AMERICAN MUSEUM OF NATURAL HISTORY

Media Inquiries: Aubrey Miller, Department of Communications
212-496-3409; amiller@amnh.org
www.amnh.org

November 2017

OUR SENSES: AN IMMERSIVE EXPERIENCE OPENS AT THE AMERICAN MUSEUM OF NATURAL HISTORY

RIVETING NEW EXHIBITION INCLUDES 11 INTERACTIVE GALLERIES THAT REVEAL HOW OUR BRAINS MAKE SENSE OF THE WORLD

OPENS NOVEMBER 20, 2017
PREVIEW DAYS FOR MEMBERS BEGIN NOVEMBER 17

In the new, highly experiential exhibition ***Our Senses: An Immersive Experience*** opening at the American Museum of Natural History, a series of 11 funhouse-like galleries dare visitors to rely on their senses—and then reveal how and why what we perceive is not all, or exactly, what's actually occurring around us. Inspired by extraordinary diversity of sensory "super powers" in species, including humans, across the natural world, ***Our Senses*** takes experiential exhibition to a new level. ***Our Senses*** opens for a weekend of Member previews beginning on Friday, November 17, and will be on view to the public from Monday, November 20, 2017, through Sunday, January 6, 2019.

"Our senses are essential to how we live and make sense of the world around us. They provide pleasure, warn us of danger, and allow us to interact with one another," said Ellen V. Futter, President of the American Museum of Natural History. "But how exactly do they work, why did they evolve the way they did, and what things are we not able to sense or perceive accurately? In a kind of 'sequel' to our 2010 exhibition about the brain, ***Our Senses: An Immersive Experience*** will explore the intriguing power of our sensory perceptions, offering our visitors not only highly enjoyable learning experiences, but an enriched perspective on what makes us human."

Human senses, and human brains, adapted over millennia to help our ancestors survive by shaping and enhancing their perceptions of everyday encounters. ***Our Senses***

(more)

reveals how until recently in our evolutionary history, humans have been oblivious to some of nature's ubiquitous signals, including UV and infrared light, very high- and very low-frequency sounds, and electric fields. With the advent of new technologies, scientists now know those signals are all around us—whether or not perceptible to us through our senses alone. But detecting things is not enough, because our ears and eyes alone cannot create a conscious perception—that requires a human brain. Human sensory perceptions may seem like windows into the outside world, but actual perceptions are created in the brain.

"How we sense the outside world has been on humans' minds probably since our species could think about thinking," said ***Our Senses*** curator Rob Desalle, who is a curator in the Division of Invertebrate Zoology. "The evolutionary nature of how and why we sense our surroundings the way we do made this a perfect topic for our museum to explore. This exhibition will immerse visitors in galleries that test their senses, and give them some tools to approach the age-old human question of how we sense the world."

Visitors will experience 11 interactive galleries designed to test perceptions and illuminate the complex relationships between sensing and perceiving. A musical soundtrack uniquley customized for each space, will enhance the immersive experience. In addition, a live presenter in the exhibition gallery will invite visitors to discover why humans have senses and what's unique about human perception—including why human beings are the only species that creates imaginary sensory experiences and shares them with others through language.

SEEING

What we see always depends on light and also on specialized cells in our eyes that detect light intensity and color. While humans typically have three kinds of these cells (called cone cells), most other mammals only have two, so they see a much smaller range of colors than we do. Marine mammals, such as seals and whales, have only one kind of cone cell, meaning they see no color at all. In this gallery, decorated walls lit with an alternating series of colored lights will reveal just how much a world bathed in white light can differ from one illuminated in blue, green, or red.

DETECTING

As it turns out, there are entire categories of color—like infrared and ultraviolet—invisible to the human eye but vital to the survival of other species. In this gallery, **visitors can explore a garden through the eyes of a bee or a butterfly, encountering larger-than-life models.** For insects looking to feed on the nectar and pollen in the center of blossoms, flowers appear like enormous targets, with ultraviolet marks that help insects find a place to land and to enjoy a meal. **An infrared viewer will allow visitors to hunt like a snake and find prey by the heat they generate.**

Just as there are colors we cannot see, there are also sounds we cannot hear. Humans evolved to detect certain frequencies, while some animals, including mice and rats, communicate at ranges we can't perceive without the aid of technology. It turns out, for example, that when slowed down, some rodent squeaks sound like laughter. **Visitors can turn a dial to bring a variety of animal sounds normally outside the range of our hearing into soundbites human ears can perceive**—including the calls of a fin whale, forest elephant, house mouse, and Indiana bat. They will also discover that a male peacock, when creating its dazzling mating display, produces secret, low-frequency sounds by rattling its tail feathers.

