New Smithsonian Triceratops Unveiled
65 Million Year-Old Dinosaur Gets a 21st Century Facelift and Name

On May 24 a new, more accurate and dynamic, cast skeleton of *Triceratops*--one of the last dinosaurs to roam the Earth--will be unveiled at the Smithsonian’s National Museum of Natural History.

The new *Triceratops* skeleton, the result of Smithsonian research using cutting-edge technology, will reveal a different posture for the iconic three-horned dinosaur. The new mount and its accompanying exhibition also will show for the first time an accurate dinosaur skeleton in virtual motion.

The Smithsonian *Triceratops* will be given a name according to a winning entry written by a student in a nationwide contest sponsored by USA Weekend. The student will be on hand for the May 24th unveiling.

History of Triceratops

*Triceratops* (“three-horned face” in Greek) lived 65 million-70 million years ago, and was one of the very last dinosaurs before they became extinct. It belonged to the Ceratopsia, the horned dinosaur group.

The Smithsonian *Triceratops* was collected in Wyoming in the 1891 by John Bell Hatcher, during the time of great dinosaur discoveries in the American West. Hauled out of its quarry by horse-drawn wagon and shipped on the new Transcontinental Railroad, it was brought east to the Smithsonian, where in 1905 it became the first mounted dinosaur skeleton set up in life-like position in the world.

After nearly a century on display, through years of fluctuating vibration, heat and humidity, many *Triceratops* bones were found to have cracks, making them very fragile. Some bones had developed pyrite disease, a condition in which the mineral pyrite grows within the bone and breaks it up from the inside. In the process of restoring the original fossil, special hardeners were used to fill the cracks and stanch the pyrite disease. Each original bone is stored in a special padded jacket to hold them stress-free.
The Process Leading to the New Skeleton

The new skeleton is a product of cutting-edge technology that addresses some inaccuracies of the original *Triceratops*. The original mount included bones from more than a dozen individual *Triceratops*, sculpted elements, and foot bones of a duckbill dinosaur to replace missing *Triceratops* bones. The Smithsonian staff and partners in the digital technology industry replaced these mismatched or sculpted bones by prototyping more appropriately sized and shaped bones from computer data files.

These data files were created by surface scanning each bone in three dimensions to record them in the highest detail. Each bone data file is accurate to .15 mm. These data could be sent to a stereolithography machine which carves the shape in a plastic-cellulose composite material, or grows it out of a bath of photosensitive plastic polymer. Several bone replacements were created this way to complete the new skeleton, which is made mostly of casts in plaster, fiberglass cloth and expanding foam that were molded from the original bones.

This modeling process also allowed Smithsonian staff to have a 1/6-scale model of *Triceratops* produced. About the size of a dog, this model was used by Smithsonian scientists and other specialists to assess each joint in the *Triceratops* skeleton and reconstruct the new posture. This led to mounting and animating the most realistic posture and movements for *Triceratops* ever seen by humans.

Digital Dinosaur

*Triceratops* now exists accurately in the computer as fully rendered bones that can be sent to researchers as easily as e-mail. Researchers can make highly accurate measurements from the digital dinosaur, and do various analyses on shape and function of the bones. This data was used to analyze the posture and gait of *Triceratops*.

The Exhibit

The new *Triceratops* will be exhibited in its new posture, facing off with *Tyrannosaurus rex*, in the museum’s Dinosaur Hall. *Triceratops* and *Tyrannosaurus rex* lived at the same time and place, and probably encountered each other.

The permanent exhibit will include the original skull, the original left and right humerus and the prototype replacement left humerus of *Triceratops*. Visitors can also see the two-horned Diceratops, Stygiosaurus (a full skeletal mount of a baby), Centrosaurus, Protoceratops, Bagaceratops, Psittacosaurus, and for the first time ever at the Smithsonian, casts of four bone-headed dinosaurs, the Pachycephalosaurs. Touchable elements include a cast horn core of *Triceratops* and a 1/6-scale *Triceratops* skull in bronze.

An interactive video will show visitors the entire process of conserving, molding and casting, surface scanning, prototyping and researching the posture of *Triceratops*. The video includes animation of the new mount of *Triceratops* walking–as it would have been used in life.
The Smithsonian's National Museum of Natural History welcomed 9.5 million people during the year 2000, making it the most visited museum in the world. Opened in 1910, the museum is dedicated to maintaining and preserving the largest collection of natural history specimens and human artifacts in the world. The museum also fosters critical scientific research as well as educational programs and exhibitions that present the work of its scientists and curators to the public. The museum is part of the Smithsonian Institution, the world's largest museum and research complex. Located at 10th Street and Constitution Avenue in Washington, D.C., N.W. the museum is open free of charge to the public from 10 a.m. to 5:30 p.m., every day of the year except Christmas. For more information, call (202) 357-2700.

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