

# NISE Network Online Workshop

The Science Behind the 2019 Explore Science:  
Earth and Space Toolkit - Exploring the Universe

*Tuesday, March 12, 2019*



***Welcome!***

**Today's presenters are:**

- **Katherine Kornei**, NISE Net Earth & Space Content Expert
- **Frank Kusiak**, Lawrence Hall of Science, UC Berkeley
- **Darrell Porcello**, Children's Creativity Museum



As we wait to get started with today's discussion, please:

**Introduce yourself!** Type your name, institution, and location into the Chat Box

**Questions?** Feel free to type your questions into the Chat Box at any time throughout the webinar or use the raise your hand function in the participants list and we'll unmute your microphone.

Today's discussion will be recorded and shared online at [nisenet.org/events/online-workshop](https://nisenet.org/events/online-workshop)

# Online Workshop Overview



**5 min**

NISE Network introductions & toolkit overview

**30 min**

**Dr. Katherine Kornei** on universe connections to the 2019 Explore Science: Earth & Space Toolkit

**Frank Kusiak** with highlights from “Space Guess Quest”, “Expanding Universe”, and “Static Electricity”

**20 min**

Q & A from our audience

# Your Friendly NISE Net Webinar Crew



Dr. Katherine Kornei  
NISE Net Earth & Space Content Expert  
Portland, OR



Frank Kusiak, M.A.  
NISE Net Western Regional Hub Leader  
Lawrence Hall of Science, UC Berkeley

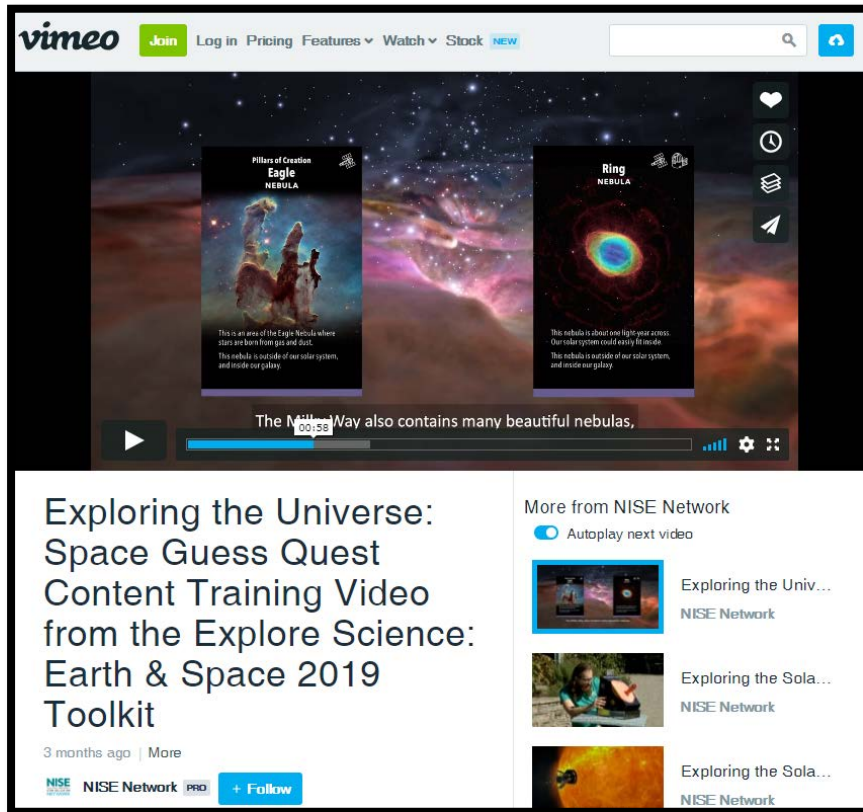


Dr. Darrell Porcello  
NISE Net Earth & Space, Co-I  
Children's Creativity Museum



Lindsay Bartolone, M.S.  
NISE Net Earth & Space Content Expert  
Chicago, IL

# 2019 Explore Science: Earth & Space Toolkit + Videos



Watch all the facilitation and content training videos:  
<https://vimeopro.com/nisenet/explore-science-earth-space>

## Explore Science: Earth & Space 2019 toolkit

In collaboration with NASA, the NISE Network has assembled a new set of engaging, hands-on Earth and space science experiences with connections to science, technology, and society.



### Links to download the entire digital toolkit (zip files):

Digital version of the Explore Science: Earth & Space 2019 toolkit

**COMING SOON - FEBRUARY 2019**

*Open Me First - Four Parts*

Open Me First (1 of 4): Planning Materials	18.32 MB
Open Me First (2 of 4): Explore Science Ads	40.86 MB
Open Me First (3 of 4): Explore Science Banner	42.96 MB
Open Me First (4 of 4): Explore Science Logos	39.63 MB

**Educational Products - COMING SOON!**

**Training Materials**

Training Guides	3.21 MB
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**Training Films - Including:**

- Activity & content training films
- Edu-Cathalon: A facilitation strategies and best practices training film
- Strategies for approaching common misconceptions training films

Download the 2019 digital toolkit now:  
<http://www.nisenet.org/earthspacekit-2019>

# Submit your questions...

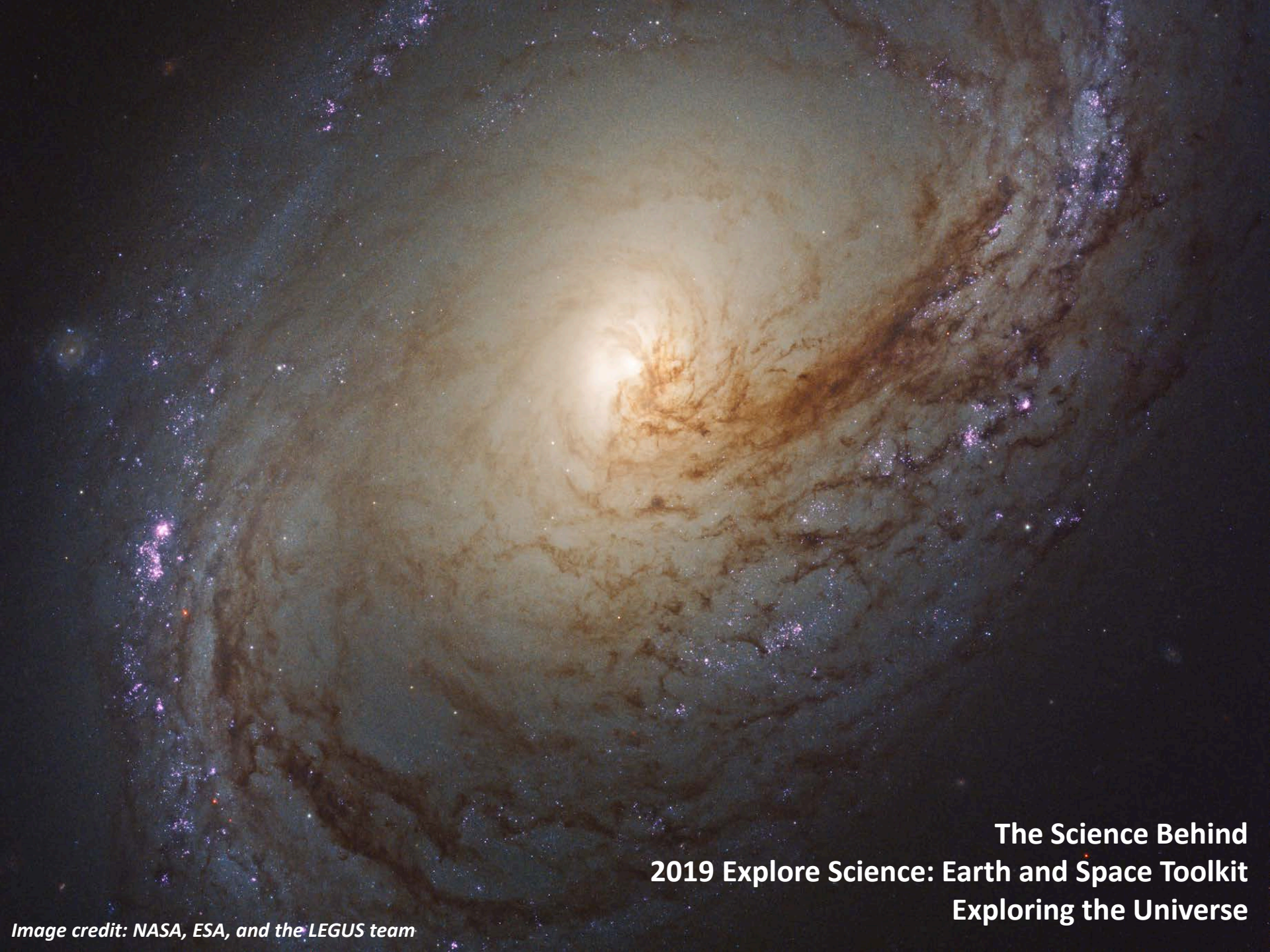
**We will be collecting your Questions in the chat window to your right throughout the talk.**

