

# ADVENTURES IN SPACE AND TIME

Interacting with science in 3D

Brian Jacobs, Senior Graphics Editor | Victoria Jaggard, Senior Science Editor



VIRTUAL TOUR

# Resurrecting a Dragon

An ancient underwater burial yields one of the best dinosaur fossils ever discovered.  
Take an exclusive 3-D tour of the find below.

↓ SCROLL TO CONTINUE

<https://www.nationalgeographic.com/magazine/2017/06/nodosaur-3d-interactive-dinosaur-fossil/>

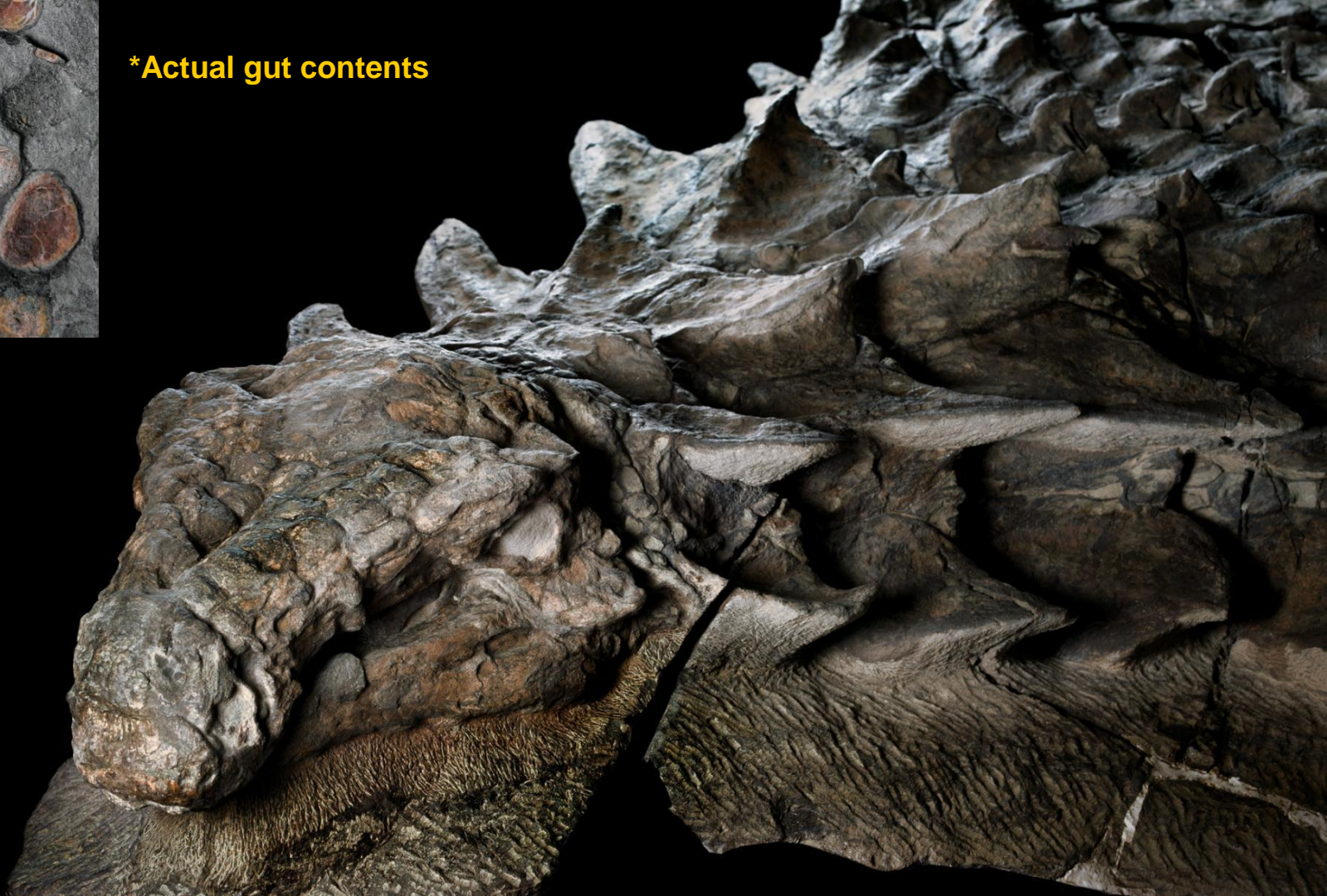


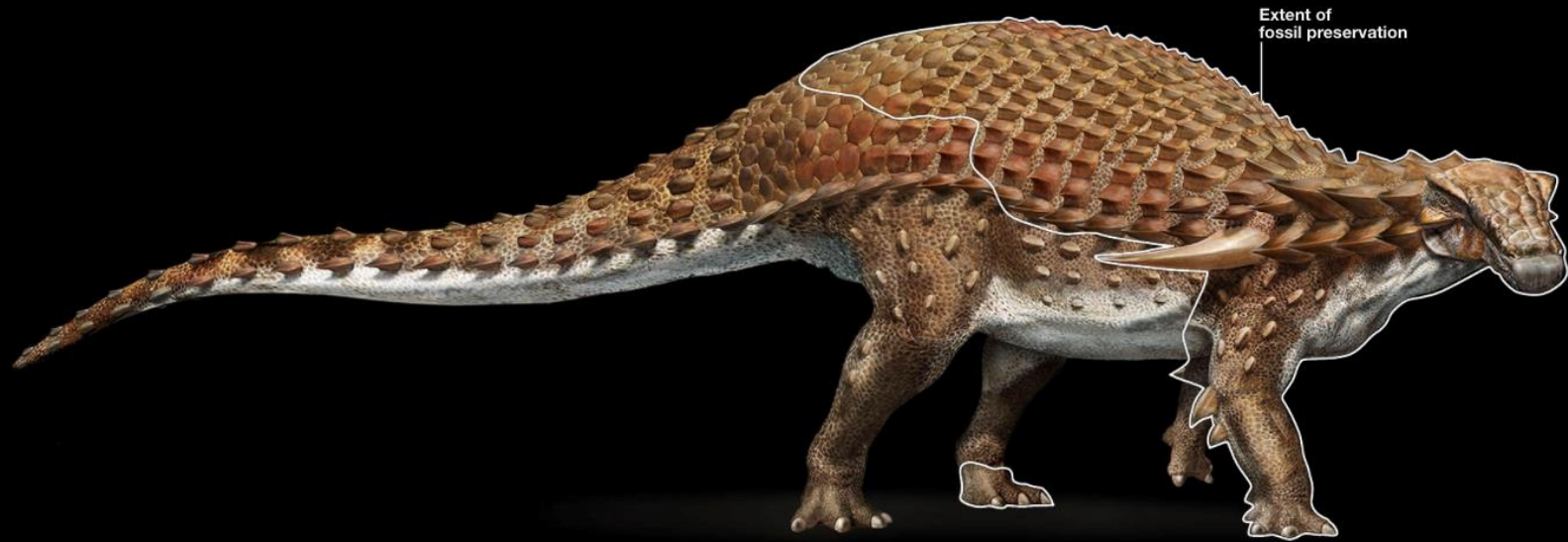


**Ankylosaur  
skeleton in the  
Senckenberg  
Museum in  
Frankfurt**

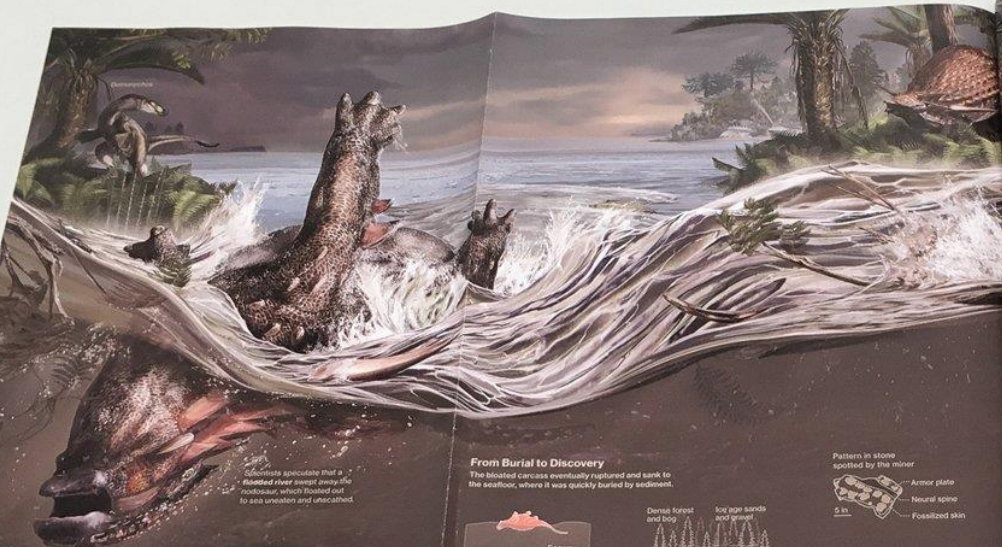
**(Image courtesy  
Wilfried Berns  
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**\*Actual gut contents**





18 feet (5.5 meters)



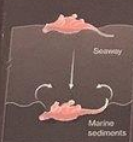
Scientists speculate that a flooded river swept away the nodosaur, which floated out to sea unharmed and unscathed.

## Trapped in Time

Few dinosaur fossils retain their true-to-life, three-dimensional shape, but the process illustrated here ensured that this nodosaur became a rare exception. Entombed in marine sediments, it lay in its grave for more than 110 million years, until an observant miner discovered it by chance.

### From Burial to Discovery

The isolated carcass eventually ruptured and sank to the seafloor, where it was quickly buried by sediment.



