ago, the shallow seas of the Western Interior Seaway flooded North America. Extending from the Arctic Ocean in the north to the Caribbean in the south, the seaway cut the continent in two, forming the long, ribbon-shaped landmass of Laramidia in the west. Mountain building near the Pacific coast created a spine of peaks and uplands running the length of Laramidia. To the east of these uplands, low coastal plains and swamps stretched from what is now Alaska's North Slope, south through the plains of Canada and Montana, across the canyon country of Utah and New Mexico, and into the central deserts of Mexico. It is in these regions, from rocks dating from between 80 and 72 million years ago, that paleontologists have recovered the most complete and diverse world of dinosaurs ever assembled.

While fossils from northern Laramidia, such as Montana and Alberta, have been collected and studied for well over 100 years, the southern half has remained a mystery. In recent years, paleontologists from our Museum, the Natural History Museum of Utah, and the Bureau of Land Management, among others, have intensively worked in a half-mile-thick pile of 76-million-year-old rock in Utah known as the Kaiparowits Formation.

These efforts have resulted in dozens of new species of plants and animals, including horned dinosaurs like *Kosmoceratops* and *Nasutoceratops*, and the predatory tyrannosaur *Teratophoneus*. While the project has successfully answered many questions, it has created even more. For instance, why are the dinosaurs and other animals found in the Kaiparowits different from those found up north in Canada from exactly the same time interval? The Museum team is digging deeper for answers.

The abundance of fossils provides the perfect opportunity to understand the dynamics of ecology and evolution in a greenhouse world. Because Laramidia is vast, these dinosaur-rich ecosystems can be directly compared from north to south, allowing paleontologists to understand how the world of dinosaurs varied from subtropical to temperate climates, and how variables such as prolonged darkness affected ecosystems. The Laramidian rocks can offer a direct glimpse into dinosaur evolution, extinction, and distribution. In some parts of Laramidia, you can literally walk through time and see transformations between different species of dinosaurs.

Perhaps most challenging is reconstructing dinosaur ecosystems from the bottom up. To do this, we must seek a more complete understanding of the physical world of Laramidia—its

geology, geography, and climate. We then add the biological record of plants, insects, snails, clams, lizards, turtles, crocodiles, and dinosaurs. Aided by an army of well-trained volunteers, students, and scientists, Museum paleontologists are gleaning every bit of fossil information from the rocks, ranging from the smallest snail and turtle to immense samples of fossil plants to gargantuan dinosaurs. Only by coordinating the skills, expertise, and experience of its research partners can the Museum team hope to reconstruct the full grandeur of these ancient ecosystems.

Over the past three years, the Museum paleontology team has spent nearly 22 weeks in the rugged Kaiparowits badlands of southern Utah, collecting thousands of fossils from dozens of sites. These discoveries are currently being cleaned by volunteers in our world-class fossil laboratory, cataloged and organized, and studied by both Museum scientists and researchers from around the world. This work will continue for years to come and likely lead to numerous new species of plants and dinosaurs. Stay tuned for lots of new science as we venture into untapped parts of Laramidia in New Mexico, Wyoming, and our very own Colorado.

---

Facing page: The ancient rock layers of the Kaiparowits Formation dwarf the paleontology team as they conduct fieldwork. This page, from left: A beautiful fossil plant unearthed at Kaiparowits; volunteer Mark Hunter carefully brushes away dirt from a discovery; hundreds of fossils are safely placed in plaster jackets for transport. These specimens will help piece together the story of this prehistoric landscape.

---

## FIND IT @ DMNS.ORG

Drs. Joe Sertich and Ian Miller are curators of paleontology in the Earth Sciences Department; Dr. Scott Sampson is the chief curator and vice president of research and collections. Find out more about their research @ [www.dmns.org/science](http://www.dmns.org/science). Their work was featured in the May 2014 issue of *National Geographic*.



## EXPLORE

Dinosaur Gulch in the new Discovery Zone, opening June 7, was inspired by the Museum's dinosaur research and includes a life-size, climbable model of a *Parasaurolophus* dinosaur, whose fossils were unearthed in the Kaiparowits Formation! Find out more about the brand-new Discovery Zone @ [www.dmns.org/DZ](http://www.dmns.org/DZ).





## COLORADO'S LAST GRIZZLY BEAR

BY JOHN DEMBOSKI, PhD

In September 1979, the final chapter of a century-long story came to an end at tree line in the San Juan Mountains of southern Colorado. Ed Wiseman, a hunting guide out of Moffat, crossed paths with a grizzly bear during an expedition near the headwaters of the Navajo River. Wiseman was attacked and mauled, but while he was down he managed to fatally wound the bear by hand using an arrow. Severely wounded, Wiseman spent a frigid night in the high country until help arrived the next day. He was airlifted by helicopter to Alamosa, where he spent the next month in the hospital recovering from his injuries.