**We will go through these questions in the Q&A section of the webinar. Those we don't get to today we will reply over email.**



**...in the chat box.**





**The Science Behind  
2019 Explore Science: Earth and Space Toolkit  
Exploring the Universe**

*Image credit: NASA, ESA, and the LEGUS team*



Astrophysicist



Museum Educator



Science Journalist

# Ancient craters on Mars reveal how the planet's tilt has changed over time

By **Katherine Kornei** | Jul. 27, 2018 , 9:00 AM

Earth is a tilted planet—it lists by 23.5°. This “obliquity” causes the North Pole to sometimes tilt toward the sun and sometimes away, giving us the seasons. Now, researchers have revealed

# Solar systems, galaxies, the universe

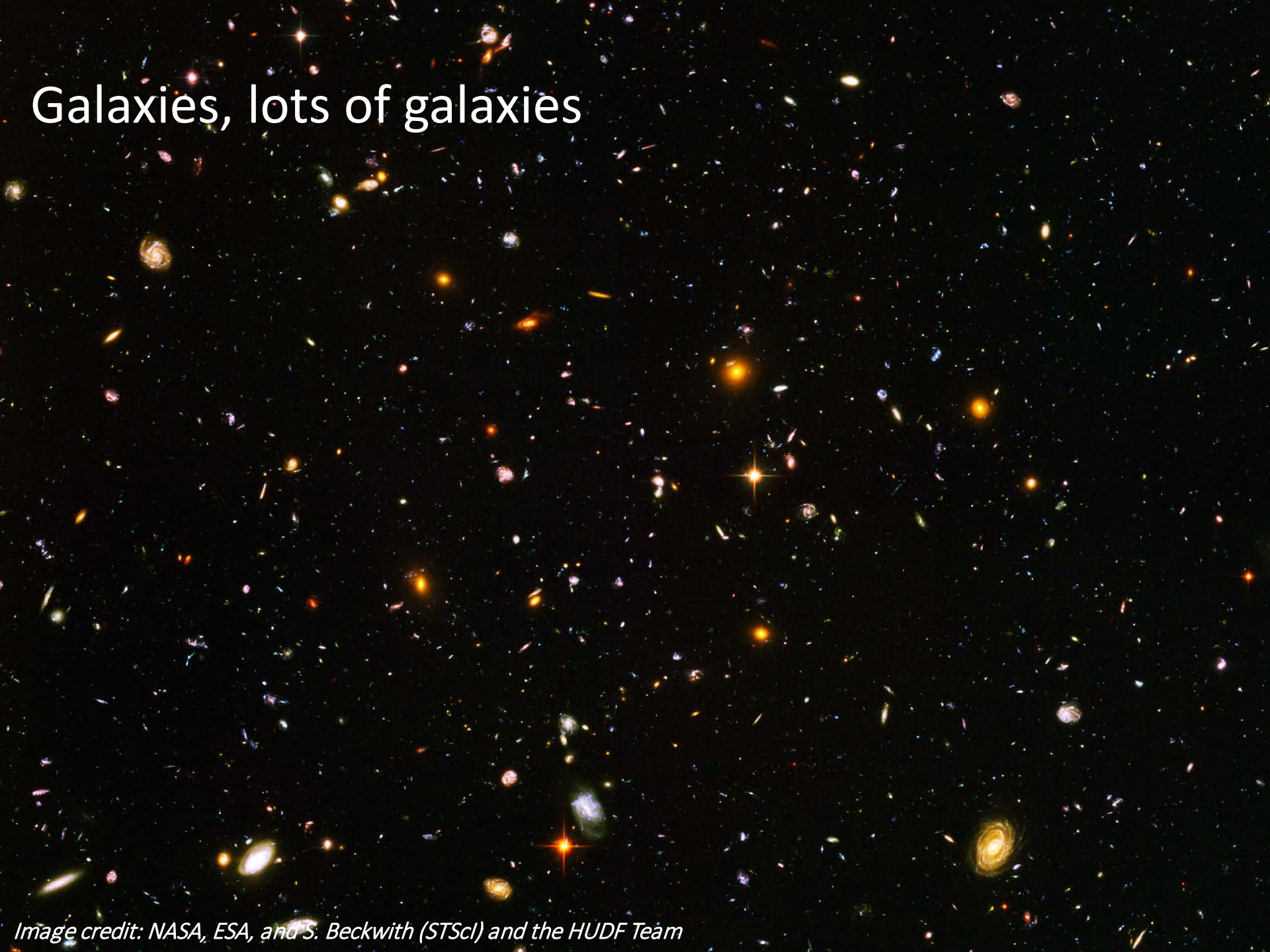
smaller.....larger



*Image credit: NASA*



Galaxies, lots of galaxies



*Image credit: NASA, ESA, and S. Beckwith (STScI) and the HUDF Team*

# *The Hubble Space Telescope*



*Image credit: NASA JSC*



# The James Webb Space Telescope

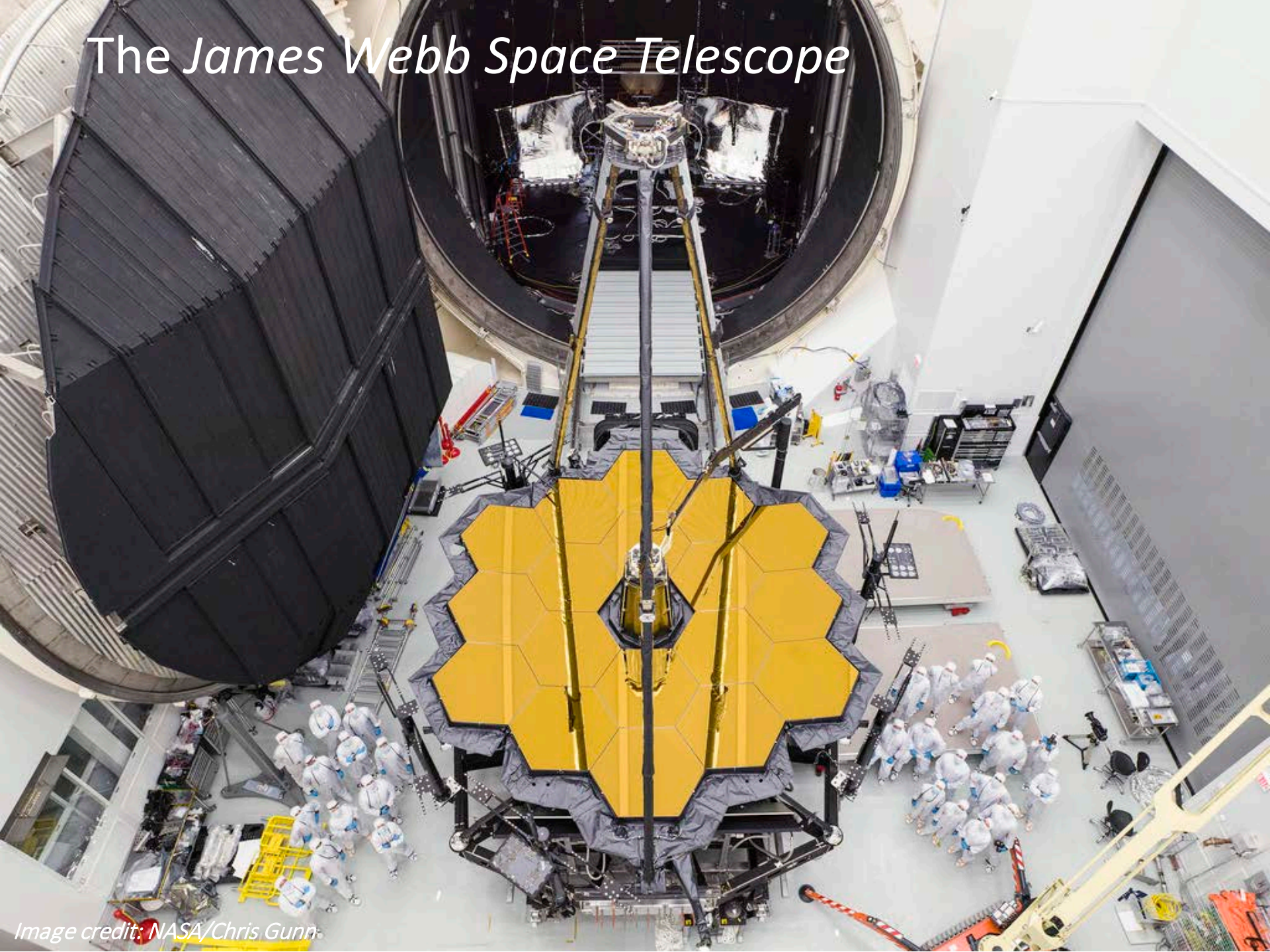
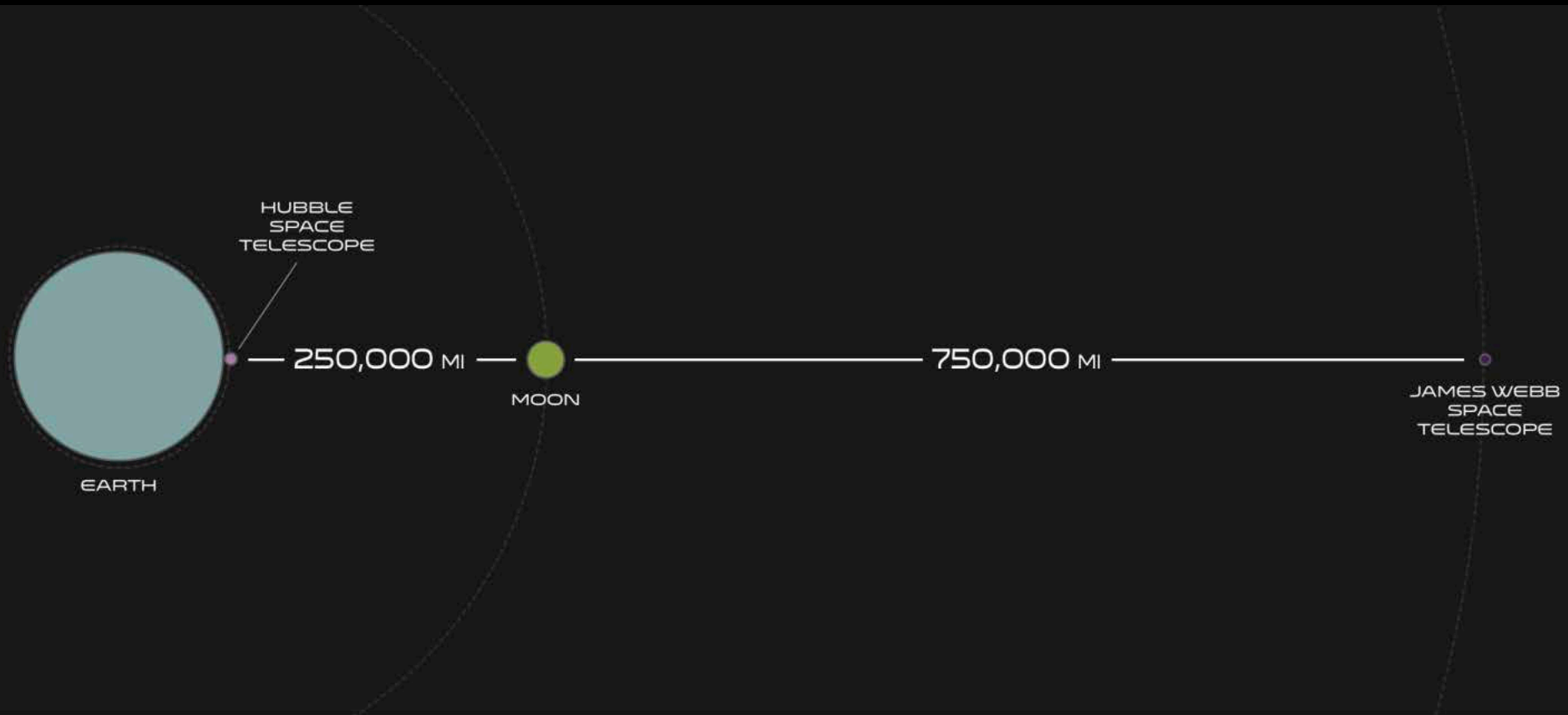