1 Sediments entombed the nodosaur's body. Over time, minerals impregnated the dinosaur's tissues, preserving its 3-D form in a stony sarcophagus.



2 Layers of sediment accumulated and hardened into stone. During the ice ages, retreating glaciers deposited more debris. In time, vegetation stabilized the soil.

Pattern in stone spotted by the miner



3 Oil-sands miners dug through the nodosaur's back half before noticing it. A keen-eyed worker then spotted unusual patterns in the rock: the nodosaur's armor.

### Paleo Jackpot

Weeks of patient excavation and years of preparation revealed a fossil that is a treasure trove for paleontologists, who will spend years studying the specimen and gaining new insights.



### Ancient Earth

North America was a very different place 110 million years ago. The nodosaur was buried in a large swampy flood plain, surrounded by the continent's interior, and it had probably lived near the warm, vegetation-rich coastline.



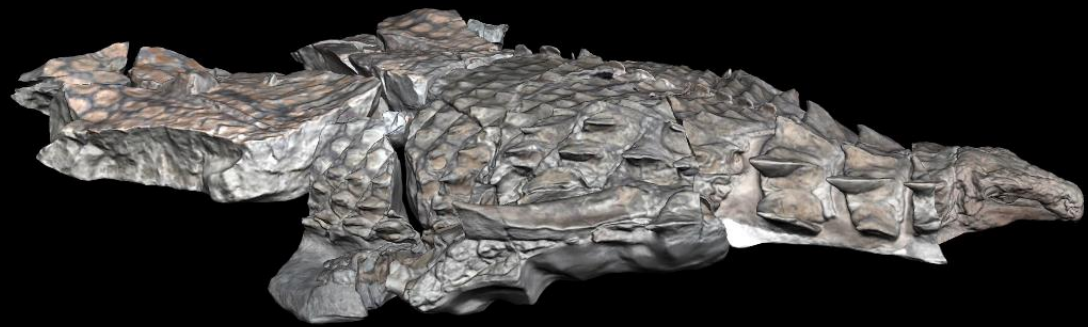
A fibrous mesh kept the nodosaur's armor in place in life and in death, thanks to mineral decay.

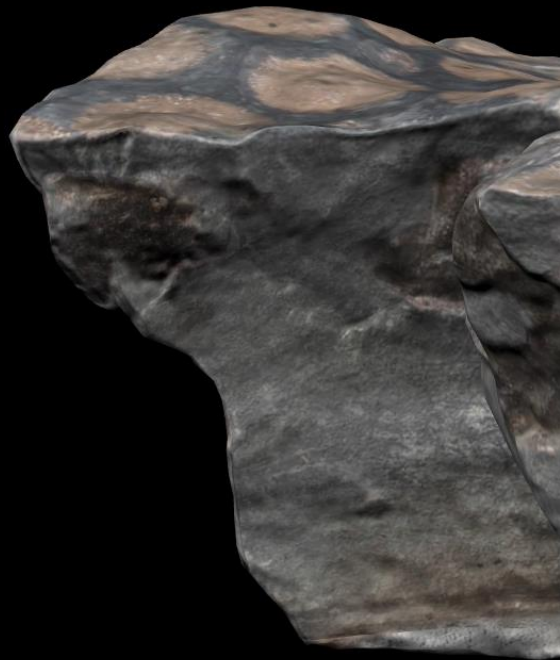
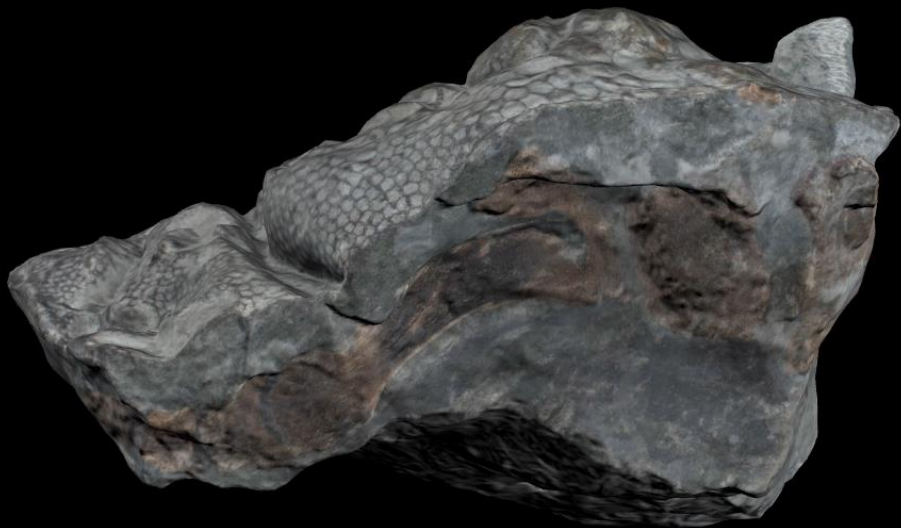
Nodosaurs and their ancestors roamed the continent during the Cretaceous period.



