

An Integrated Curriculum For The Washington Post Newspaper In Education Program

## Discovery and Documentation

- Interview: Let's Meet a Dino's Mom
- Student Activity: Photography and Science
- Photo Essay: Shining Strands



NATIONAL GEOGRAPHIC EXPLORER-IN-RESIDENCE ENRIC SALA

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# Let's Meet a Dino's Mom

"Yeah, it's true. They call me 'The dino's mom.'" Wavy fair hair, clear cheerful eyes, a huge smile — Tiziana Brazzatti looks very nice, so that it's easy to start the interview with her.

## How did your story with dinosaur Antonio begin?

"It was April 25, 1994, and I was working on my geology dissertation. That's why I was wandering around a deserted quarry in Villaggio del Pescatore, a little seaside village near Trieste, a town in the far northeast of Italy. It wasn't my first time in the area, and I wasn't the first one to search it. In the 80s two people in love with fossils had found some specimen dating back to the reptiles age, probably dinosaurs.

Some years ago there even was a contestation about who discovered Antonio, as they declared to have been the first ones. I have always stated they were the first to signal the deposit of Villaggio del Pescatore, but I found Antonio's paw! And what an emotion!

Well, on that day of national holiday I was crawling alone among the prickly blackberry bushes, a compass in one hand and a little hammer in the other when I saw it. "But ... It's a reptile paw!" I burst out. I immediately understood it was going to be a big deal.

## How big is Antonio?

Antonio is four meters long and about 130 cm tall. It took six months of field work and 3,500 hours of lab preparation to extract it. It was necessary to use particular methodologies to isolate a series of big rock blocks and later to dissolve the rock without damaging the specimen. It took all the ability of the technician from Stonage (now Zoic), a local firm, the only Italian one working on reconstructing big dinosaurs, lead by Giorgia Bachhia, called the Lady of Dinosaurs.



ALESSANDRO STUPER

**Tiziana Brazzatti, above right, was a geology student when she discovered the leg of a dinosaur. A paleontologist and an archaeologist supervised the careful excavation of the intact, preserved bones deep in the rock.**

## Why was it named Antonio?

I certainly didn't. Being given the chance I would have chosen Louise, from the movie *Thelma and Louise*, even if we don't know what gender it is. But maybe it is Antonio because that's the name of the director of the excavations, and everybody kept calling his name.

## You said we don't know if it was a male or a female, then?

In fact, Antonio is the only sample of its species, so there is no way to compare its pelvis bones with others so to discover about it.

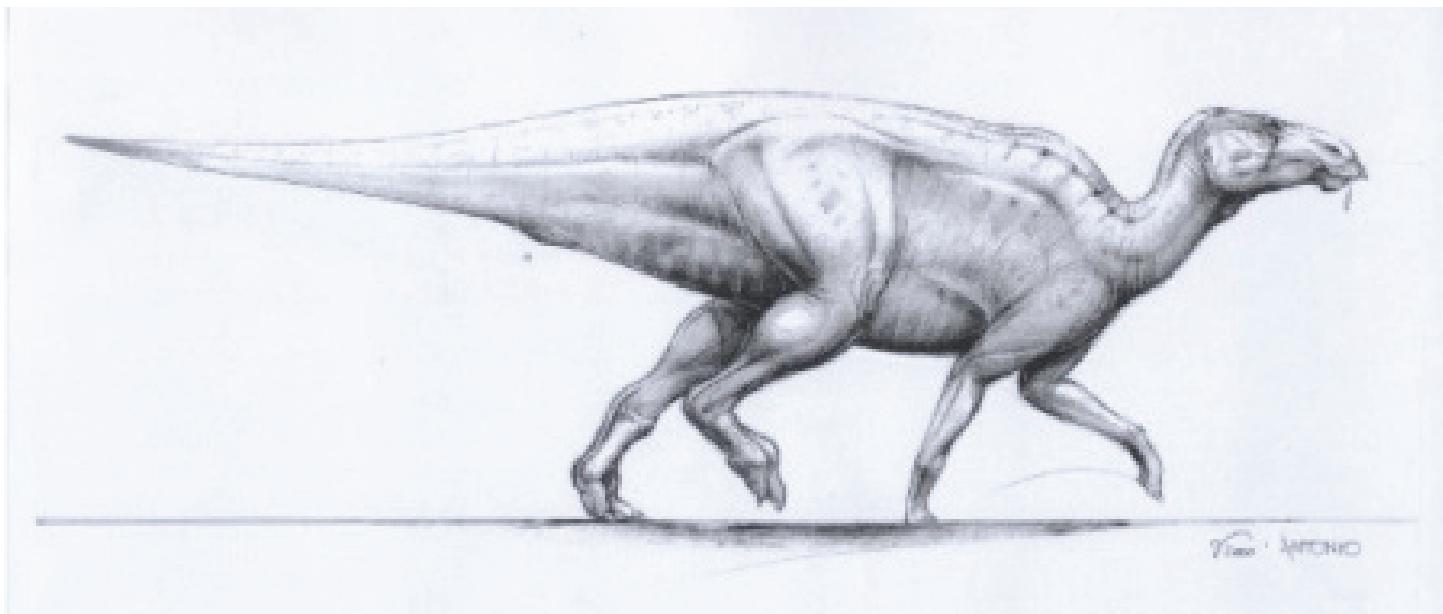
## Can you tell us more about Antonio?