Image credit: NASA/Chris Gunn



*Hubble* is nearby; *James Webb* won't be



# Seeing in different wavelengths of light



SPITZER INFRARED



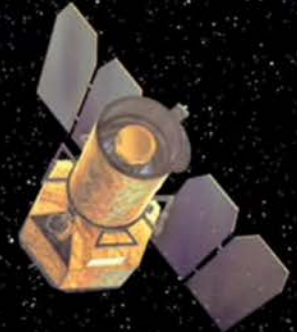
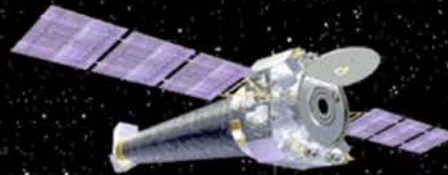
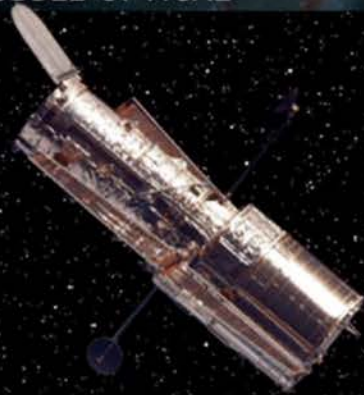
HUBBLE OPTICAL