Because grizzly bears were protected by law, a seven-month investigation into the incident ensued until it was determined that Wiseman had acted in self-defense. The case was officially dropped when he passed a polygraph test in April 1980.

Besides the incredible story of Wiseman's encounter, a major surprise to people at the time was that he was attacked by a grizzly bear and not a black bear, the other species of bear native to Colorado. Grizzly bears had been considered extirpated, or locally extinct, in Colorado since 1951. One of the suspected last grizzly bears had been killed 28 years earlier near the same area as Wiseman's bear. A few days after the attack, state biologists confirmed that it was a grizzly bear that had attacked Wiseman. Grizzlies have not been sighted in Colorado since that day.

Once the investigation wrapped up, the bear came to the Museum and was cataloged into the mammal collection. The adult female that weighed 350 to 400 pounds and based on examination of a tooth was estimated to be 16 to 20 years old. The Museum's specimen consists of the skull; the skeleton, except just the right front leg and scapula; and a beautiful grizzled hide. The skeleton shows signs of osteoarthritis because it is riddled with calcified spurs. The bear had worn-down teeth, including an abscessed upper right canine.

Over the years, the grizzly specimen has provided further insight into the bear's history. A 1999 study of the stable isotopes of carbon and nitrogen in the bear's hair and bones—a method to figure out what an animal eats—suggested that its diet was more than 90 percent meat. A 2006 study, which also examined other grizzly bear museum specimens, showed that the bear carried a unique genetic signature found only in the San Juan Mountains of southern Colorado and northern New Mexico.

Grizzly bears, a type of brown bear (*Ursus arctos*), once ranged across western North America from Mexico to Alaska, including across the Great Plains as far east as Missouri. By the early 20th-century, they had disappeared from 98 percent of their original range in the lower 48 states due to human-caused mortality and habitat loss. In North America, besides Alaska and Canada, they are currently found only in Wyoming, Montana, Idaho, and Washington.

Colorado's grizzly bears were once found throughout the state and the population in the remote San Juan Mountains was one of the last to be eliminated in the lower 48. Although there are reports of grizzly bear sightings in Colorado to this day, these remain unconfirmed, and most likely represent sightings of our remaining native

black bears. In Colorado, black bears are common in the mountains and can range in color from black to light brown. A big male can weigh up to 700 pounds, which might easily lead people to misidentify it as a grizzly bear.

Grizzly bears, along with other large mammals such as bison and wolves, are iconic western animals that have been dancing with extinction over the last 200 years. You could argue that Colorado's last grizzly bear represents the outcome of tension between humans and wild animals and a loss of unbridled freedom in the West, all at the expense of progress.

---

Facing page: A frontal view of the skull of the grizzly. This page, top from left: The Museum is preserving the bear's hide in its collections; the female bear had worn-down teeth, including an abscessed upper right canine. The specimen continues to reveal scientific information about not only this individual bear but also about grizzly bears in general.

---

## FIND IT @ DMNS.ORG

Dr. John Demboski is chair and curator of vertebrate zoology in the Zoology Department. Find out more about his research @ [www.dmns.org/dembo-lab](http://www.dmns.org/dembo-lab).

The Museum is responsible for preserving collections, such as the grizzly bear, that are timeless in origin and value. To fulfill this responsibility, the Museum recently opened the new Rocky Mountain Science Collections Center. Find out more @ [www.dmns.org/newwing](http://www.dmns.org/newwing).

Colorado's last grizzly was recently selected as one of Colorado's Top 10 Most Significant Artifacts. Find out more @ <http://collectioncare.auraria.edu>.

## EXPLORE

The skull of Colorado's last grizzly bear will soon be on exhibit in the Bears and Sea Mammals Hall on Level 2, which continues to be reinvigorated with new content and displays.

A first-hand account of Ed Wiseman's experience is recounted in the new book *Grizzly Attack in Colorado: The Ed Wiseman Story*, which is on sale in the Museum Shop.

## BRAND-NEW DISCOVERY ZONE MADE POSSIBLE BY KAISER PERMANENTE

Kaiser Permanente Colorado is the proud sponsor of the new Discovery Zone, opening to the public on June 7, and a corporate partner at the Denver Museum of Nature & Science.

As the state's largest nonprofit health plan, Kaiser Permanente Colorado has been committed to improving the lives and health of Colorado residents for 45 years. Kaiser Permanente Colorado provides comprehensive health care services to more than 565,000 members through 28 medical offices and a network of affiliated hospitals and physicians.