HEARING

We hear with the help of some 15,000 cells arranged in rows deep inside our ears—and with our brain's selective filter. High-pitched sounds trigger cells near the outer part of the cochlea (the spiral cavity of the inner ear), while deeper sounds activate cells farther in. With age, hair cells near the front of the cochlea often die—one reason older people have trouble hearing high-pitched sounds. In some animals—including birds and reptiles—hair cells naturally regenerate, so researchers are hoping to find ways to help human hair cells do the same. **An audio collage in this gallery challenges visitors to test their skill at tracking individual sounds**, such as a certain creature in a natural setting or an individual instrument within an orchestra.

SELECTING

Our senses flood our brain with information—how can we pay attention to it all? This gallery discusses what helps us focus—and why our eyes jump to certain features, with our

brain filling in the rest. Visitors will be able to try a **variety of experiences that reveal how our brains are wired to prioritize certain signals and focus on particular cues and details, such as movement or human faces**. Our perceptions are also shaped by whatever is happening around us. Senses can influence each other, which is why the loud, crunching sound of potato chips can make them seem fresher and tastier.

BALANCING

Every moment of every day, your brain performs a balancing act between the information you see, feel, and sense with the organs in your inner ears. What happens when those streams of information clash? In one gallery, **visitors will discover what happens when our senses disagree: though their feet will feel a flat floor beneath them, their eyes will see walls and a floor that appear to curve and ripple**. (Some visitors may feel off balance, but will be able to bypass the gallery if they prefer.)

CORRECTING

Perceptions don't come solely from our eyes and ears. They're produced by our brains. A series of activities in the exhibition allow visitors to explore what our brains are actively creating, how different inputs from sensory organs are pieced together, filling in the gaps, and even overruling our senses when needed. When an image is incomplete, or inconclusive, our brain figures out the most likely interpretation and shows us that. Visitors can **look through a pair of goggles that upend the information the brain receives from the eyes**—when hands move up, the brain sees them moving down—making it harder to handle objects and put them in their proper place. But as long as there is a consistent relationship between what you see and where your hands go, your brain will figure it out—often in less than a minute.

As we read, our eyes sense the shape of the letters, but our brain supplies the meanings, interpreting everything we see, not just what we read. Understanding anything in our culture, whether a wedding, funeral, holiday party, or football game, requires learning cultural codes, which affect how we perceive everything around us. In the West, a white dress represents purity and a red dress suggests sexuality. In China, red is linked with the life-giving Sun and is an auspicious color for Chinese brides, while white suggests funeral-

wear. **A case of cultural objects from the Museum's Anthropology collection explores the traditional Chinese five-element theory,** with artifacts that include a monkey puppet toy (linked to the element Metal), a Korean fish-shaped water vessel (Wood), a jade pig paperweight used to secure the delicate paper used in Chinese painting and calligraphy (Water), miniature clay fruits purchased in a Chinese New Year market around 1900 (Earth), and a red carved lacquer bowl (Fire) associated with joy and happiness and bearing a "double happiness character" representing marriage.

TOUCH

Our sense of touch isn't just one sense—it's many, with nerve endings to feel hot, cold, extreme temperatures, pressures, textures, pain, even itch. Our brain knits together information from all of these sensations to create a unified perception. Three-dimensional models of specialized touch receptors **show how complex our touch system really is, with different types of touch signals traveling from our skin to our brain along different pathways**. **Merkel receptors** detect subtle differences in pressure when we touch something and send a steady stream of messages to our brain. Capsule-like sensors called **Meissner corpuscles** detect sensations like a gentle breeze or a mosquito landing on our skin--these tiny changes in pressure cause the nerves to fire a burst of signals to our brain. **Ruffini receptors** are bundles of intricately branching nerve endings that sense when skin is stretched while wiggling our fingers or grabbing an object and help us fine-tune our grip. Made up of many layers of fiber and flattened cells, **Pacinian corpuscles** react to the rapid changes in pressure caused by vibrations like the rumble of a subway train.

SMELL

All day, from the glass of orange juice at breakfast to the afternoon cup of tea, our noses are decoding mixes of molecules—and our brain is linking aromas to memories to help us recognize familiar scents. With around 400 types of odor-sensing cells, and a virtually endless variety of odor molecules that trigger different combinations of these cells, we can likely perceive millions of odors or more. Most scents come as a bundle: the aroma of roasted cacao beans, the main ingredient in chocolate, is made up of around 600 fragrant chemicals.

