

# Visualize our Galaxy



Image of the Milky Way over Blanco Observatory  
Credit CTIO/NOIRLab/NSF/AURA/D. Munizaga

Have you ever seen the Milky Way Galaxy?

# This model of the Milky Way Galaxy puts the night sky we see into perspective.

On our model, our Solar System, including the Kuiper Belt, is only about one nanometer in diameter – 100,000 could fit across a hair!

The stars visible to the unaided eye in the darkest night sky are between 4 and 4,000 light years away, or less than 2 inches from our Solar System in this model.

The Andromeda Galaxy (right) our nearest spiral neighbor, is about **13 Milky Way diameters** distant and nearly the same size as our galaxy.

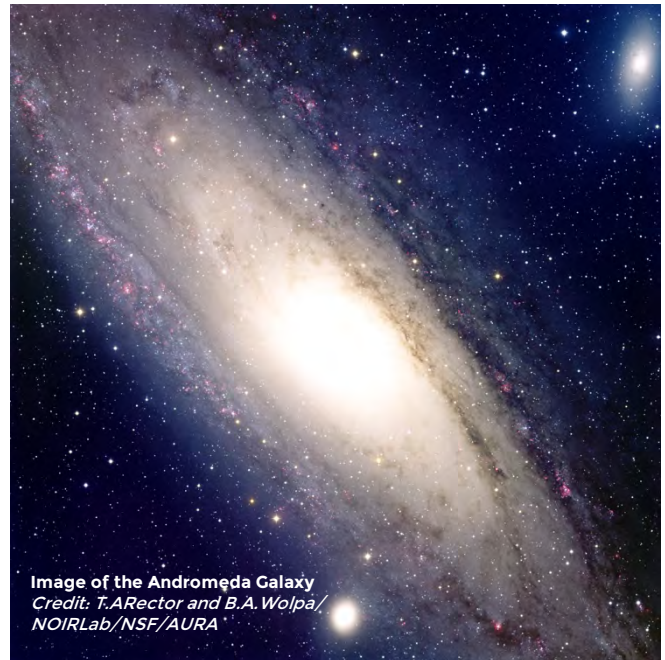


Image of the Andromeda Galaxy  
Credit: T.A.Rector and B.A. Wolpa/  
NOIRLab/NSF/AURA

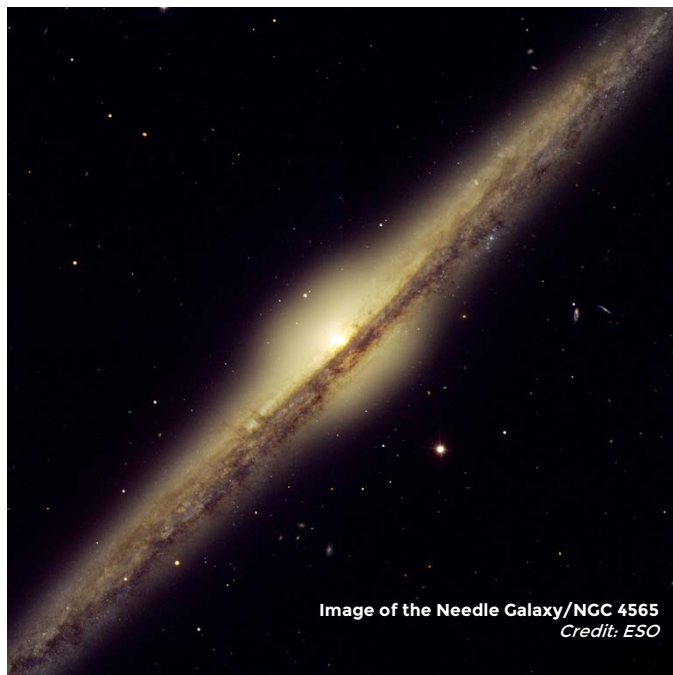


Image of the Needle Galaxy/NGC 4565  
Credit: ESO

**Seeing a galaxy from the edge gives us a glimpse of our perspective from within a similar structure.**

Scientists study galaxies of all shapes and sizes to learn about their composition, formation, and evolution.