Kaiser Permanente Colorado consistently ranks among the nation's top health plans for delivering quality care and service. The health plan focuses on prevention as well as managing disease and looking at health from a full 360-degree angle including mind, body, and spirit. Kaiser Permanente Colorado's founding principles of partnership, integration, and prevention have withstood the test of time and continue to drive its success.

In 2013, Kaiser Permanente proudly directed more than \$96 million to community programs to improve the health of all Coloradans. This work includes Thriving Schools, a grant program providing funding for schools to become healthier places for

children and staff. In addition, Kaiser Permanente's Educational Theatre Programs have brought dynamic free health-education theatre performances into Colorado classrooms since 1986. Kaiser Permanente is also a founding funder and continued supporter of LiveWell Colorado's school-based health initiatives.

Support for the Denver Museum of Nature & Science aligns with Kaiser Permanente's mission to help Coloradans be as healthy as they can be. As the original presenting sponsor of Expedition Health, Kaiser Permanente invited all visitors to participate in a whole new journey toward good health. Support for the Discovery Zone continues that important work, with a new increased focus on early childhood education.

"Young children need a strong foundation for learning and those earliest years are critical to their academic success later in life," said

Donna Lynne, DrPH, president of Kaiser Permanente Colorado. "The new Discovery Zone will help inspire an entire generation of Colorado youth to explore the fascinating world of science through interactive exhibits and hands-on play."



Discovery Zone made possible by  
**KAISER PERMANENTE®**



## SUMMER EVENT FOR YOUNG PROFESSIONALS

Enjoy a custom-made brew at this year's Science on Tap, a special event for Young Professionals. This annual event is set for Monday, July 21, from 6 to 9 p.m. at Denver Beer Company. The recipe for the new beer is based on actual scientific data related to Museum artifacts from an ancient Maya city!

Mix and mingle with other YPs while learning about the science of beer from guest scientists Dr. Nicole Garneau, curator of human health, and Dr. Michele Koons, curator of archaeology.

Young Professional members are a group of metro-area leaders who not only support the mission of the Museum but

also receive a full year of benefits designed specifically for them. Join today to gain access to Science on Tap and the many other benefits available to all Museum members. Find out more @ [www.dmns.org/join/young-professional-membership](http://www.dmns.org/join/young-professional-membership).



## GET THE ULTIMATE MUSEUM EXPERIENCE!

Thank you for your membership support! Your membership not only offers you great benefits but it also helps the Museum inspire and serve our community.

We invite you to upgrade your membership today and join the Giving Club at \$300 or above. As a Giving Club member, there are many special opportunities to greatly enrich your Museum experience.



Giving Club members are invited to customized events throughout the year:

- **IMAX Family Night:** Choose from Wednesday, July 9, or Thursday, July 10, to go to the movies, IMAX style! Enjoy some of your IMAX favorites and complimentary movie munchies and soft drinks.
- **Behind-the-Scenes Night:** On Tuesday, September 16, Giving Club members and their families will be treated to a free event that offers special access to Museum scientists, and treasures and collections not on public display. You will also enjoy a complimentary buffet dinner and cash bar.



Additional benefits greatly increase your access to Museum programming:

- **“Anytime” Tickets:** All Giving Club members receive free “anytime” tickets to all surcharged exhibitions, including Maya: Hidden Worlds Revealed, now open, and Traveling the Silk Road, opening in fall 2014. This benefit guarantees quick and easy access to temporary exhibitions, making your visit even more convenient. No reservations are needed, even if it’s sold out! The number of tickets you receive is determined by your membership level.
- **Free IMAX and Planetarium Tickets:** Although members receive a discount on tickets to our theaters every day, members of the Giving Club receive free tickets to these venues. You may use the tickets for yourself or share them with friends and family. (Passes not accepted for Laserium shows.)

It is easier and more affordable than ever to become a Giving Club member with monthly installments starting at just \$25 per month! Find out more about Giving Club levels and benefits @ [www.dmns.org/join/giving-club](http://www.dmns.org/join/giving-club).

## DID YOU KNOW?

By being a member, you helped the Museum serve 1,353,580 visitors onsite and at offsite programs around the state in 2013. More than 315,000 children and teens enjoyed science education programs with their schools, youth groups, and families, and over 85 percent of this audience participated for free or at a reduced cost. And you and our other 61,500 member households continued to be some of our most valued partners, providing \$4.3 million in revenue to support our mission to be a catalyst and ignite the community’s passion for nature and science.