MANUEL GARCIA, MATTHEW W. CHAMBERLAIN, AND DAVID ORLANDI, NISM STAFF, PATRICIA HEALY, AND DAVID BONDAROVA. SOURCES: CALEB MARSHALL, BROWN, AND DONALD HENDERSON, ROYAL TYRRELL MUSEUM OF PALEONTOLOGY, JAMES WINTER, C. H. SCOTT, PALAEONTOLOGY PROJECT.









PHOTOGRAMMETRY



TEXTURE MAP

A detailed texture map of a dinosaur head, showing various textures like scales, feathers, and skin. The map is rendered in a grayscale, high-resolution format, typical of a texture map used in computer graphics.



NORMAL MAP

A normal map of the same dinosaur head, rendered in a blue and purple color scheme. The map shows the surface normals of the head, which are used to determine the lighting and shading of the model.

The background features a dark, textured, organic shape in shades of brown and black, resembling a rock or a piece of wood. This shape is overlaid with a complex, glowing blue wireframe mesh that forms a series of interconnected triangles and polygons, giving it a digital or 3D appearance. The overall aesthetic is high-tech and abstract.

# CLEANING AND OPTIMIZATION

# CASSINI'S GRAND TOUR

Nearly 20 years ago, NASA's Cassini spacecraft left Earth and began a seven-year journey across the solar system. Its destination? Ringed Saturn and its many, many moons. After more than a decade exploring the system, Cassini will plunge to its doom in the planet's atmosphere on September 15, 2017. Here, we take a look at Cassini's voyage and its greatest achievements.

By **Nadia Drake** and **Brian T. Jacobs**

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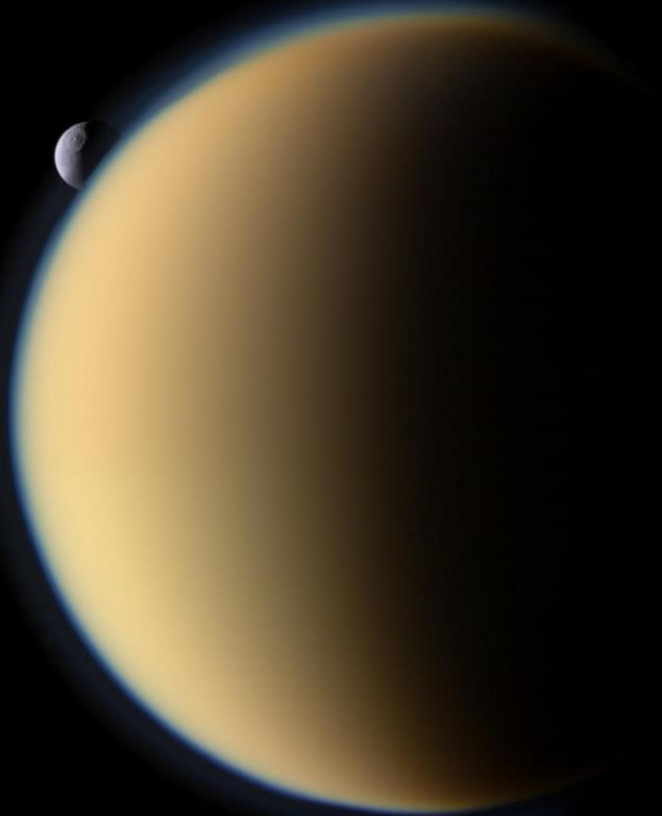
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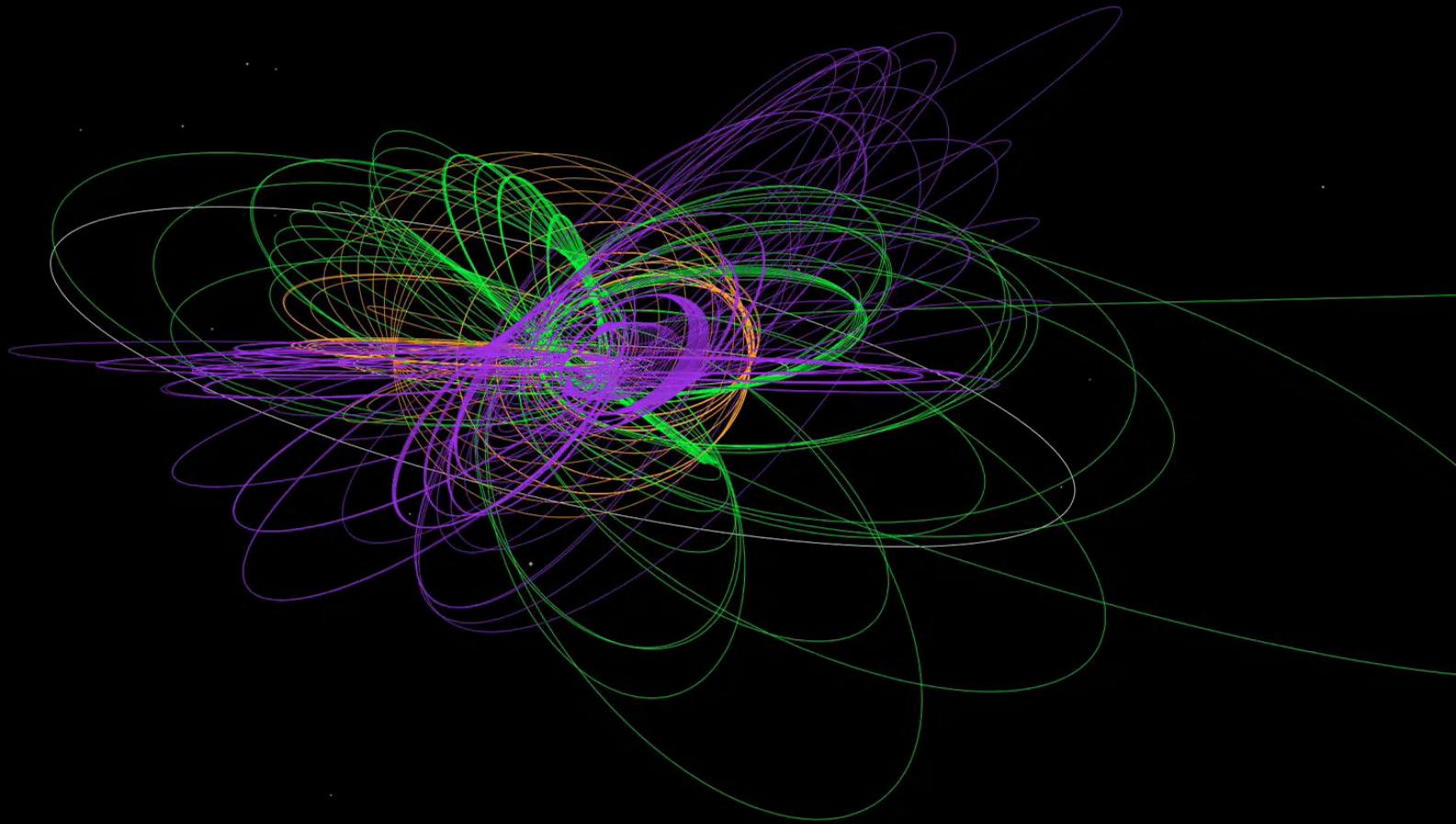