He has got a big stretched head, similar to that of a horse, three-fingered hands, strong hind paws probably fit for running, a thin tail — maybe it was an herbivorous. Its characteristics tell it apart from its American cousins, *hadrosaurids*, in spite of the common feature of the duck-bill.

Antonio probably lived about 70 millions years ago (during the Upper Cretaceous) on an island of what is believed to have been a marine or lagoon environment. It probably suffered from

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Paleoartist Tullio Perentin uses his knowledge and skill to bring Antonio to life. Antonio's bones indicate that the *Tethyshadros insularis* was perhaps five to six years old.

TULLIO PERENTIN

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insular dwarfism. Its fossil shows fractures at all four paws and maybe that prevented it from finding food, so taking it to death.

### So it is an important discovery!

Very much so! It not only is the only sample of its species with all parts of the body connected, but it's also the most complete. We have got 98% of its body, only missing a tiny bit of its tail.

### You seem to be very proud! Did your dream come true?

I have dreamt to be a paleontologist from the very day, when I was 8, my mother gave me a book about fossils. Nowadays I teach Science and Math. Paleontology field isn't easy to work in, but I keep taking care of Antonio. It is at Trieste Natural History Museum, but I work with other volunteers on the site where he was discovered. There we found other fossils of dinosaurs, fish, plants, shrimps and primitive crocodile.

Anyway, should I ever forget about my passion there is my son Rymond to remind me. One of his first words was ... dinosaur!

— Giulia Basili

*with the assistance of Alessio Colonna, Rocco De Rinaldis, Chiara Di Candia, Andrea Fontanot and Maria Elena Pais  
for the editorial staff of Muja Littlerary Review*



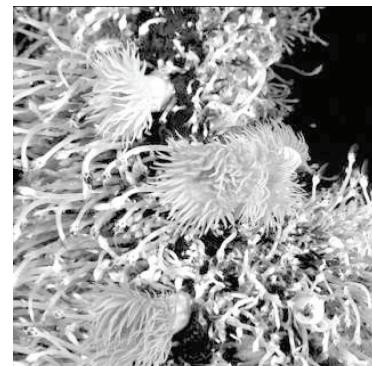
Teacher Lilia Ambrosi in front, colleagues Renzo Fornasaro and Valentina Marchesan, and students from four third-year classes at Scuola Nazario Sauro di Muggia, a little town near Trieste. These students, who are interested in journalism, conducted the interview of Tiziana Brazzatti.

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## Photography and Science: Seeing to Believe



ENRIC SALA



NATIONAL ENVIRONMENT RESEARCH COUNCIL



**Top, surgeonfish form schools in the thousands near the Southern Line Islands in the central Pacific Ocean. Top right, a remotely operated vehicle films barnacles and anemones near hydro thermal vents, and, below right, crabs in the icy sea near Antarctica.**

Photographs – no matter how the image is captured or processed – since the 1800's have been used to record history, tell stories and document discoveries. The technology has found its way from merely chronicling events to providing artistic expression, journalistic essays, and forensic evidence.