Please take a moment to read our 2013 Annual Report at [www.dmns.org/annualreport](http://www.dmns.org/annualreport). Our commitment to ensuring all Coloradans have access to the wonders of science and nature wouldn’t be possible without you.

DENVER MUSEUM OF NATURE & SCIENCE



ANNUAL REPORT



# MUSEUM RESEARCH CHALLENGES SUPERTASTER PHENOMENON

BY NICOLE GARNEAU, PhD

The 3,000 Museum members and visitors who participated in the “blue tongue project” in the Genetics of Taste Lab in Expedition Health have officially contributed to science. Findings from the taste perception research challenge the supertaster phenomenon, as was recently published in the open-access journal *Frontiers in Integrative Neuroscience*.



Crowd-sourced data and citizen science-driven research led to the discovery that a characteristic previously thought to predict supertasting does not. Supertasting is one of the central dogmas of taste research and has long been a term embraced by both the media and the public alike to explain everything from why some people don't like spicy foods to why some kids are picky eaters.

Supertasters are scientifically defined as people sensitive to even low concentrations of the chemicals phenylthiocarbamide and propylthiouracil, bitter molecules commonly used in taste research that are related to foods like broccoli and kale. Supertasting has been attributed to the number of papillae (which house the taste buds) on the tongue, the theory being that the more bumps you have the more taste buds you have and the more sensitive you are. There has been a long-held belief that if you stick out your tongue and look at the bumps on it, you can predict your sensitivity to strong tastes like bitterness in vegetables and capsaicin in chilies. While genetics is a key predictor in the ability to taste bitter, it is not responsible for supertasting.

The results show there is a gradient of sensitivity, confirming that some people are very highly sensitive; however, the data found that papilla density is unrelated. The findings argue that the term *supertaster* should be dropped and replaced with the more scientific term *hypergeusia* (heightened taste) to objectively describe people who are sensitive when eating, regardless of the cause.

The research project was managed on a day-to-day basis by 130 specially trained volunteer citizen scientists who collected the data. Thousands of Museum visitors had their tongues painted blue to examine each individual's papilla density. (Some humans have up to 10 times the number of taste buds as others.) Participants also tasted strips containing the bitter molecules and then rated their level of tasting sensitivity.

The Genetics of Taste Lab is the museum world's first example of community-based participatory research in human genetics. By using community volunteers, the Museum can create an extensive collection of population data that helps Museum scientists generate new knowledge about how genetics and taste affect our overall health. It also cultivates engaging learning experiences that are personally relevant to our audience.

A new community-based project is now underway in the Genetics of Taste Lab. The Fatty Acids Taste Study is examining the possibility that there are more than the five known tastes of sweet, sour, salty, umami (savory), and bitter. The two-year study is being conducted in partnership with Purdue University. The goal is to enroll 3,000 participants.

The Museum is committed to actively generating and publishing new knowledge that contributes to the field of genetics and human health while making scientific research accessible and relevant to people's everyday lives. With the blue tongue project, new methods were used to challenge a central dogma of our knowledge, which is the very nature of science itself.

Left: Dr. Nicole Garneau paints the tongue of a participant in the Museum's first study in the Genetics of Taste Lab. Below: The new taste study is open to Museum visitors and involves pinching the nose as part of the testing.

## FIND IT @ DMNS.ORG

Dr. Nicole Garneau is chair and curator for human health in the Department of Health Sciences. For more information about her research, visit [www.dmns.org/genetics](http://www.dmns.org/genetics) or follow her @yoppearlscigirl on Facebook and Twitter. Her research paper is published @ [www.frontiersin.org/integrative\\_neuroscience](http://www.frontiersin.org/integrative_neuroscience).

Dr. Garneau recently presented a TEDxYouth@MileHigh talk about taste research and the engagement of citizen scientists. Find it @ [www.youtube.com/watch?v=FhM-ZPZO8JQ](http://www.youtube.com/watch?v=FhM-ZPZO8JQ).

## EXPLORE

You can contribute to science! You are invited to participate in the new Fatty Acids Taste Study. Participants rate and describe a series of dissolvable taste strips and list how everyone in their enrollment group is related, genetically or not. We welcome individuals and groups of friends to participate; family groups are encouraged, particularly twins. Children ages 8 to 17 are eligible for the study but must enroll with a legal guardian present. Enrollment is available daily from 9:30 a.m. to 4 p.m. in the Genetics of Taste Lab inside Expedition Health.