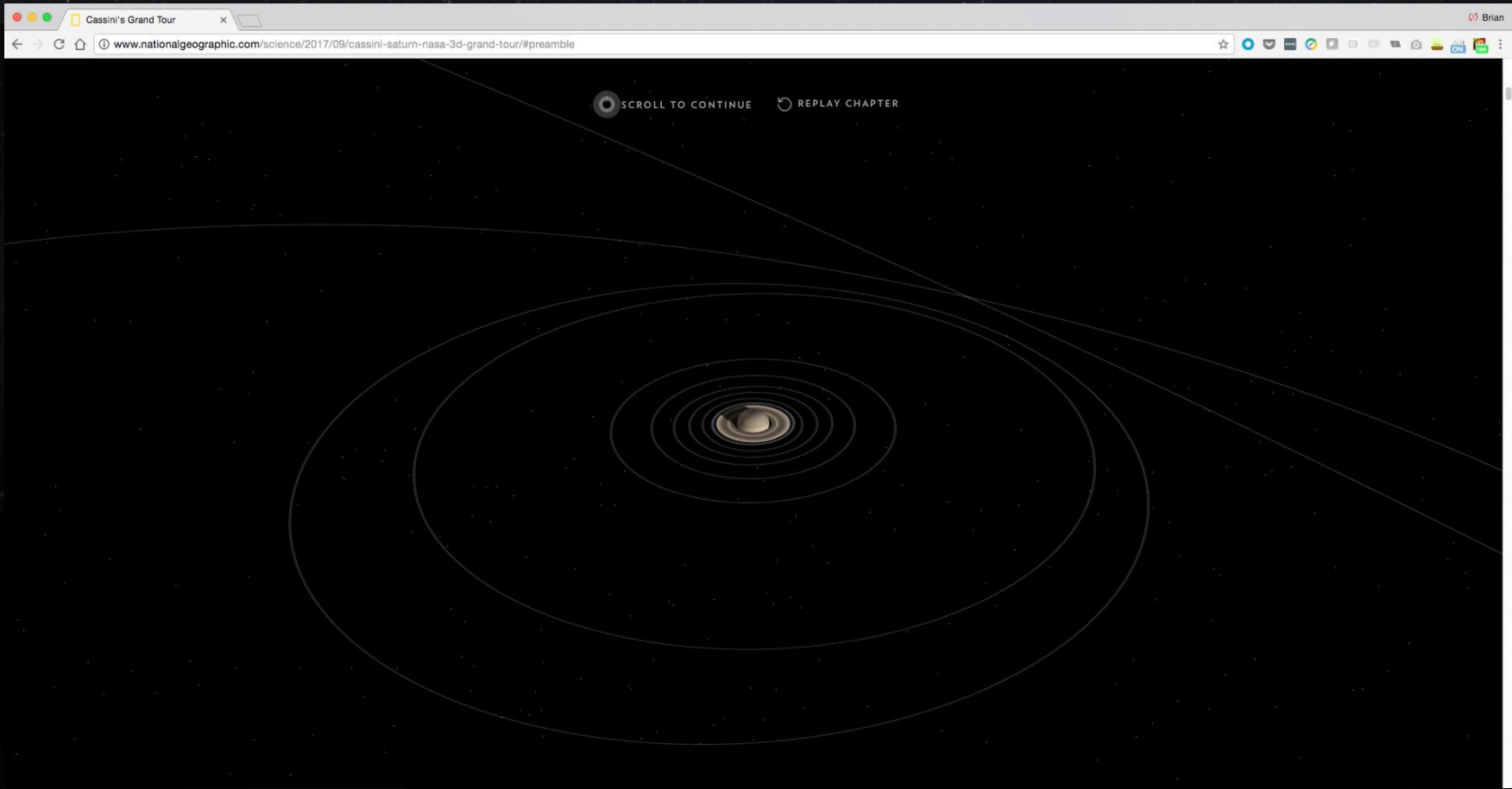
August 12, 2009. NASA/JPL/Space Science Institute

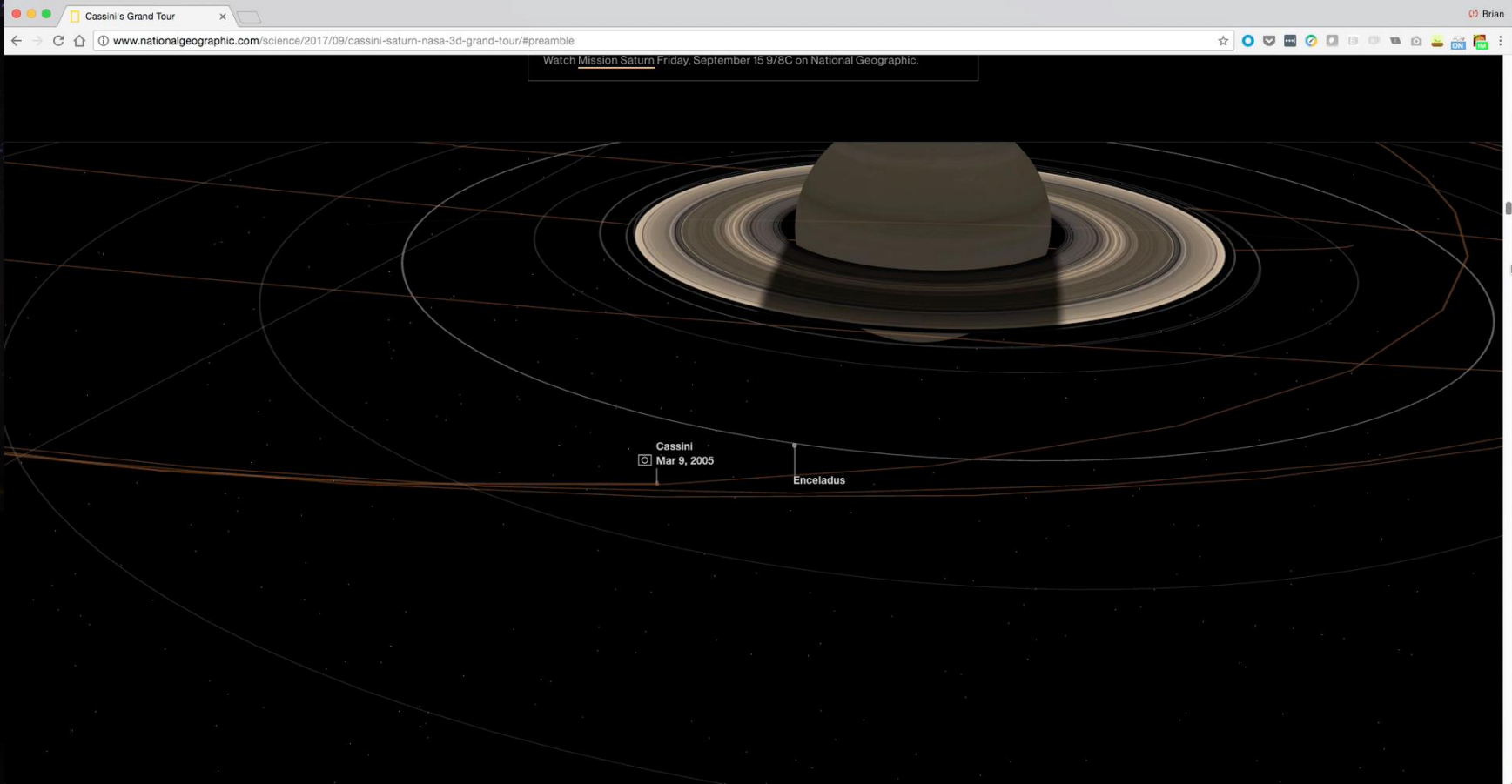
<https://www.nationalgeographic.com/science/2017/09/cassini-saturn-nasa-3d-grand-tour/>

