

The Hunt for Planet B

Video Transcripts

This document provides transcripts of clips from the CNN Films documentary *The Hunt for Planet B*. Students can read along as you play the clips that share the journey to launching NASA's Webb Space Telescope.

Habitable Planet

Featuring Maggie Turnbull, Astrobiologist, SETI Institute

:11 [Game Lake, Antigo, Wisconsin]

:13 One of my favorite little lakes.

:17 There's an eagle circling around in front of us.

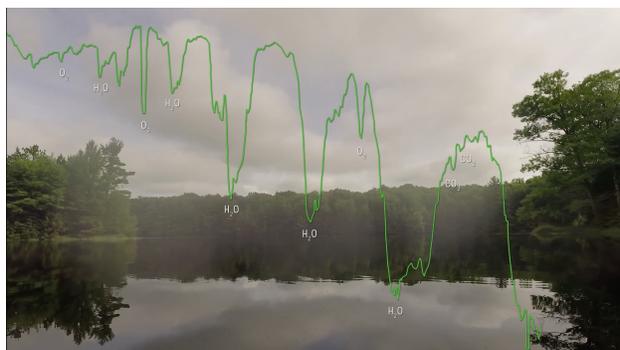
:24 In grad school, I asked the question, what does the earth look like from very far away when you can't see the continents and the ocean?

:37 [Maggie Turnbull, Astrobiologist, SETI Institute] And can you actually tell that there is life on that planet?

:39 So we looked at the moon not too many days after new moon, when you can just first start to see that thinnest crescent right at sunset. You'll notice that the dark part of the moon is also visible because the earth is shining on that part of the lunar surface. So if you take a telescope and you look at that light, it's earth light all jumbled up together—it's the land, it's the ocean, it's the clouds, the air... And when you spread that light out and look at it, you can plainly see the squiggly line that this is a planet that has a definite, clear oxygen line, and there's definitely carbon dioxide and there's methane.

1:25 Those signals were all tangled up together in the colors of the earth.

1:33 And that was what we call the spectrum of a habitable planet.



Taking Humanity on a Journey

Featuring Lee Feinberg, Optical Telescope Element Manager, JWST NASA; Matt Mountain, Director Emeritus, Space Telescope Science Institute and Telescope Scientist, JWST; and John Mather, Senior Project Scientist, JWST, NASA



:17 The Webb Telescope is a hundred times more powerful than Hubble. Telescopes keep getting bigger because the bigger the telescope, the better the resolution.

:25 [Lee Feinberg, Optical Telescope Element Manager, JWST, NASA] You know we wouldn't build a telescope this big unless we needed too. And you need to build a telescope this big if you want to look at the very dimmest, earliest galaxies in the universe.

:37 [Matt Mountain, Director Emeritus, Space Telescope Science Institute. Telescope Scientist, JWST] The James Webb Telescope is not just a machine built by engineers and scientists to look after the universe.

:40 It's taking humanity on a journey.

:44 We're gonna enter a completely new part of observation, a space where we have never trod before. And every time we have done this as a species, we have discovered new things.

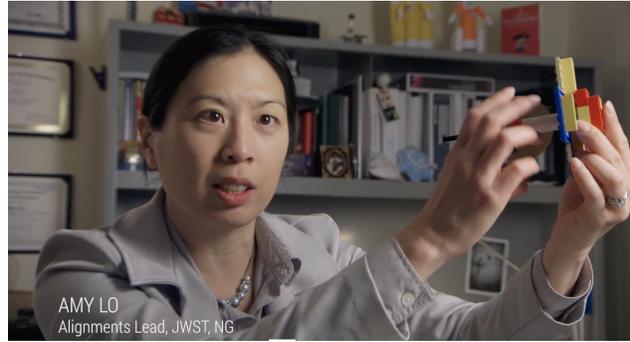
:59 [John Mather, Senior Project Scientist, JWST, NASA] We have just received the 18 hexagons that make up the big mirror that collects the starlight and focuses in on the camera.

1:08 Gold has very unique properties in terms of reflecting infrared light, and this is an infrared telescope. So that's why we choose gold.