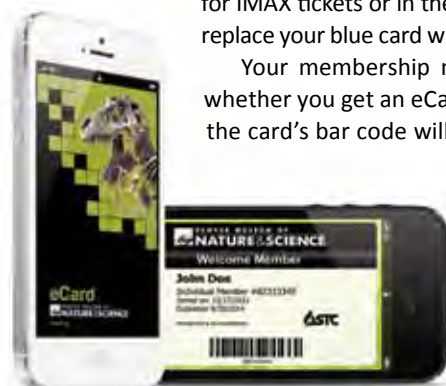




## ELECTRONIC CARD NOW AVAILABLE IN WINDOWS

The new membership eCard is now available for Windows! More than 7,000 members have downloaded the eCard from their app stores.

You can also get a plastic version of your updated membership card. When you make your next purchase at the Museum—such as for IMAX tickets or in the Museum Shop—we will replace your blue card with a new green card.



Your membership number stays the same whether you get an eCard or a plastic card; only the card's bar code will change to complement our improved ticketing system. Find out more @ [www.dmns.org/membercard](http://www.dmns.org/membercard).

## PACK YOUR MEMBERSHIP CARD

Use your members benefits at more than 290 museums and science centers nationwide, through the ASTC Passport Program. Typically you will need a photo ID and your Denver Museum of Nature & Science membership card to redeem. Find out more @ [www.astc.org/members/passlist.htm](http://www.astc.org/members/passlist.htm).

## BRINGING GUESTS TO THE MUSEUM?

- Among the basic membership levels, Family Plus is the first level that admits guests! For all other membership levels, only the named members of the household can visit on the membership.
- SCFD Free Days allow the community—and your nonmember guests—free admission to the Museum. Dates for Free Days are available at [www.dmns.org/about-us/scfd-free-days](http://www.dmns.org/about-us/scfd-free-days).
- Purchase an Add-On for just \$20 to add another person to your membership. Great for nannies, grandparents, and grandchildren! The Add-On member must be named.

## GET THE LATEST

If you are not receiving updates from us by e-mail, make sure you are staying in touch with Museum happenings by sending your e-mail address to [members@dmns.org](mailto:members@dmns.org). You'll always know the latest on exhibitions, programs, events, and other members-only insider information. Your e-mail address is used for official Museum business only.

## QUESTIONS?

303.370.6306 (daily, 9–5)

[members@dmns.org](mailto:members@dmns.org)

[www.dmns.org/members](http://www.dmns.org/members)

**THANK YOU FOR YOUR  
MEMBERSHIP SUPPORT!**

# LASERIUM®

## THE COSMIC LASER CONCERT


### Cosmic Laser Concerts Return!

Experience Laserium under the stars of Gates Planetarium featuring spectacular tributes to the music of Pink Floyd, The Beatles, Led Zeppelin, and U2. Today's Laserium has been enhanced with unique new laser technologies and effects that just have to be seen to be believed, all performed live by a master laserist.

#### Friday & Saturday Nights!

<i>Laserium Beatles</i> .....	5 p.m.
<i>Laserium Pink Floyd:</i> <i>Dark Side of the Moon</i> .....	6:15 p.m.
<i>Laserium U2</i> .....	7:30 p.m.
<i>Laserium Led Zeppelin</i> .....	9 p.m.
<i>Laserium Pink Floyd:</i> <i>Dark Side of the Moon</i> .....	10:15 p.m.

**Members receive a discount on tickets!**  
Advance reservations recommended.  
Buy tickets at [www.dmns.org/planetarium](http://www.dmns.org/planetarium).  
No passes accepted. Limited engagement.

 **DENVER MUSEUM OF  
NATURE & SCIENCE**



NON-PROFIT  
ORG.  
U.S. POSTAGE  
**PAID**  
DENVER CO  
PERMIT NO 1253

**Wednesday, July 23**  
**6–9 p.m.**

Enjoy this FREE exclusive evening for all members and help us celebrate the new Morgridge Family Exploration Center and Rocky Mountain Science Collections Center.

- Explore the **brand-new Discovery Zone** for families with young children!
- Check out the **skies through telescopes** on the new Nature Plaza (weather permitting).
- Catch a live performance of **Science on the Fly** in the Science Atrium.
- **Visit with scientists** in the new collections preservation area, typically closed to the public.

In addition to the new wing, the rest of the Museum will be open so you can enjoy your favorites!\*

- Catch mini **presentations by space scientists** and educators.
- Take in the **best view of Denver** from the Anschutz Family Sky Terrace.
- Experience the wonders of the cosmos in **Gates Planetarium**.
- Meet **Mr. Bones**, the dinosaur puppeteer.

This evening is free for members with an optional prepurchased dinner. Reservations required beginning June 13. Find out more at [www.dmns.org/memberevents](http://www.dmns.org/memberevents).

\*IMAX and the Maya exhibition will be closed this evening.

