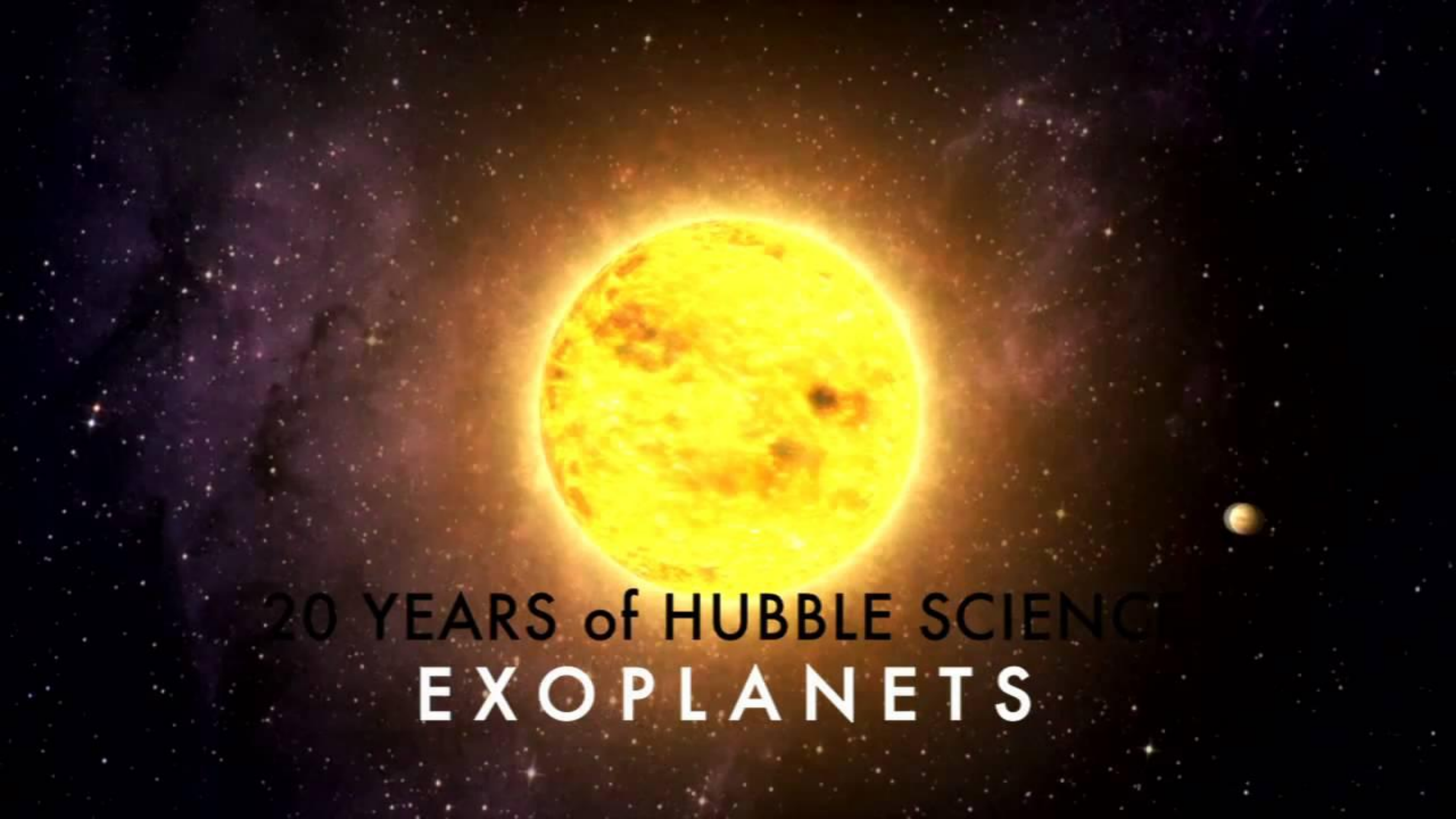
20 YEARS of HUBBLE SCIENCE
EXOPLANETS

1
00:00:00,010 --> 00:00:04,050
Marc Kuchner: I don't know--when I was growing up, there was no such thing as planets around

2
00:00:04,070 --> 00:00:08,110
other stars. If you were to talk about it at a scientific meeting, people would laugh at you.