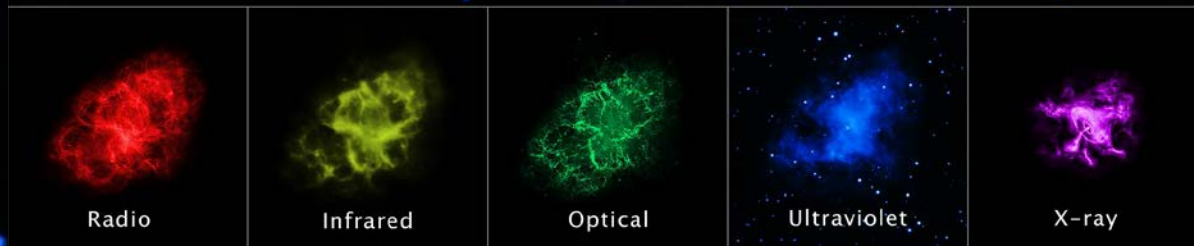
CHANDRA X-RAY



GALEX ULTRAVIOLET

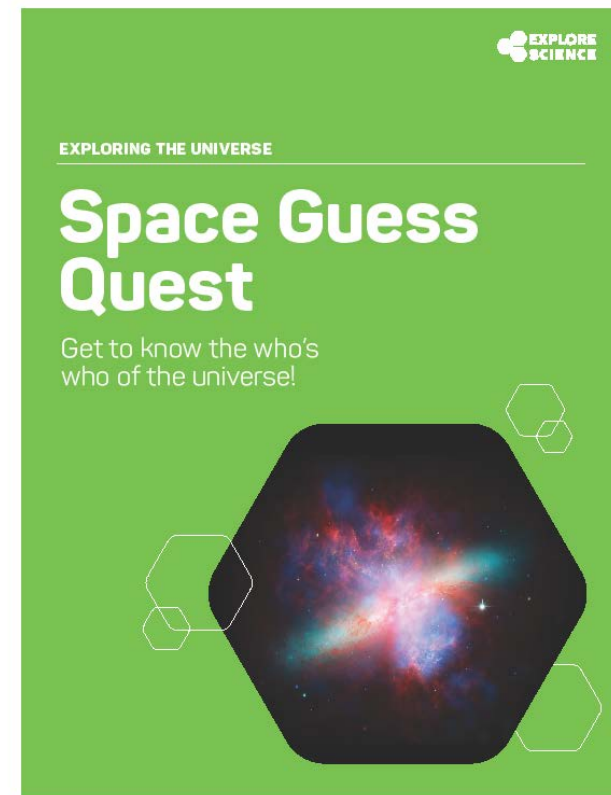


Scientists use representational color





# Space Guess Quest



# The Milky Way



*Image credit: Flickr user, David Kingham*

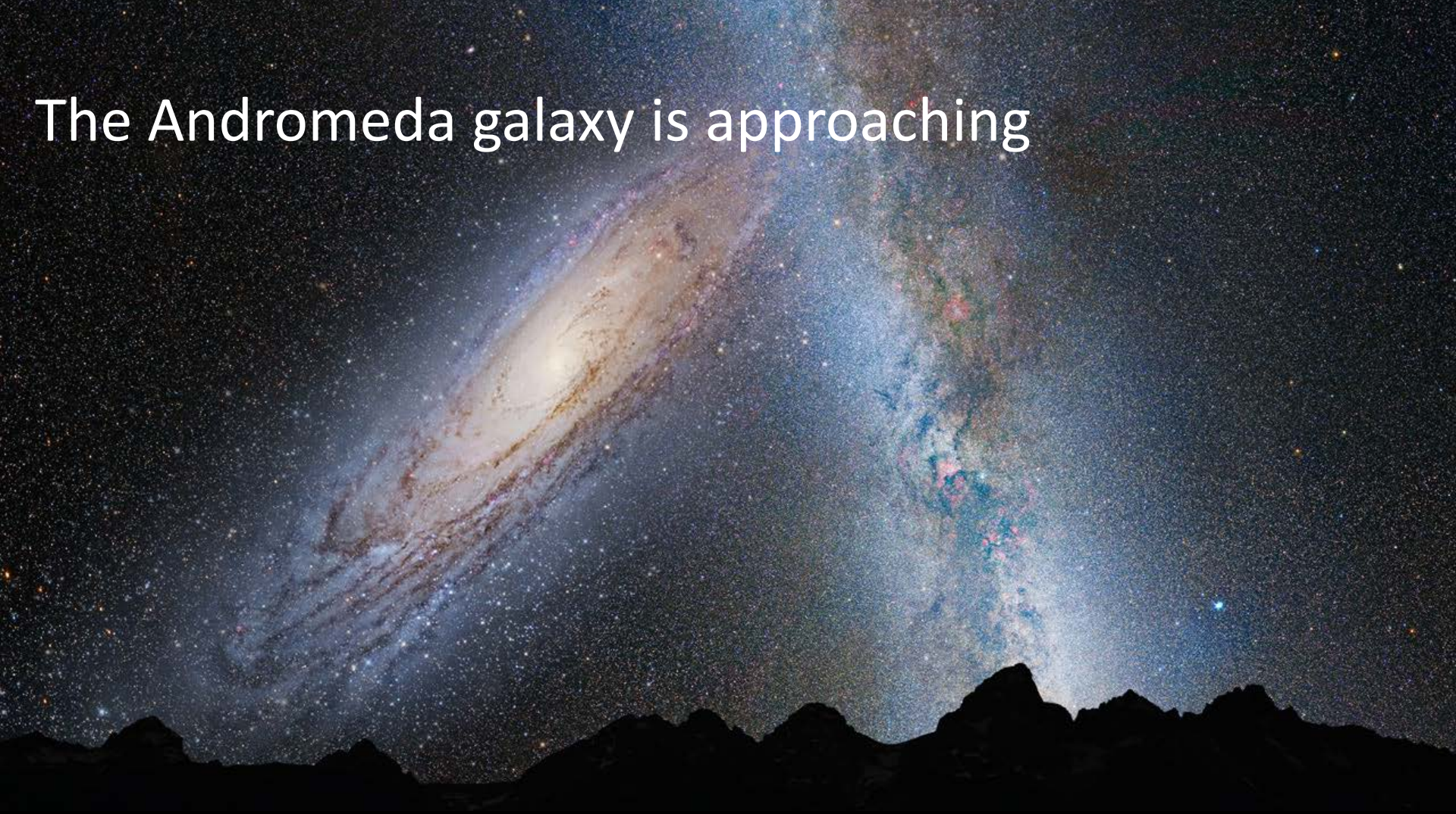