1:16 I think people want us to build this telescope because they want to know how we got here. I want to know how we got here.

The Webb Telescope Sunshield

*Featuring Amy Lo, Alignments Lead, JWST,
Northrop Grumman*



:10 [Northrop Grumman, Redondo Beach, California]

:11 [Background chatter] That's it, OK, let's get started. Any questions, guys?

:15 [Background chatter] We have four more to go.

:17 [SunShield Deployment Test]

:18 [Amy Lo, Alignments Lead, JWST, Northrop Grumman] We don't want the telescope portion of the Webb Telescope to see any of the sun because we are trying to keep it very, very cold.

[Five layers will protect the mirror and instruments.]

:25 In order to detect heat signature, infrared signature, it obviously needs to be very cold or all it is going to measure is just, itself.

:32 [Amy Lo, Alignments Lead, JWST, NG]

:35 [Background chatter] OK minus J mid, MTS full deployment, layer 1.

:39 In space, really the only thing that will heat you up is the electronics that you've got, and a really bright source, which is the sun. And that is the purpose of the sunshield. The sunshield keeps the telescope from getting all of that sunlight so it stays cold.

:52 [Background chatter] Nice and slow guys. Nice and slow.

:56 What is particularly challenging is the fact that we have to fold it up, and deploy it once we get on orbit.

The Exoplanet TRAPPIST-1 e

Featuring Nikole Lewis, Deputy Director, Carl Sagan Institute, Cornell University; Natasha Batalha, Planetary Scientist, NASA, AMES; and Hannah Wakeford, Gacconi Fellow, Space Telescope Science Institute.



:09 Hey.

:10 Hello!

So it sounds like we should stick with TRAPPIST-1E, and then look at this plan in detail and make sure that we have it finalized.

:16 [TRAPPIST-1e Observation Team Meeting]

:18 This is our observation plan, you mean?

:19 Yeah, it's going to be a really good test of the telescope itself.

:20 Yeah.

:24 I would be really interested to understand if they are tidally locked, like the moon. What that means for having a permanent day and a permanent night side....

:30 [Nikole Lewis, Deputy Director, Carl Sagan Institute, Cornell University]

:33 [Natasha Batalha, Planetary Scientist, NASA, AMES] There would be some people who would be constantly living in daylight, and there would be other people who would be constantly living in darkness?

:40 Right.

:41 The best place to be on these planets would probably be perpetual twilight, right? Right around the edge—

:44 [Hannah Wakeford, Gacconi Fellow, Space Telescope Science Institute]

:47 Right, right at the limb.

:49 And what that would be like—

:51 –Because living in the Arctic, if you’re living through perpetual twilight, it’s a very strange experience.

:56 Do we know what the temperature differences would be?

:59 As long as there’s air. Air is very good.

1:03 Which they have...a substantial atmosphere.

1:04 My favorite thing about TRAPPIST is that if you are on the surface of one of the planets you can see the other planets resolved in the sky.

1:11 Yeah, bigger than the moon, right?

1:14 There would never have been a question of, you know, is the Earth the center of the universe.

1:18 I mean it is crazy to think that TRAPPIST, being 39 light-years away, means that they can hear what we were doing on the radio and television 39 years ago. The first years of Reagan, Madonna....

1:32 What do you think they would think about us?

1:34 Do you think they would think that we are going in the right direction?

1:37 Interesting question...

1:38 Yeah.

1:39 I like that one.

1:40 Well—

How Diversity Powers Teams

Featuring Gregory L. Robinson, Program Director, JWST NASA



:11 We all have the same desires and wants. And generally science and NASA missions bring those things to the table.

:19 Unfortunately, in the space science community, it hasn't been as diverse as it should be.

:22 One of the things with exoplanets: It's newer.

:23 [Gregory L. Robinson, Program Director, JWST, NASA]

:26 Generally the newer sciences attract more diverse teams.

:30 So yes, that really excites me, and we're scientists and engineers, right?

:36 So, certainly we follow the data.

:40 All of the data supports that, that teams are far more successful and better when they are more diverse.

:46 So, I always say now is the time, and I think now is the time.