3
00:00:08,130 --> 00:00:12,150
Not that I was talking at scientific meetings when I was in high school, but

4
00:00:12,170 --> 00:00:16,200
so I'm told.
Music swells

5
00:00:24,300 --> 00:00:28,310
Jennifer Wiseman: Planets are very small compared

6
00:00:28,330 --> 00:00:32,330
to the stars that they orbit. They're also very dim.

7
00:00:32,350 --> 00:00:36,340
Marc Kuchner: For example, the Earth is ten billion times fainter

8
00:00:36,360 --> 00:00:40,420
than the Sun--ten billion times fainter.
Jennifer Wiseman: It's kind of like

9
00:00:40,440 --> 00:00:44,490
trying to see a firefly next to a lighthouse.

10
00:00:44,510 --> 00:00:48,560
It gets lost in the glare.

11
00:00:48,580 --> 00:00:52,600
Marc Kuchner: The Hubble Space Telescope takes pictures of nearby

12
00:00:52,620 --> 00:00:56,630
stars and uses a special tool called a coronagraph

13
00:00:56,650 --> 00:01:00,650
and the coronagraph blocks out the light from the star.

14
00:01:00,670 --> 00:01:04,680
Aki Roberge: It's a fancy way of putting your thumb over the star, basically, so you can see

15
00:01:04,700 --> 00:01:08,690
something faint that is right next to it.

16
00:01:08,710 --> 00:01:12,710
Jennifer Wiseman: We can also use Hubble and other telescopes to study

17
00:01:12,730 --> 00:01:16,830
regions where we think planets might be forming.

18
00:01:16,850 --> 00:01:20,900
Marc Kuchner: We see in images from Hubble, we see these rings of dust

19
00:01:20,920 --> 00:01:24,970
around nearby stars.
Aki Roberge: Well what I observe

20
00:01:24,990 --> 00:01:29,030
with Hubble are those disks. Those disks of gas

21
00:01:29,050 --> 00:01:33,070
and dust around the young stars, in which we think the dust grains

22
00:01:33,090 --> 00:01:37,110
are starting to clump together and build up into pebbles,

23
00:01:37,130 --> 00:01:41,140
rocks, asteroids, comets, Earths.

24
00:01:41,160 --> 00:01:45,160
Jennifer Wiseman: We're finding baby solar systems by using

25

00:01:45,180 --> 00:01:49,190
Hubble and other telescopes, including sort of ground-based radio telescopes

26
00:01:49,210 --> 00:01:53,200
that can peer into these disks around stars and

27
00:01:53,220 --> 00:01:57,260
see young planets or regions where young planetary systems

28
00:01:57,280 --> 00:02:01,340
are forming.
Aki Roberge: The study of exoplanets is

29
00:02:01,360 --> 00:02:05,390
only a little over 15 years old.
Marc Kuchner: We've discovered more

30
00:02:05,410 --> 00:02:09,440
than 400 extrasolar planets now.

31
00:02:09,460 --> 00:02:13,490
Aki Roberge: You know, we're still just beginning to

32
00:02:13,510 --> 00:02:17,530
understand how the processes that formed

33
00:02:17,550 --> 00:02:21,560
our own solar system, also formed these really diverse

34
00:02:21,580 --> 00:02:25,590
types of planets. I think the thing that excites me

35
00:02:25,610 --> 00:02:29,600
most is just the basic discovery of what

36
00:02:29,620 --> 00:02:33,670
exists. You know, what's out there. Waterworlds, carbon planets?

37

00:02:33,690 --> 00:02:37,750
It sounds like science fiction, but not really.

38
00:02:37,770 --> 00:02:41,830
Not anymore.
Marc Kuchner: Why did life arise on

39
00:02:41,850 --> 00:02:45,890
Earth instead of somewhere else?

40
00:02:45,910 --> 00:02:49,940
I mean if there's another planet that could have life on it,

41
00:02:49,960 --> 00:02:53,970
why aren't we there?
Music