# Galactic neighbors





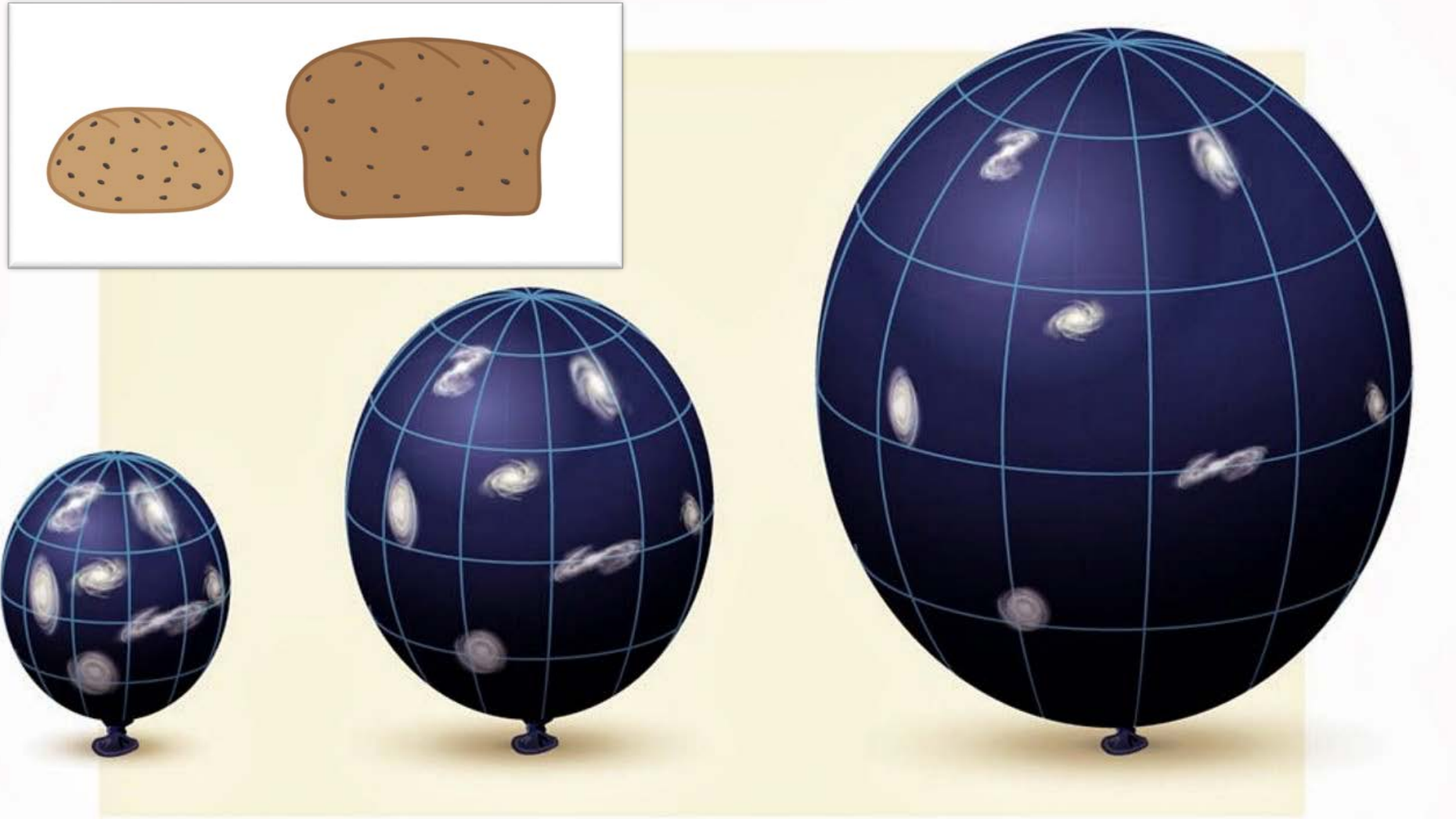
The Andromeda galaxy is approaching



*Image credit: NASA/ESA/Z. Levav/R. van der Marel/STScI/T. Hallas/A. Mellinger*



But most other galaxies are getting farther apart

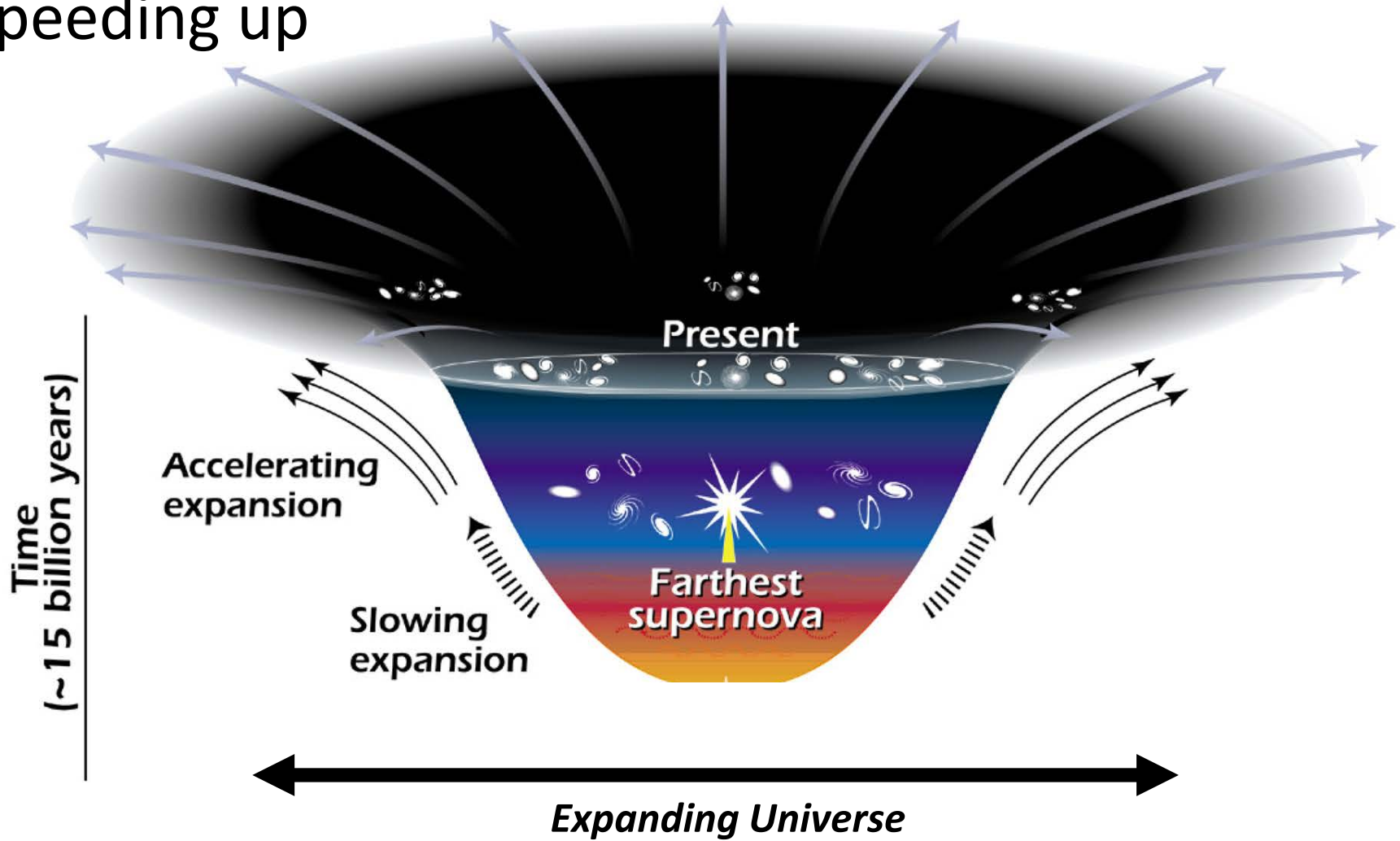


Edwin Hubble discovered this expansion in the 1920s