A smell test invites visitors to unpack the fragrance notes in a complex scent, since what we perceive as a particular odor is actually a symphony of smells.

EXTENDING OUR SENSES

Humans have an advantage: we can extend our senses with technology, using tools to detect things our bodies cannot sense. The final gallery of the exhibition will illustrate how we are using technology to enhance our capacity to detect and perceive the universe around us. A scanning electron micrograph shows details of a mosquito's foot that cannot be seen with the naked eye, a diffusion spectrum image reveals three-dimensional pathways connecting neurons inside a living brain, ultraviolet fluorescence imaging distinguishes among species of scorpions, and satellite images of harsh desert environments provide information about the expansion of deserts and predict those areas at risk of soil degradation and erosion.

The next frontier in extending our senses? Machine learning. Computers can learn to perceive the world around them using artificial neural networks--computing systems that mimic the way that human brains learn. To test a computer's learning abilities, visitors will be invited to arrange puzzle-like pieces atop a sensor to create pictures of common, everyday objects, such as a butterfly, house, or car, and challenge the computer to guess what it is based on prior input. Over time, the computer records the different ways individuals choose to create images of the various objects and becomes more adept at recognizing them.

EXHIBITION ORGANIZATION

Our Senses is curated by Rob DeSalle, a curator in the Museum's Division of Invertebrate Zoology. DeSalle has overseen several major exhibitions, including ***Brain: The Inside Story***, which explored how the human brain uses molecular, chemical, and electrical signals to interpret information and learn at every stage of life.

Our Senses will be open from Monday, November 20, 2017, through Sunday, January 6, 2019. Members will be able to preview the exhibition starting on Friday, November 17, through Sunday, November 19. Following the exhibition's opening, OLogy, the Museum's science website for kids, will launch an exhibition-related feature about optical illusions and what they reveal about the human brain and our species' evolutionary past.

The exhibition is designed and produced by the American Museum of Natural History's award-winning Exhibition Department under the direction of Lauri Halderman, vice president for exhibition.

Our Senses is generously supported by Dana and Virginia Randt.

AMERICAN MUSEUM OF NATURAL HISTORY (AMNH.ORG)

The American Museum of Natural History, founded in 1869, is one of the world's preeminent scientific, educational, and cultural institutions. The Museum encompasses 45 permanent exhibition halls, including those in the Rose Center for Earth and Space and the Hayden Planetarium, as well as galleries for temporary exhibitions. It is home to the Theodore Roosevelt Memorial, New York State's official memorial to its 33rd governor and the nation's 26th president, and a tribute to Roosevelt's enduring legacy of conservation. The Museum's five active research divisions and three cross-disciplinary research centers support approximately 200 scientists, whose work draws on a world-class permanent collection of more than 34 million specimens and artifacts, as well as specialized collections for frozen tissue and genomic and astrophysical data, and one of the largest natural history libraries in the world. Through its Richard Gilder Graduate School, it is the only American museum authorized to grant the Ph.D. degree, and, beginning in 2015, the Master of Arts in Teaching (MAT) degree, the only such freestanding museum program. Annual visitation has grown to approximately 5 million, and the Museum's exhibitions and Space Shows are seen by millions more in venues on five continents. The Museum's website, mobile apps, and MOOCs (massive open online courses) extend its scientific research and collections, exhibitions, and educational programs to additional audiences around the globe. Visit **amnh.org** for more information.

Hours

The Museum is open daily, 10 am–5:45 pm. The Museum is closed on Thanksgiving and Christmas.

Admission

Museum admission is free to all New York City school and camp groups.

Pay-what-you-wish admission is available only at ticket counters, where the amount you pay is up to you.

General Admission, which includes admission to all 45 Museum halls and the Rose Center for Earth and Space but does not include special exhibitions, giant-screen 2D or 3D film, or Space Show, is $23 (adults), $18 (students/seniors), and $13 (children ages 2–12). All prices are subject to change.

General Admission Plus One includes general admission plus one special exhibition, giant-screen 2D or 3D film, or Space Show: $28 (adults), $22.50 (students/seniors), $16.50 (children ages 2–12).

General Admission Plus All includes general admission plus all special exhibitions, giant-screen 2D or 3D film, and Space Show: $33 (adults), $27 (students/seniors), $20 (children ages 2–12).

Public Information

For additional information, the public may call 212-769-5100 or visit the Museum's website at amnh.org.

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