Looking at a photograph we feel emotion, see connections, are transported to other worlds and gain understanding.

Photography is as important as ever in scientific endeavors. It can be used to document methods, collect data, record discoveries, display landscape, capture weather conditions, and even render the night sky. There is communication power in photography. Pictures represent convincing documentation of the research and are an expected element in most scientific publications. Often, good pictures can

describe a project more quickly or succinctly than words. This can also be important in science fairs or poster sessions when an audience or judge is comparing and contrasting an exhibit against dozens of others.

Photography is also used as a recording tool. For example, you can measure the flight of a seed as it is dispersed through air, follow the track of a horseshoe crab as it moves across a grid on the bottom of an aquarium or even record the embryonic development of a sea urchin's fertilized egg through a microscope's lens. If an astronomer is recording the movement of Jupiter's moons, photography is necessary to make measurements. For organisms in the abyssal depths, photography may be the first and perhaps only documentation of new species' existence.

Photography and science are nearly inseparable.

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## Illustration

Photographs are an important element when it isn't feasible to transport delicate laboratory apparatus or live specimens to a presentation, lecture, or demonstration. Photographs can transcend different languages as a "how to" guide for scientific protocols or field methods.

Instead of showing multiple images and writing multi-paged examples, one representative image or photograph of a species can illustrate the concept. A photograph of an ice crystal can illustrate the structure to enhance a scientific description. Descriptions may be poetic but photographs are often astonishing.

Photographers often relentlessly pursue their subject willing to go anywhere and do anything to get a picture. Technical mastery, patience, an eye for composition, and physical stamina are often needed to illustrate effectively through photography. It is not always about the equipment. With a passion and understanding of their subject, the photographer often has his or her own unique way of seeing and making images.

Through this unique perspective, the scientists' and photographers' awe and enthusiasm are often conveyed as in this picture of the Eurasian eagle-owl.



BONNIE JO MOUNT/THE WASHINGTON POST

**Lola, a 14-year-old Eurasian eagle-owl, is one of Rodney Stotts's many birds of prey. Stotts is a licensed falconer who lives in Ft. Washington, Md.**

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## Explanation

Photographs are helpful or may be required if your paper is going to be submitted for publication. Often by studying a photograph, a detail that was not noticed during the event becomes evident. Comparisons of photos over time demonstrate changes not seen at a single observation.

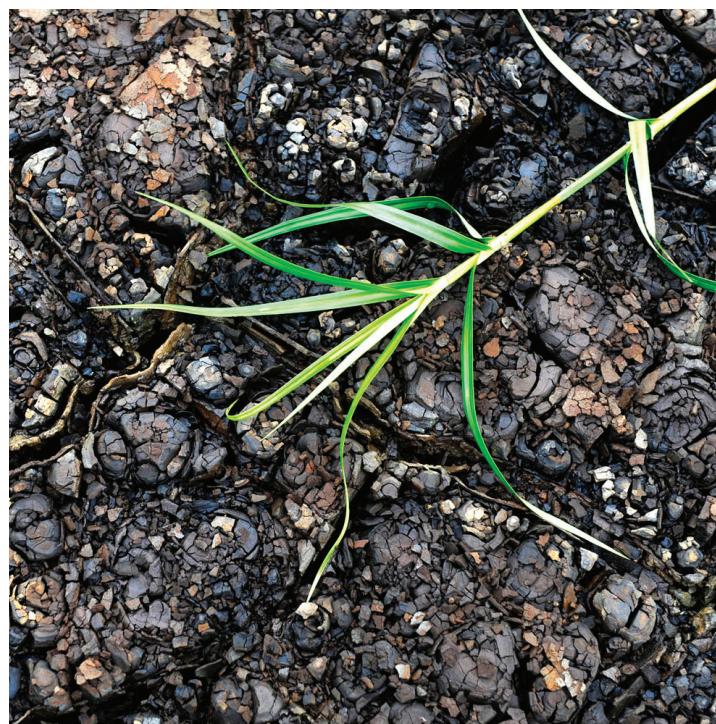
Photographs may provide different perspectives. Global images from space have provided an ongoing stream of data that have clarified and also raised questions about our understandings of Earth's terrain and water. From harmful algal blooms to tracking migration patterns of whales, satellite data can provide information

about weather patterns, ocean temperatures, and illegal fishers.