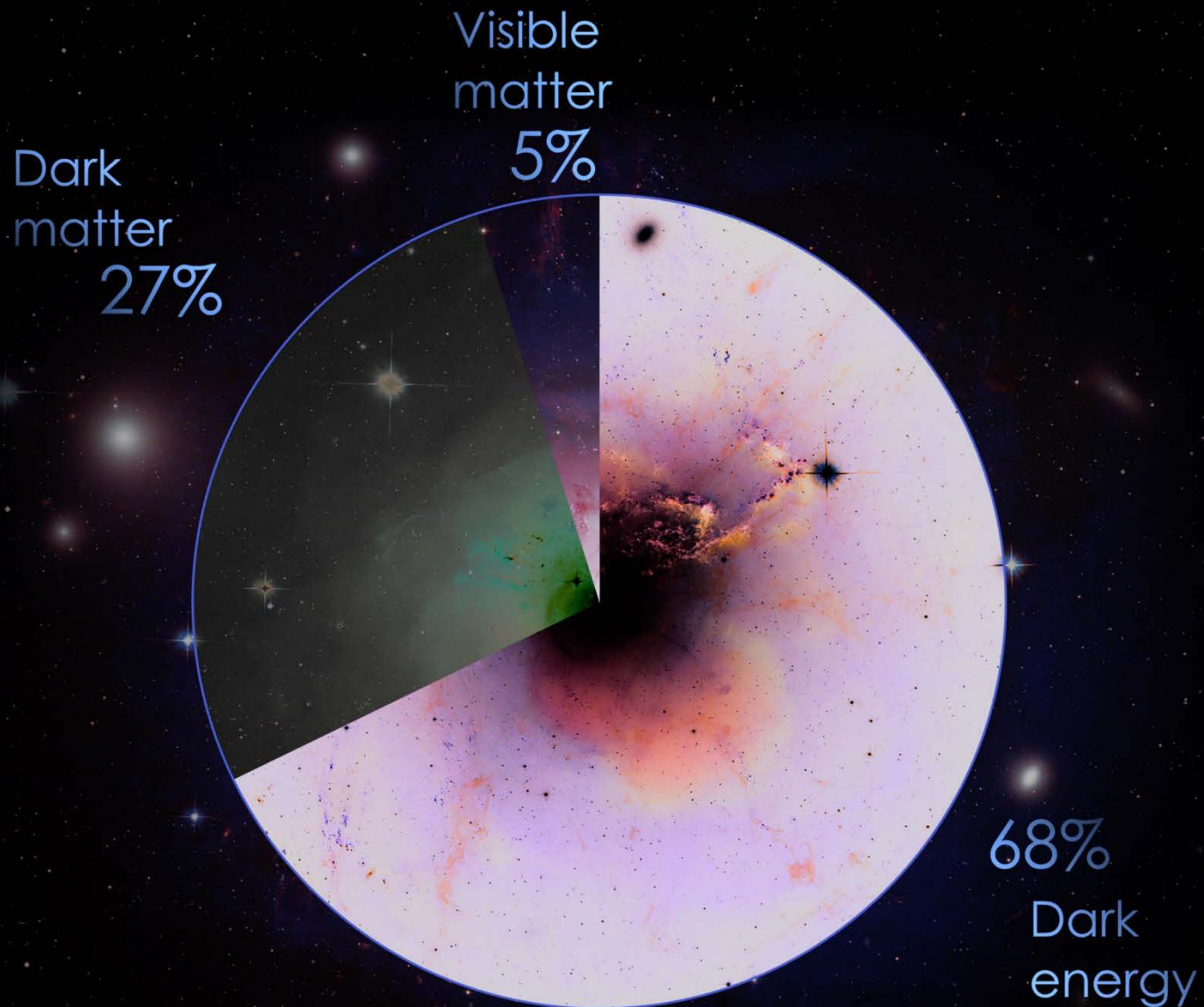




Now, we know that the universe's expansion is speeding up

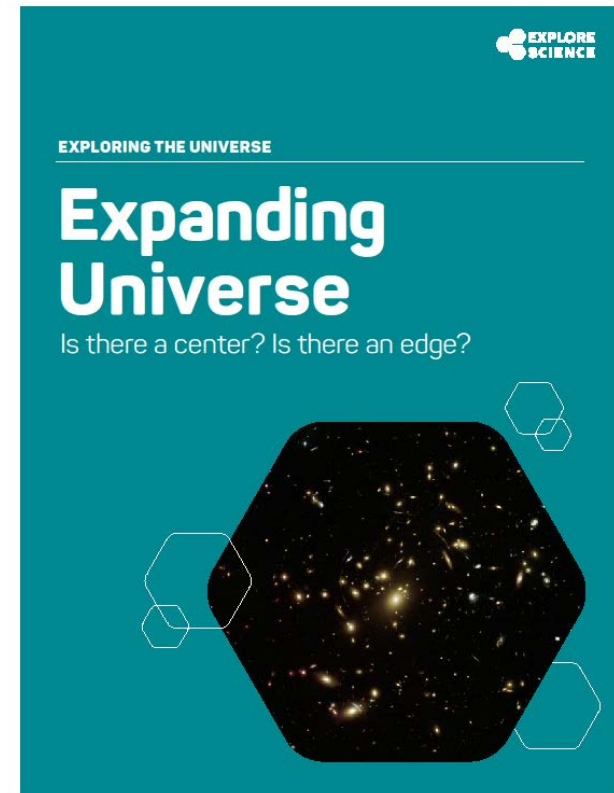


# The culprit has been dubbed “dark energy”



*Image credit: NASA Goddard Space Flight Center*

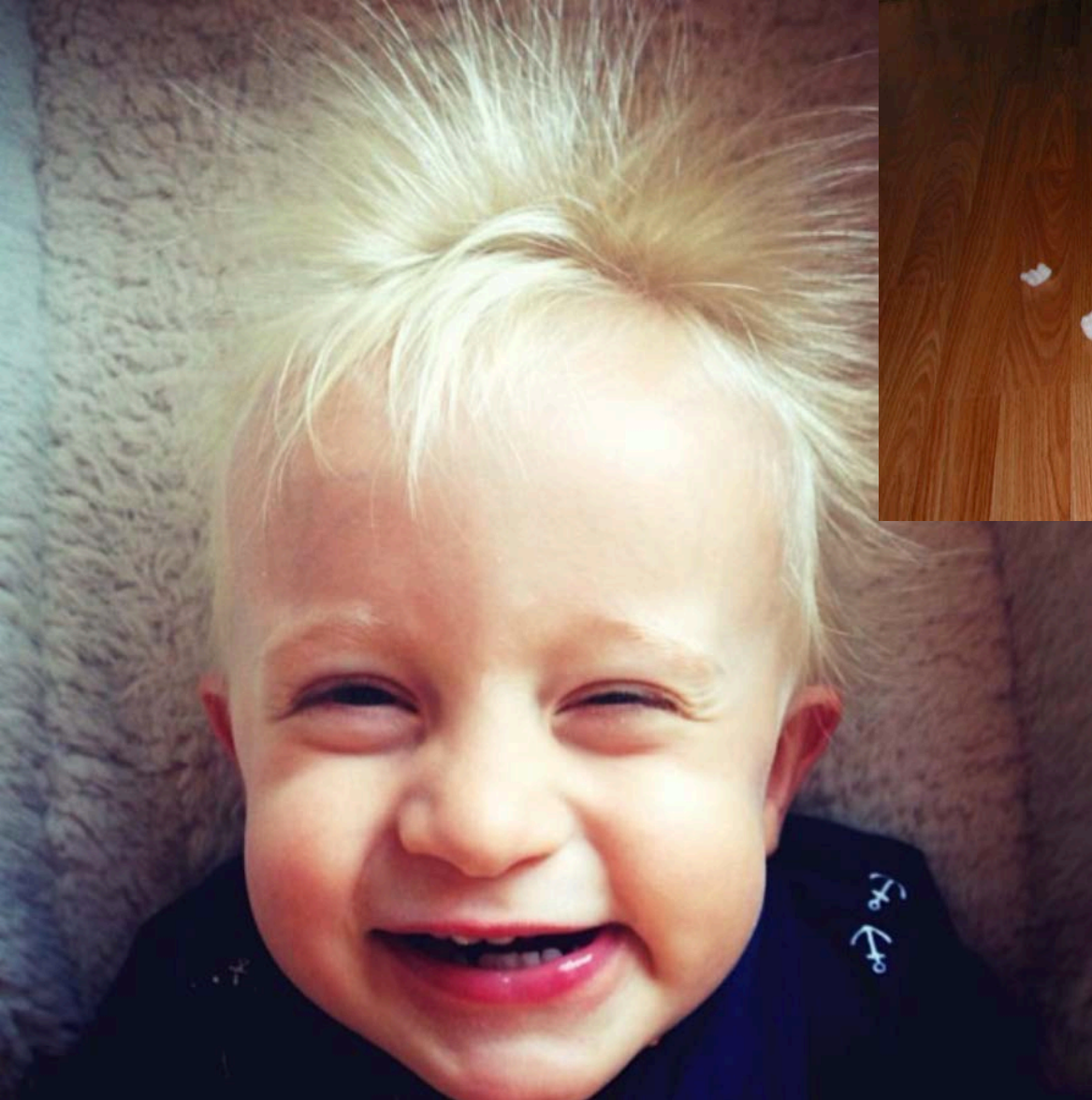
# Expanding Universe







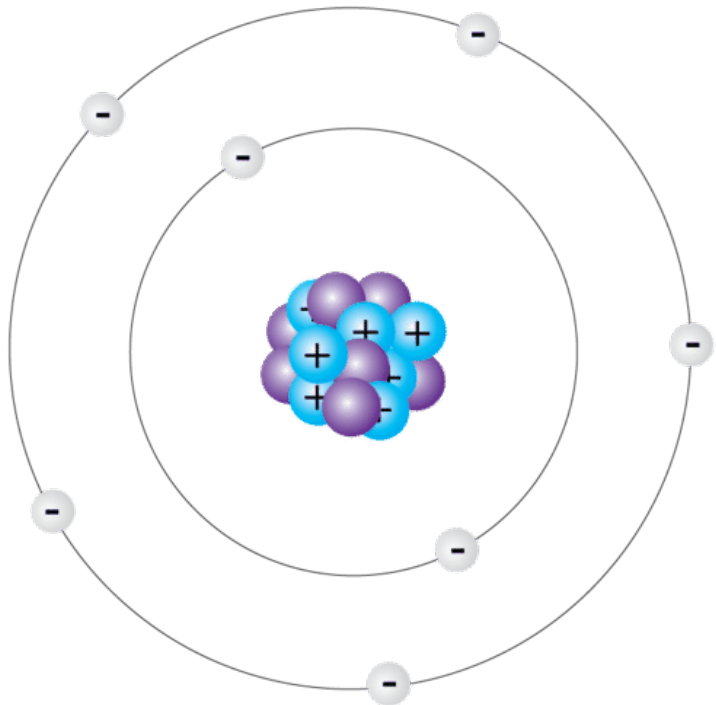