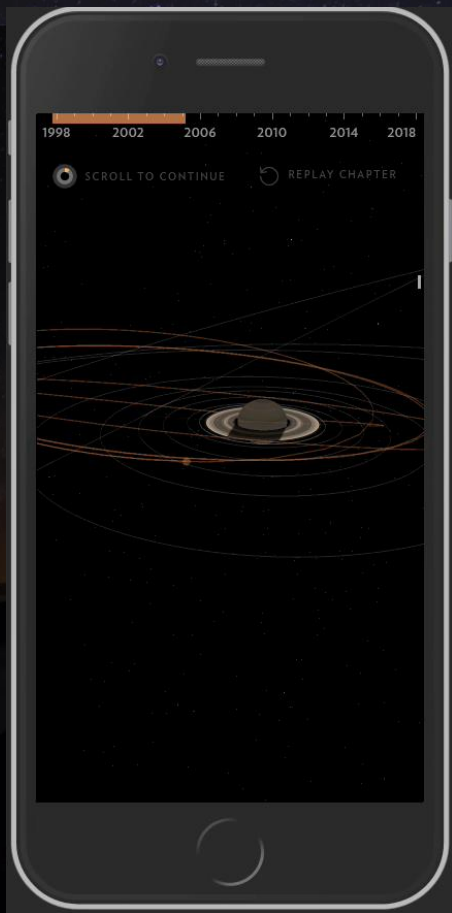
August 12, 2009. NASA/JPL/Space Science Institute













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REPLAY CHAPTER

Cassini  
July 16, 2017

# HOW DID I MAKE THIS?

Cassini's final moment  
Sept 15, 2017





SCROLL TO CONTINUE



REPLAY CHAPTER

Cassini  
July 16, 2017

← UH OH ANGLES

Cassini's final moment  
Sept 15, 2017



# 3D POSITIONS IN THE PAST, PRESENT AND *FUTURE* OF:

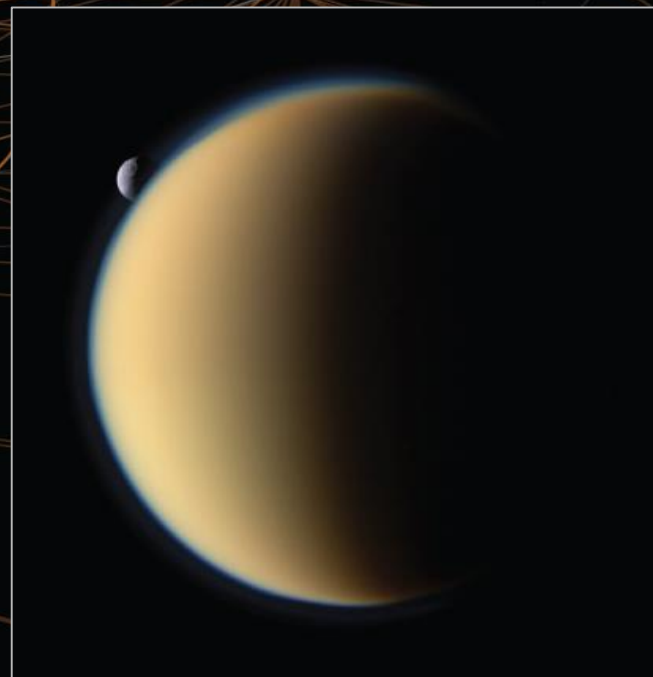
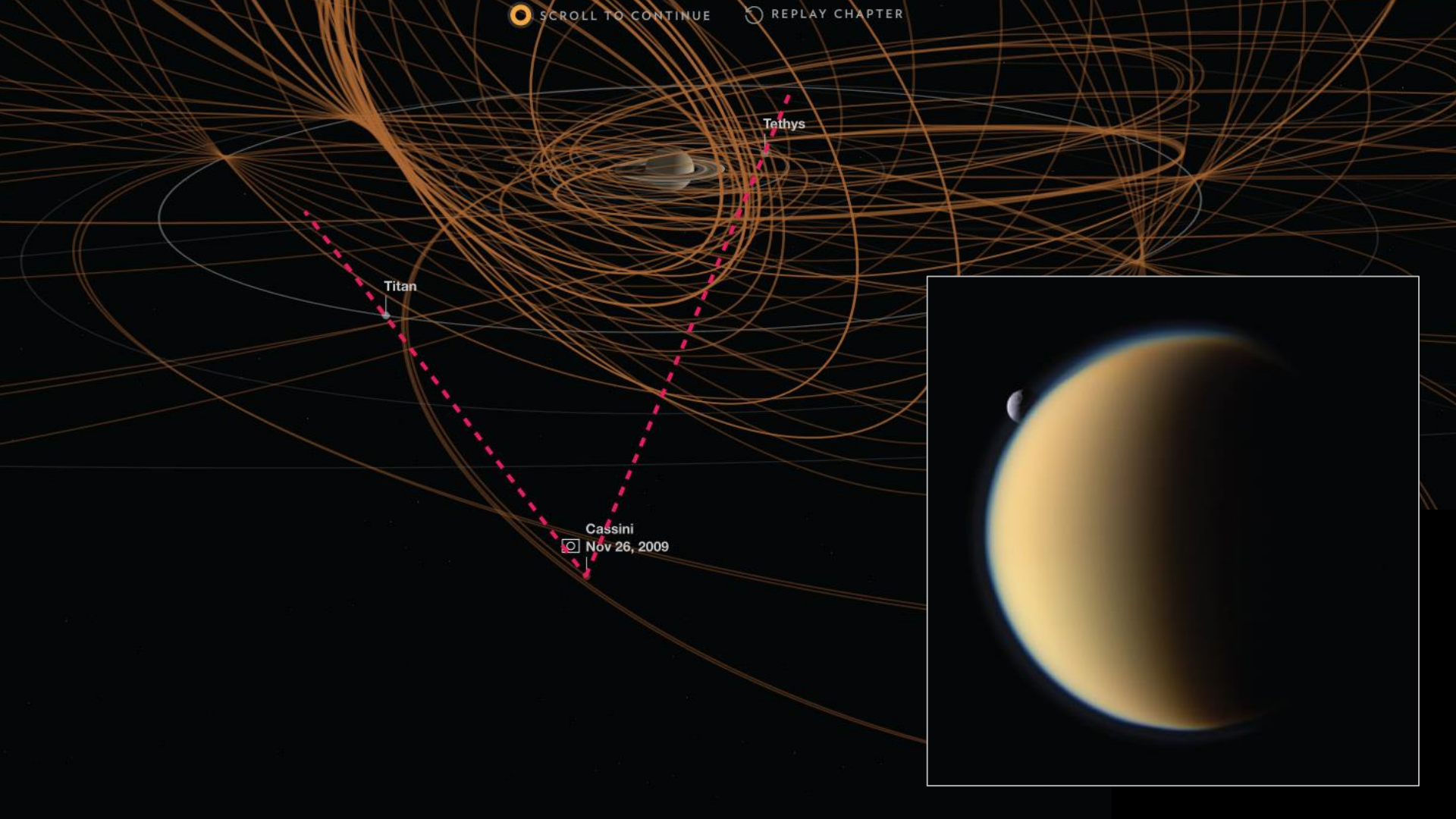
739,282 ASTEROIDS  
3,480 COMETS  
178 PLANETARY SATELLITES  
8 PLANETS  
THE SUN  
SELECT SPACECRAFT