Special lenses and various techniques that have been developed can reveal phenomena that may only be seen in a much greater part of the electromagnetic spectrum not typically visible to the human eye. Infrared imagery, for example, can give insights into phenomena like heat and capture images where there is no visible light. It allows one to photograph through the aerial haze to capture a distant horizon. Special emulsions and wavelengths of light allow us to view the internal structure of leaves or determine if chlorophyll is fluorescing in a plankton sample.

Close-up photography and photography through a microscope, micrography, have enabled the human eye to see the smallest of structures providing invaluable details into the anatomy and physiology of organisms. Manipulation of nanotubes has provided electrical and mechanical properties not otherwise possible without highly detailed imagery.

Don't forget, it was a chance photograph of a molecule using x-ray crystallography by Rosalind Franklin that provided James Watson and Francis Crick the insight to determine the double helix structure of DNA.



**Indonesia is one of the worst offenders of carbon emissions which destroy the ozone layer. Carbon emissions come from slash and burn fires started by land owners who are clearing the area for palm oil plantations.**

**Since it's technically illegal, left, people set unattended fires such as this so they can clear land without retribution. Right, freshly burned peatland that land owners will use for the next, fastest growing cash crop.**

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## Documentation

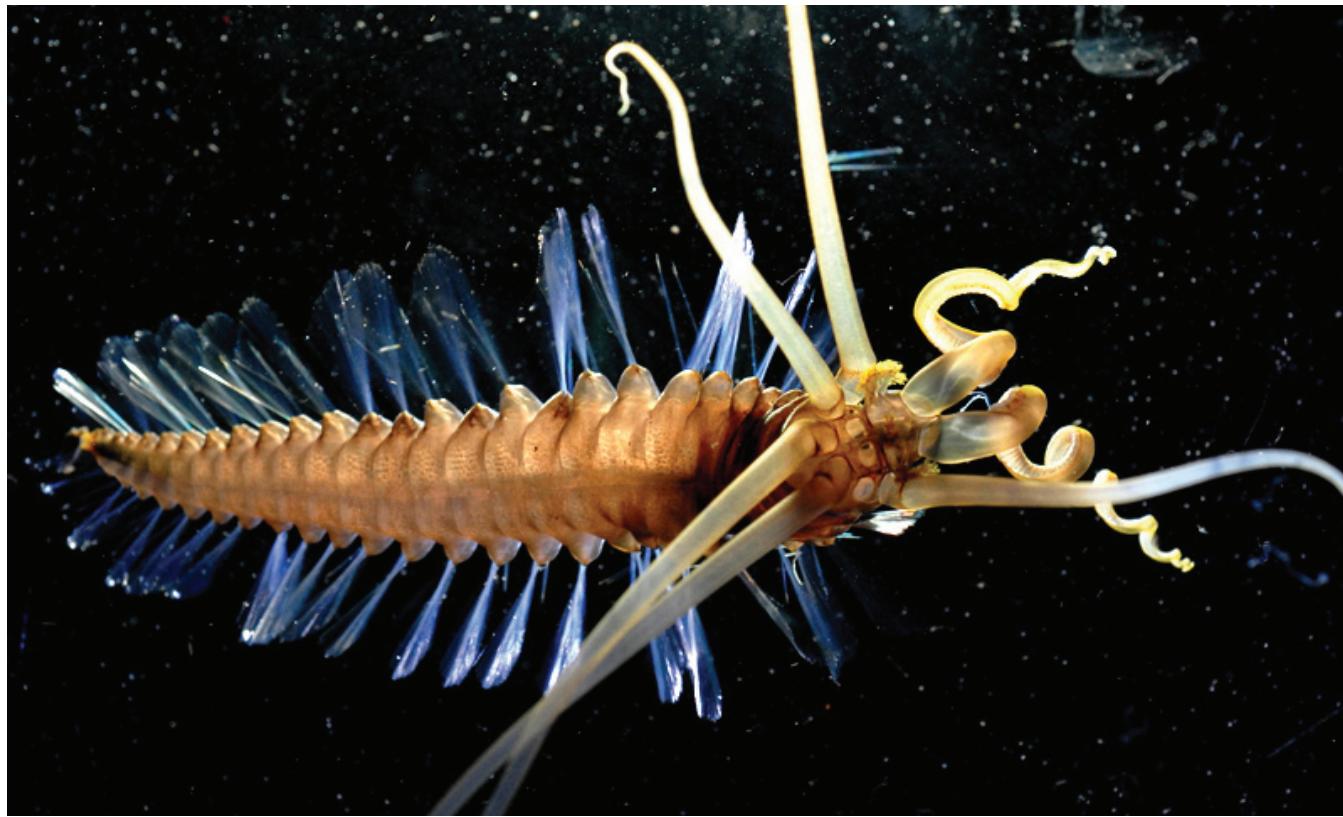
The drive to develop the first camera was a desire to document. It was a means to record an historic event, capture a family portrait or illustrate a scenic landscape. Traditional photography made it difficult for photographers who found themselves in remote locations far from accessing their dark rooms or a processing lab. For scientists or photojournalists, the need to process quickly meant that chemicals and processing equipment be carried with them into the field so that their images