*Image credit: Wikimedia user Jp Marquis*



*Image credits: Flickr user, marcusnelson; Flickr user, Sean McGrath*



# Static electricity is due to electrons



fur loses electrons  
++++++



styrofoam gains electrons  
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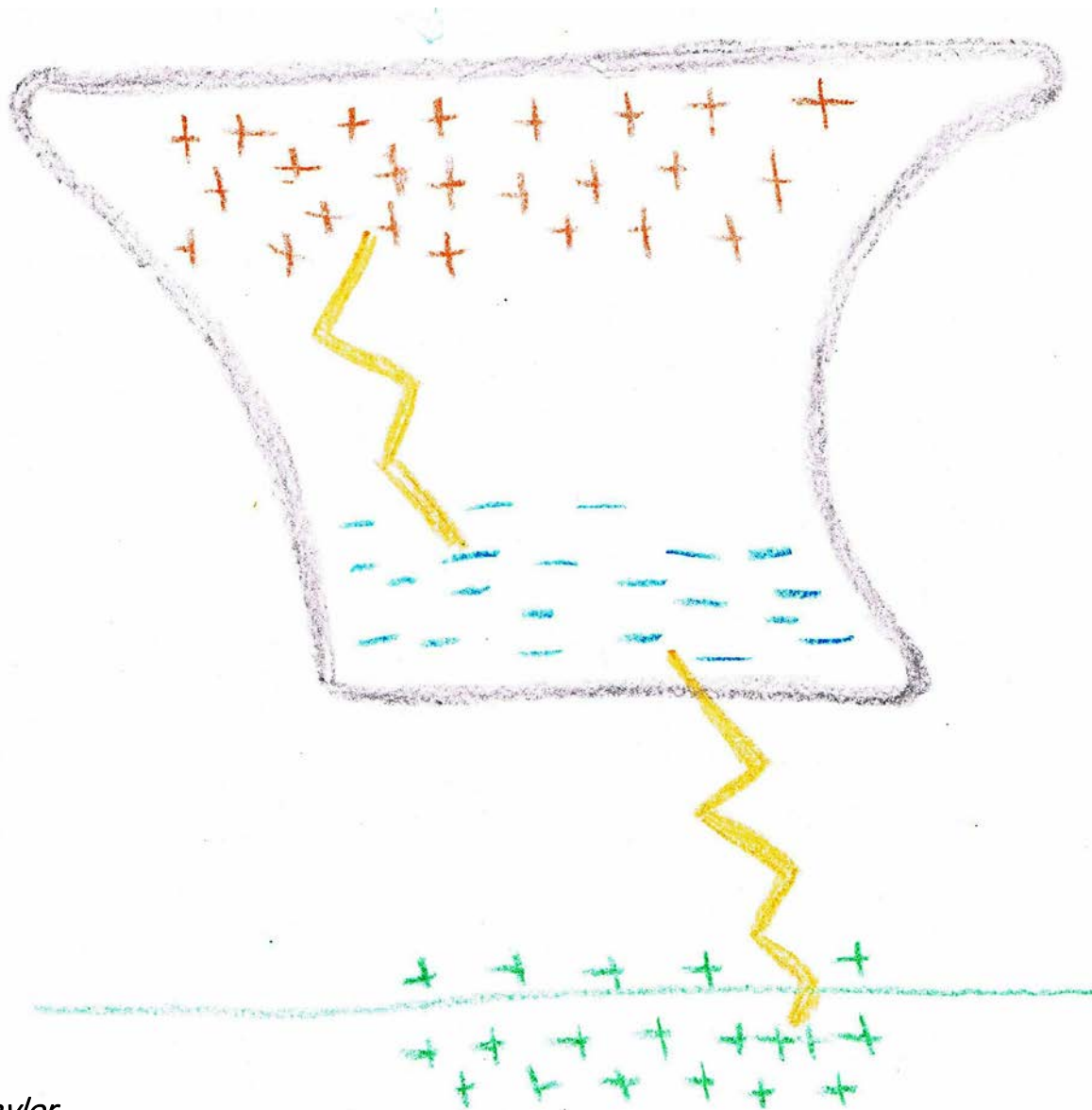