SCROLL TO CONTINUE

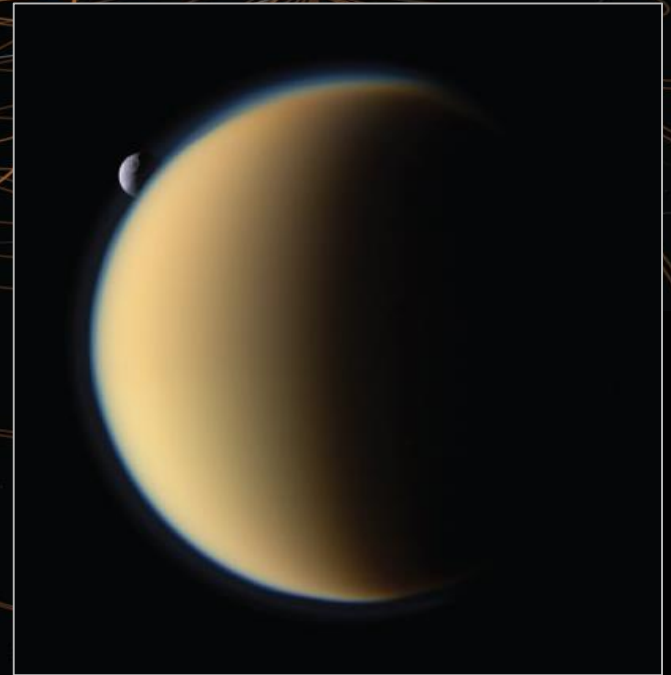
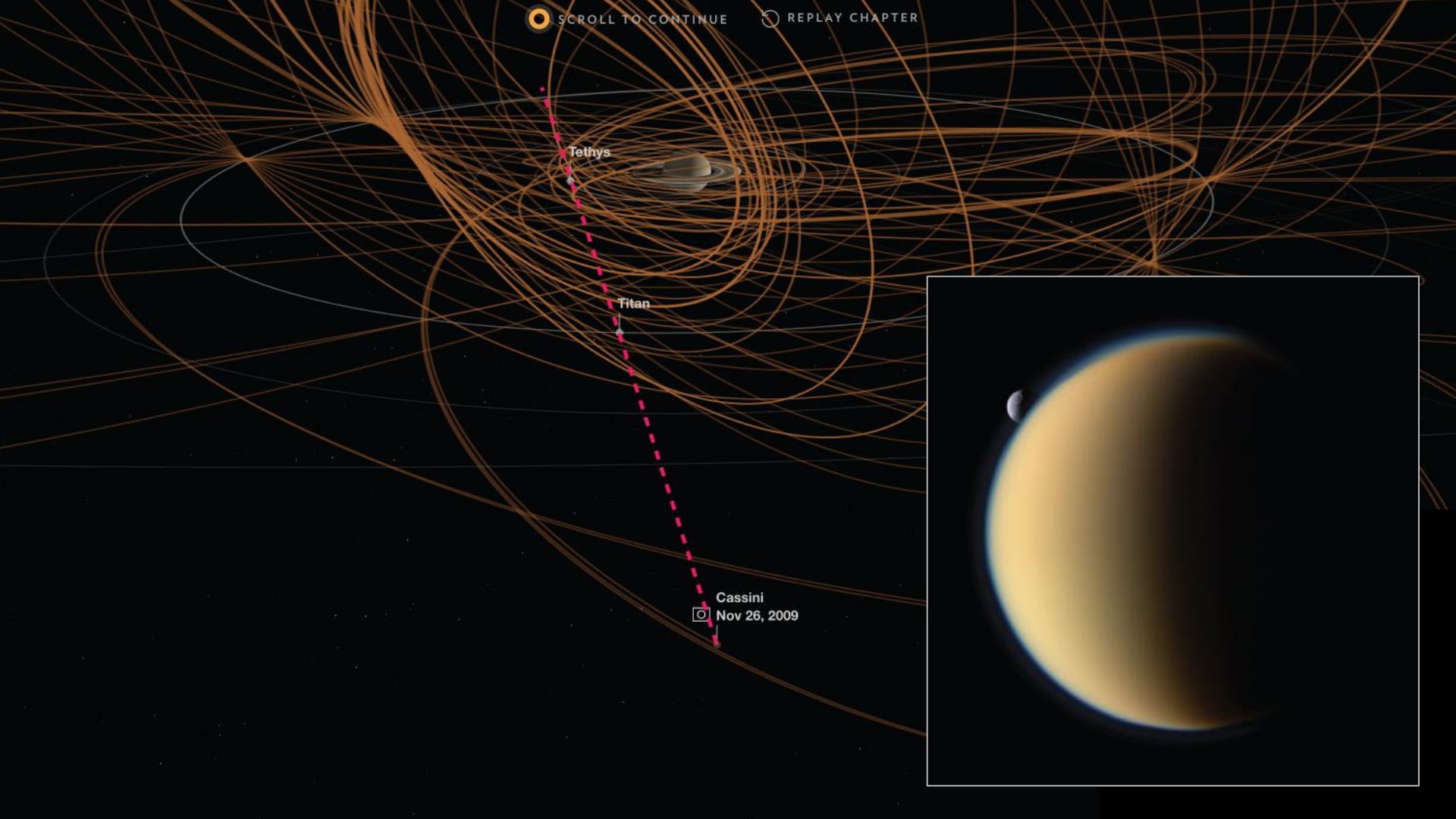


REPLAY CHAPTER



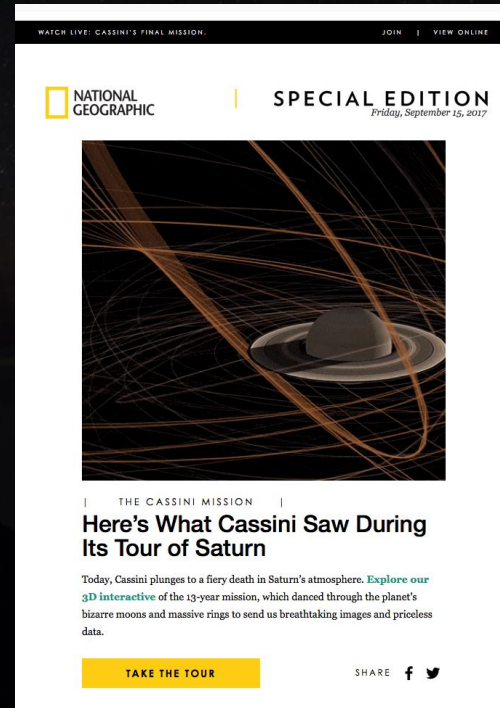
SCROLL TO CONTINUE

REPLAY CHAPTER



# SHARED ACROSS PLATFORMS

- Linked and embedded in News articles
- Shared on social and notified via Apple News
- Featured in a special edition newsletter
- Mentioned on the BBC and NPR
- 1.1 million users