could be examined immediately or sent through telephone lines.

Digital camera techniques have revolutionized the art and science of photography. From a political uprising to a chance weather disaster, it takes only seconds for anyone to upload an image for the World Wide Web to critique and archive. Critter cams provide 24/7 movement, interaction and habits of animals and plants in their habitats.

Traditional or digital photographs continue to be used to document and contribute to

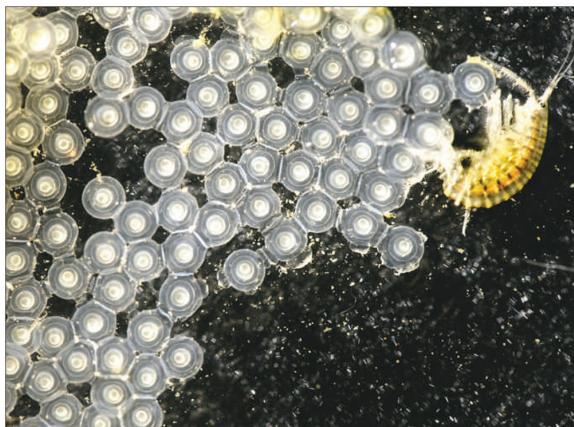
our understanding of science and nature. Photography is a project recording technique and a communication medium. Investigative procedures, project results, pre- and post-test results, and time recordings are effectively documented. It is an analysis tool and a measuring tool, chronicling epic adventures and creating a gallery of images to spark the imagination, making connections between disparate cultures and ideas, and providing a different lens with which to understand our world.



LAURENCE MADIN/WHOI

**In October 2007, U.S. and Filipino scientists traveled to the Celebes Sea in Southeast Asia, searching for new species. They discovered this extraordinary worm, which they named Squidworm.**

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**PHOTO ESSAY**

Gelatinous strands of newly laid yellow perch eggs drift in the brackish waters of Mattawoman Creek in Indian Head. Yellow perch can grow to 18 inches long and have been known to live as long as 13 years, according to the Maryland Department of Natural Resources. They are a popular sport fish in the state.

## Shining strands

PHOTOS AND TEXT BY LINDA DAVIDSON

In an important but less obvious sign of spring, yellow perch eggs appear in Mattawoman Creek. The fish make their annual spawning run into the creek, leaving 2-to-7-foot-long strands containing 28,000 to 60,000 eggs. Within weeks, the eggs hatch and the fry remain upstream until they gain in size. Earlier this year, Maryland denied a Charles County request to build a highway through the Mattawoman watershed area, which is considered a critical spawning ground for the Chesapeake Bay.