wool loses electrons  
++++++



hair gains electrons  
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Lightning is static electricity on a grand scale

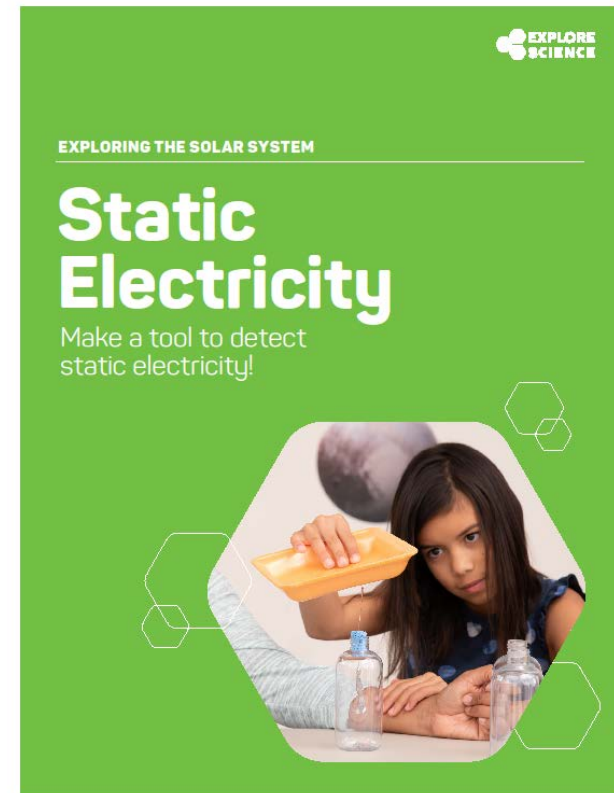






Static electricity can damage sensitive electronics

# Static Electricity



Questions?



# Our Next Workshop

**Celebrate Earth Day with NISE Net:  
Activity Connections and How  
Visitors Can Contribute Local  
Environmental Observations to  
NASA Science**

**Holli Kohl  
GLOBE Observer  
NASA Goddard Space Flight Center**

**Jeannie Colton  
Arizona State University**

**Emily Hostetler  
Museum of Science, Boston**

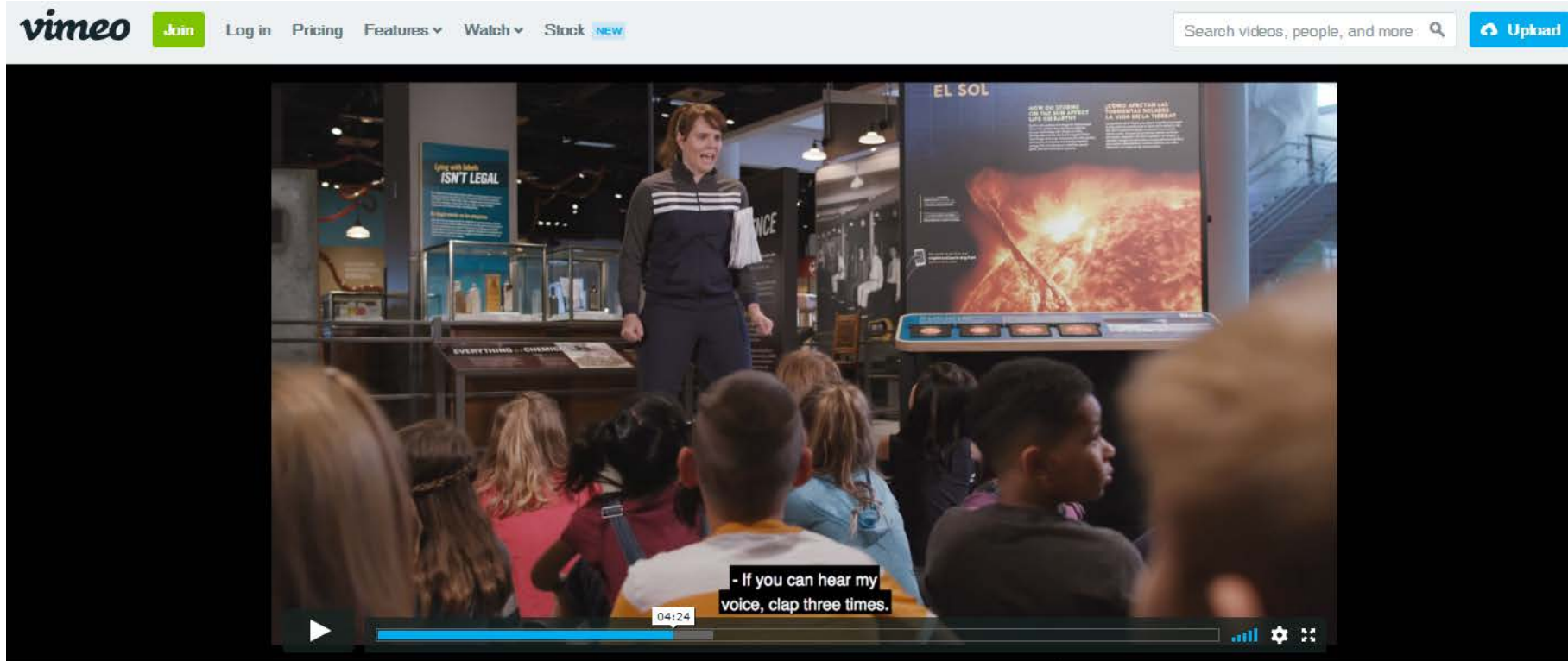
**Tuesday, April 16, 2019:  
2pm-3pm Eastern /  
11am-12pm Pacific**



# Toolkits shipped!



# Edu-Cathalon Video



Edu-Cathalon: A facilitation strategies and best practices training video for engaging museum visitors in STEM related content

3 months ago | More

More from NISE Network

☒ Autoplay next video



Edu-Cathalon: A f...  
NISE Network

<http://nisenet.org/catalog/educathalon-facilitation-strategies>



# Get Involved

Learn more and access the  
NISE Network's online digital resources  
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# Thank You