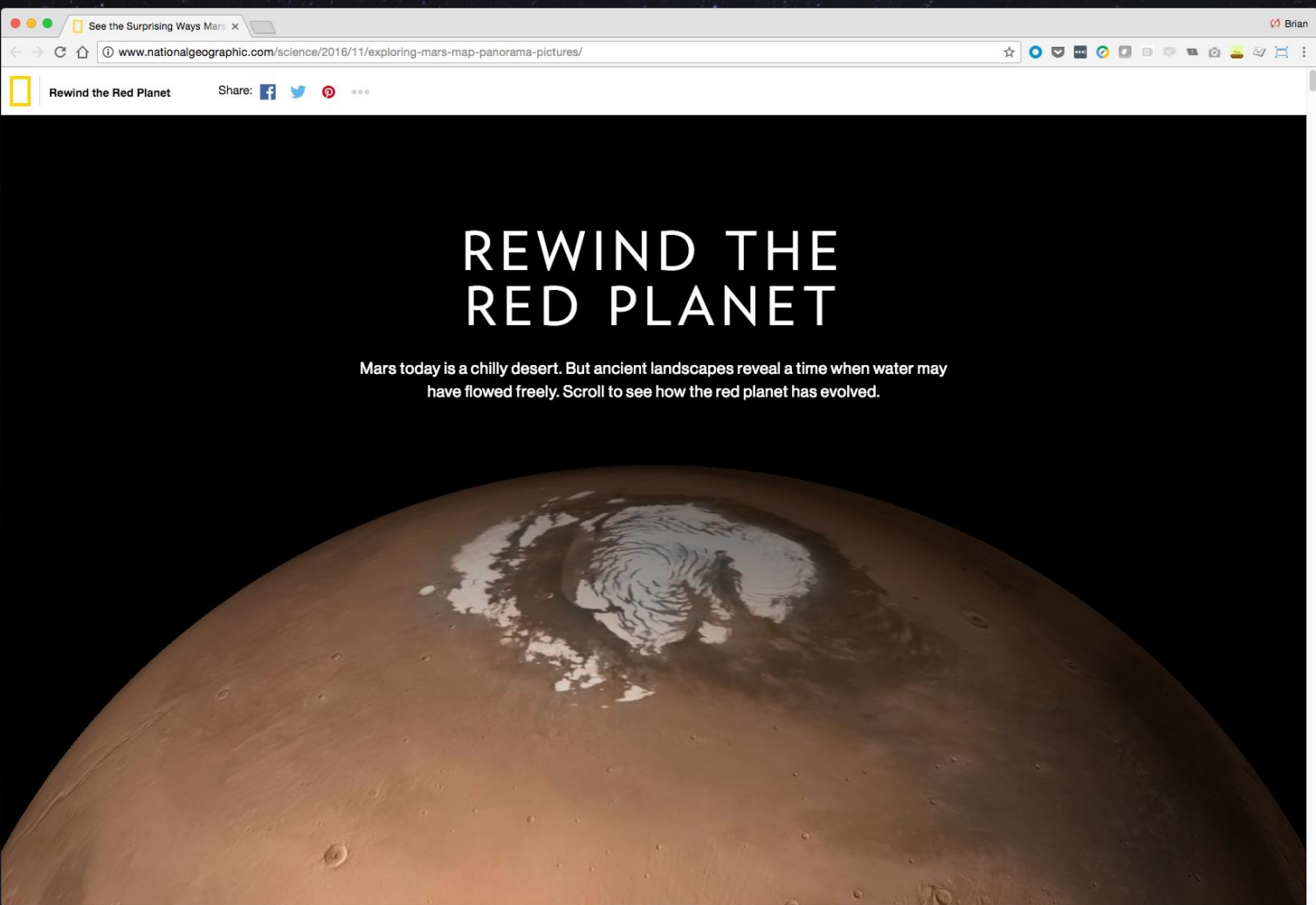


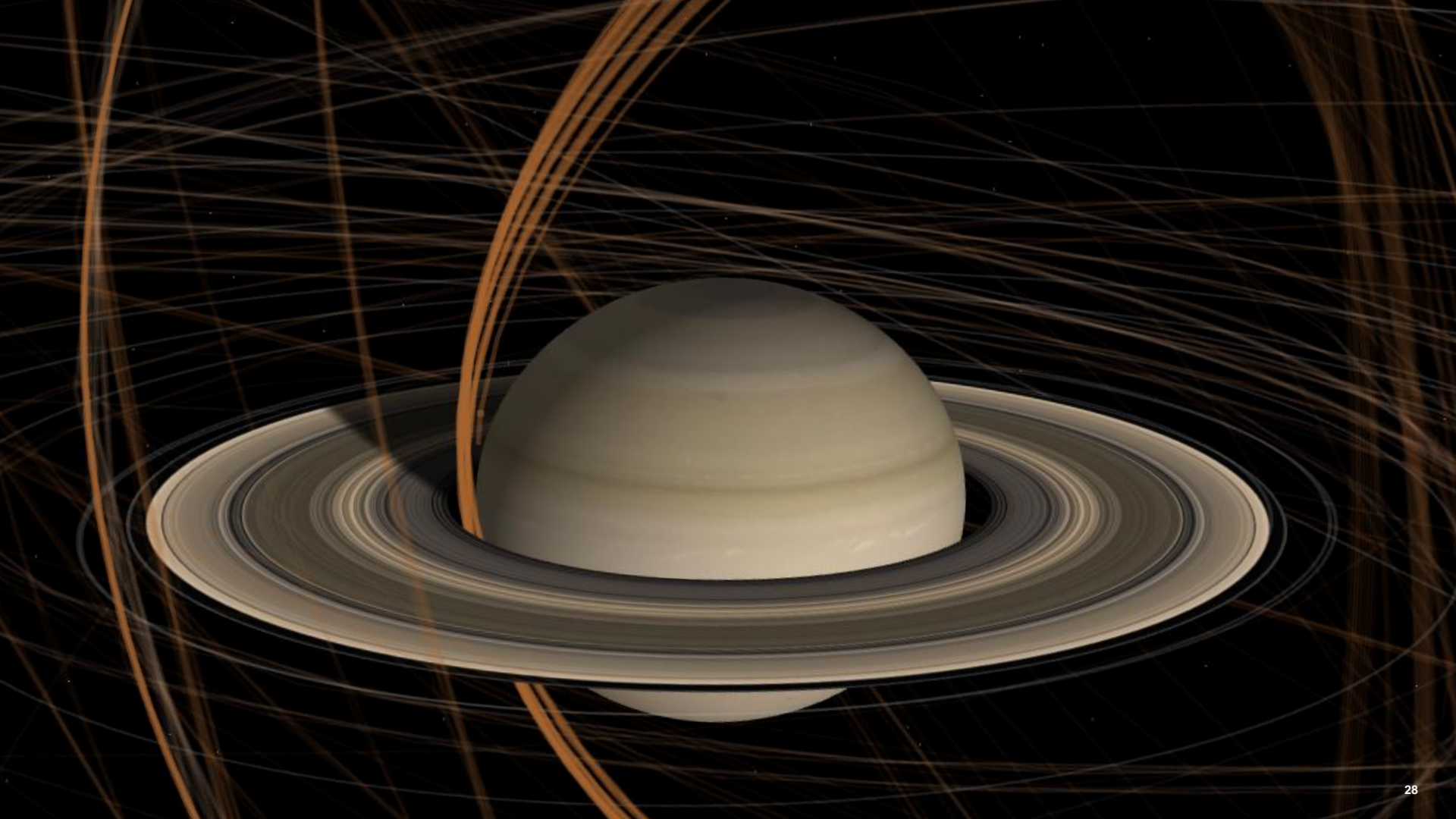
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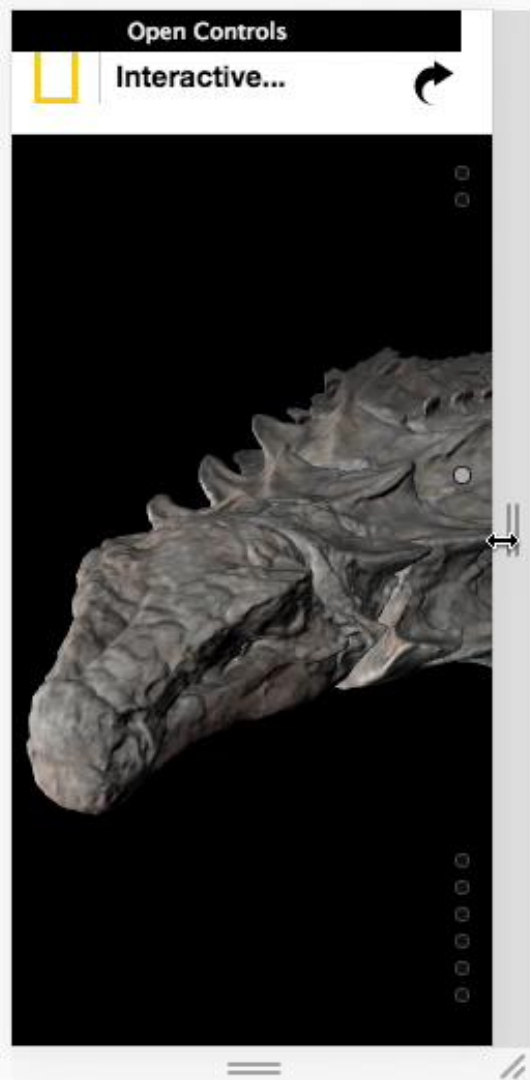