We also better understand our own galaxy through studying others.

# Notes for the Presenter

## Visualize our Galaxy

**Time:** 10-15 minutes  
**Visitors:** General audience, ages 10+, groups of 1-10  
**Venue:** Indoor or outdoor, day or night. Paired with a telescope, more options are possible.

### Learning Goals

- Understand that the Solar System is one of many star systems in the Milky Way Galaxy.
- Integrate the observation of the Milky Way in the night sky with the larger picture of the galaxy in which we reside.
- Understand that our galaxy is one of many galaxies, and we infer our model of the Milky Way partially through observing other galaxies.

### Materials (and Sources)

- Model of the Milky Way Galaxy, additional umbrellas available ([bit.ly/galaxyumbrella](http://bit.ly/galaxyumbrella)) or print your own poster from [bit.ly/bigastro](http://bit.ly/bigastro)
- (Optional) Glow-in-the-dark paint

### Advance Preparation

First time setup:

- (Optional) Use the glow-in-the-dark pen or paint to color in the stars of the Milky Way. For best adhesion, heat set with a hot hair dryer and leave umbrella open 12 hours.

### Facilitation Notes

There are many ways to lead this demonstration using the model of our galaxy, depending on your goals. It is also a useful tool for answering common visitor questions.

#### Why does the Milky Way look like a band across the sky?

Show our place in the galaxy and note that on this scale, our Sun is too small to be visible. Note that the Milky Way Galaxy is flat like a disk and on this scale would be less than an inch thick. Tilt the model and show how our perspective shifts when seeing it edge-on. Imagine being within the disk and seeing a thick band of stars running across our night sky.

#### Have you ever had a chance to see a galaxy through a telescope?

If you have a telescope, point it to one of the many beautiful galaxies visible throughout the year. By looking at the nearest galaxies, we infer information about the structure of our galaxy.

## How do we know we live in a galaxy?

Look up at the dark sky, and you may see a broad swath of bright cloud stretching across your view. Cultures worldwide noticed this, and for millennia have told stories about this “milky” cloud. We now know this “Milky Way” is our galaxy, composed of more than 200 billion suns. You might also notice dark patches; those are areas of dust and gas.

## How far away are the stars we see at night?

The visible stars in the night sky are between 4 and 4,000 light years away, or an area on the model with a radius around the Solar System of less than 2”.

## Wrap-Up Questions:

Many of us find looking out into our galaxy and beyond an awesome yet humbling experience. Visitors may have a variety of thoughts and feelings after this experience. Gentle probing into their perspective is valuable as you check into both their thinking, and the effectiveness of the engagement.

- Do you have any new perspectives after this exercise?
- What are you thinking or feeling after this experience?
- What else does this make you wonder about?

## Background Information

- All models have limitations! They don’t show every detail, and are only approximations of the actual object. In this case, the umbrella is slightly curved, while the Milky Way is flat (and doesn’t fold!). This can form the basis of a great discussion.
- It’s a common misconception that we can see the Milky Way from above. The most distant picture we’ve ever taken is from the edge of our own Solar System. Our understanding of what the Milky Way looks like comes from images of distant similar galaxies as well as mapping the distribution of stars and dust in our own.
- Find more about this image by Robert Hunt:  
[solarsystem.nasa.gov/resources/285/the-milky-way-galaxy/](https://solarsystem.nasa.gov/resources/285/the-milky-way-galaxy/)

## Virtual and Hands-on Presentation Extensions

- [A Universe of Galaxies activity](#) from the Night Sky Network  
(a scale model from the closest galaxies to the Hubble Deep Field)
- [Our Place in Our Galaxy activity](#)  
(a scale model a quarter-sized Solar System in a US-sized galaxy)
- Get creative and make your own galaxy in pastels:  
[www.ideamuseum.org/2020/04/30/pastel-galaxies/](http://www.ideamuseum.org/2020/04/30/pastel-galaxies/)



Big Astronomy is supported by the U.S. National Science Foundation (Award #: 1811436)