



1
00:00:12,290 --> 00:00:04,050
(music)

2
00:00:12,290 --> 00:00:16,310
Telescopes generally come into two different flavors. You have really powerful big

3
00:00:16,310 --> 00:00:20,370
telescopes, but those telescopes see a tiny part of the sky or

4
00:00:20,370 --> 00:00:24,390
telescopes are smaller and so they lack that power but they can see big

5
00:00:24,390 --> 00:00:28,430
parts of the sky. WFIRST is the best of both worlds. WFIRST

6
00:00:28,430 --> 00:00:32,440
is the Wide Field Infrared Survey Telescope. What I think of WFIRST is doing

7
00:00:32,440 --> 00:00:36,490
is building on what where the two great successes astronomically

8
00:00:36,490 --> 00:00:40,490
of the 1990's in the last decade, that is the Sloan Digital Sky Survey

9
00:00:40,490 --> 00:00:44,660
and the Hubble Space Telescope. WFIRST is a NASA observatory

10
00:00:44,660 --> 00:00:48,670
that has the top ranking of the National Academy of Sciences

11
00:00:48,670 --> 00:00:52,690
to launch in the twenty twenties. It has the same image precision

12
00:00:52,690 --> 00:00:56,700
and power as the Hubble Space Telescope but with one-hundred

13
00:00:56,700 --> 00:01:00,890

times the area of sky that is used. Looking at a large fraction of the sky

14

00:01:00,890 --> 00:01:04,900

allows you to get a more complete accounting. For example the stars in the Large Magellanic

15

00:01:04,900 --> 00:01:08,900

Cloud, which is the nearest galaxy to us or the stars in the galactic bulge;

16

00:01:08,900 --> 00:01:12,920

so you can do a much more complete accounting in a much shorter amount of time.

17

00:01:12,920 --> 00:01:17,120

The particular thing I'm interested in using WFIRST for,

18

00:01:17,120 --> 00:01:21,280

is to actually do a statistical census of planetary systems in

19

00:01:21,280 --> 00:01:25,280

our galaxy. And what we're looking for is gravitational microlensing events, these are

20

00:01:25,280 --> 00:01:29,470

cases when another star passes in front of our line of sight to a background star

21

00:01:29,470 --> 00:01:33,480

and it makes that background star get a little bit brighter due to the gravity of that

22

00:01:33,480 --> 00:01:37,490

foreground star, and that allows us to find planets. What WFIRST

23

00:01:37,490 --> 00:01:41,540

will do is it will have what we call a coronagraph. A coronagraph lets us

24

00:01:41,540 --> 00:01:45,550

image and characterize really dim planets,

25

00:01:45,550 --> 00:01:49,570

next to very bright stars. No matter how good a telescope

26

00:01:49,570 --> 00:01:53,580

that you build, its always going to have some residual errors. This is going to be the

27

00:01:53,580 --> 00:01:57,590

first time that we're going to fly an instrument that contains these high format deformable

28

00:01:57,590 --> 00:02:01,600

mirrors, that are going to let us correct for errors in a telescope, that's never

29

00:02:01,600 --> 00:02:05,610

been done in space before. WFIRST will allow us

30

00:02:05,610 --> 00:02:09,620

to potentially make groundbreaking discoveries in finding

31

00:02:09,620 --> 00:02:13,810

out what dark energy is. So this will tell us

32

00:02:13,810 --> 00:02:17,820

if dark energy is an unknown form of energy or if its a modification

33

00:02:17,820 --> 00:02:22,000

of general relativity. Single WFIRST images will contain

34

00:02:22,000 --> 00:02:26,120

over a million galaxies and we can't categorize

35

00:02:26,120 --> 00:02:30,130

and catalog those galaxies ourselves. Citizen science allows

36

00:02:30,130 --> 00:02:34,140

interested people in the general public to solve scientific problems

37

00:02:34,140 --> 00:02:38,150

and so one of the things that I'm really excited about is enabling this bridge

38

00:02:38,150 --> 00:02:42,330

where the general public can get involved in doing actual

39

00:02:42,330 --> 00:02:46,390

science. For me, its really an exciting opportunity to play

40

00:02:46,390 --> 00:02:50,440

a significant role in a mission that I think will be

41

00:02:50,440 --> 00:02:54,450

one of the most powerful telescopes that we have in the twenty twenties;

42

00:02:54,450 --> 00:02:58,460

and will be some of the most important things our country does in space in that

43

00:02:58,460 --> 00:03:02,650

time frame.