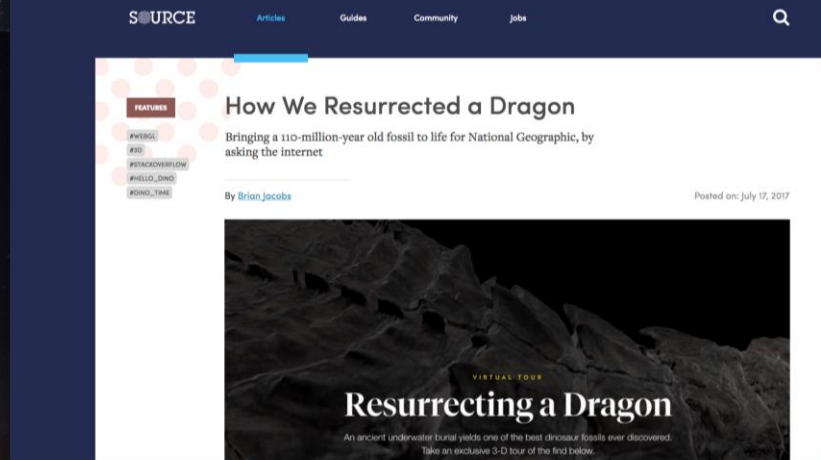
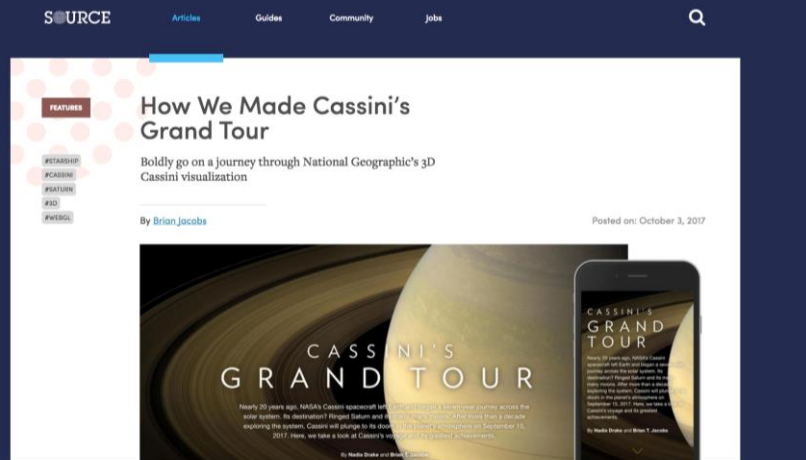
# TOOLS NOT TEMPLATES



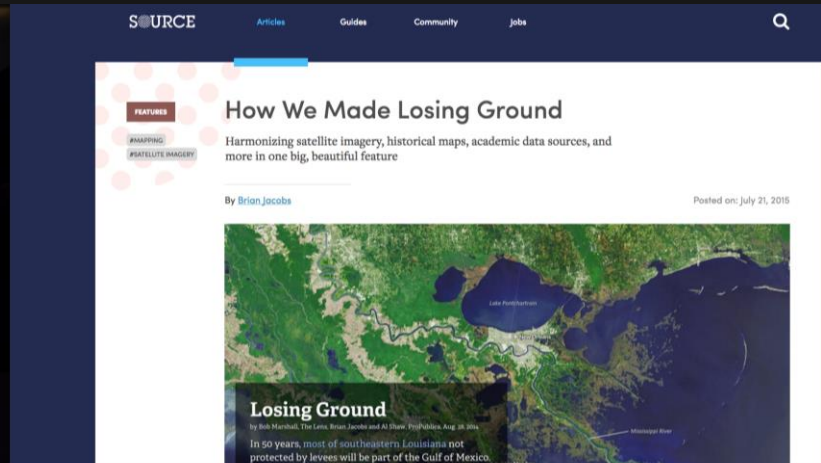
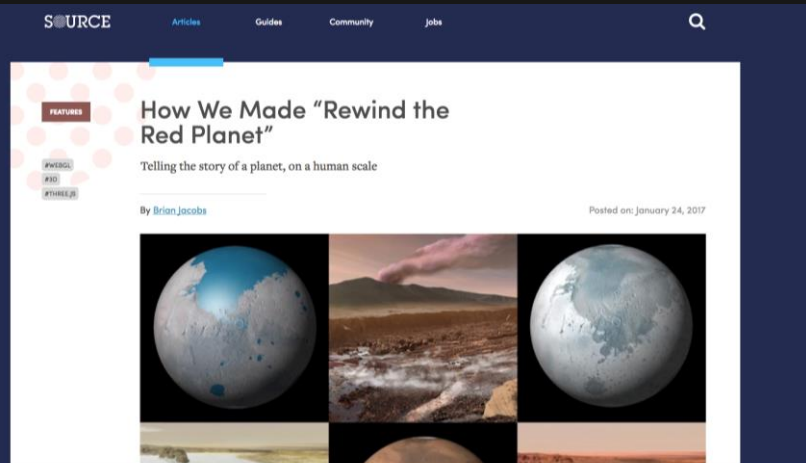








<https://source.opennews.org/people/brian-jacobs/>



# QUESTIONS?

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Victoria Jaggard: @vmjaggard99

