1
00:00:03,990 --> 00:00:01,990
here at the kennedy space center they

2
00:00:06,150 --> 00:00:04,000
continue to process the payloads for the

3
00:00:07,590 --> 00:00:06,160
spacex 4 launch and today we're going to

4
00:00:10,549 --> 00:00:07,600
talk about one of those payloads it's

5
00:00:12,870 --> 00:00:10,559
called micro 8 and it's studying yeast

6
00:00:14,230 --> 00:00:12,880
in space joining me now is sheila

7
00:00:16,710 --> 00:00:14,240
nielsen she is the principal

8
00:00:19,029 --> 00:00:16,720
investigator for the micro eight uh

9
00:00:20,390 --> 00:00:19,039
project and also fatigue

10
00:00:21,910 --> 00:00:20,400
and he is from the ames research center

11
00:00:23,750 --> 00:00:21,920
you're the project scientist thank you

12
00:00:25,990 --> 00:00:23,760
you both for joining us today first of

13
00:00:28,230 --> 00:00:26,000

all tell us about micro eight thanks

14
00:00:29,990 --> 00:00:28,240
lori microwave is our opportunity to

15
00:00:31,429 --> 00:00:30,000
evaluate how yeast

16
00:00:33,430 --> 00:00:31,439
or cells in general respond to the

17
00:00:34,870 --> 00:00:33,440
microgravity environment in our case

18
00:00:36,709 --> 00:00:34,880
we're working with the east canada

19
00:00:39,830 --> 00:00:36,719
albicans which is an opportunistic

20
00:00:41,990 --> 00:00:39,840
pathogen it causes the superficial and

21
00:00:44,549 --> 00:00:42,000
usually easily treatable infections like

22
00:00:45,910 --> 00:00:44,559
thrush and fungal nails but it can be a

23
00:00:48,470 --> 00:00:45,920
much more of a concern for some

24
00:00:50,069 --> 00:00:48,480
individuals so microwave is an extension

25
00:00:51,670 --> 00:00:50,079
of micro-6

26
00:00:53,270 --> 00:00:51,680
that we launched two years ago when we

27
00:00:56,869 --> 00:00:53,280
took what what we learned from that

28
00:00:59,029 --> 00:00:56,879
experiment and are generating

29
00:01:00,950 --> 00:00:59,039
additional experiments to sort of take

30
00:01:02,790 --> 00:01:00,960
that research one step farther on

31
00:01:04,950 --> 00:01:02,800
microwave why do we study this does it

32
00:01:06,789 --> 00:01:04,960
benefit us here on earth does it benefit

33
00:01:08,149 --> 00:01:06,799
future space flight why do we study it

34
00:01:10,390 --> 00:01:08,159
right well i actually think of the

35
00:01:11,590 --> 00:01:10,400
experiment sort of as a three-fold

36
00:01:13,910 --> 00:01:11,600
process

37
00:01:16,310 --> 00:01:13,920
the first and and most basic

38
00:01:18,950 --> 00:01:16,320

scientifically is to understand how ye

39
00:01:20,149 --> 00:01:18,960
how cells in general respond to extreme

40
00:01:21,910 --> 00:01:20,159
environments

41
00:01:23,910 --> 00:01:21,920
which microgravity certainly is an

42
00:01:26,070 --> 00:01:23,920
extreme environment and that just gives

43
00:01:28,310 --> 00:01:26,080
us some some general information on cell

44
00:01:30,469 --> 00:01:28,320
behavior and cell function the next

45
00:01:32,469 --> 00:01:30,479
level is to understand how potential

46
00:01:34,149 --> 00:01:32,479
pathogens could affect flight crew

47
00:01:36,310 --> 00:01:34,159
especially as we look forward to longer

48
00:01:37,590 --> 00:01:36,320
terms in space

49
00:01:39,590 --> 00:01:37,600
and then the third piece as you

50
00:01:41,190 --> 00:01:39,600
mentioned was what does this tell us

51
00:01:43,670 --> 00:01:41,200
about the organisms

52
00:01:45,830 --> 00:01:43,680
on earth and because this yeast is a

53
00:01:48,389 --> 00:01:45,840
potential pathogen and does cause

54
00:01:49,830 --> 00:01:48,399
disease in immunocompromised people

55
00:01:51,670 --> 00:01:49,840
people who've had surgeries or have

56
00:01:52,789 --> 00:01:51,680
diseases that compromise their immune

57
00:01:54,389 --> 00:01:52,799
response

58
00:01:57,190 --> 00:01:54,399
it can teach us a lot about

59
00:01:58,870 --> 00:01:57,200
how those organisms function within

60
00:02:00,789 --> 00:01:58,880
parts of the body that we can't easily

61
00:02:02,230 --> 00:02:00,799
access and then

62
00:02:04,230 --> 00:02:02,240
allow us to

63
00:02:06,389 --> 00:02:04,240

understand the disease process and

64
00:02:09,190 --> 00:02:06,399
develop therapies potentially to to

65
00:02:11,350 --> 00:02:09,200
improve outcomes of that and so fatigue

66
00:02:13,750 --> 00:02:11,360
the um ames research center is

67
00:02:15,270 --> 00:02:13,760
responsible for these micro payloads

68
00:02:17,190 --> 00:02:15,280
what what is the interest there with

69
00:02:18,630 --> 00:02:17,200
with ames and why do why do you guys

70
00:02:20,949 --> 00:02:18,640
want to be involved with this and how

71
00:02:23,030 --> 00:02:20,959
does it work with bioserve and sheila's

72
00:02:25,430 --> 00:02:23,040
from montana state university tell us

73
00:02:27,830 --> 00:02:25,440
how that all works yes so the

74
00:02:30,470 --> 00:02:27,840
space biology projects at nasa ames

75
00:02:31,589 --> 00:02:30,480
research center manage all the macro

76
00:02:34,150 --> 00:02:31,599
payloads

77
00:02:36,550 --> 00:02:34,160
and so those are investigations that

78
00:02:39,350 --> 00:02:36,560
more or less follow the recommendation

79
00:02:42,470 --> 00:02:39,360
from the national research councils

80
00:02:44,949 --> 00:02:42,480
in 2011 they pub publish

81
00:02:47,509 --> 00:02:44,959
a decadal survey which more or less is

82
00:02:49,270 --> 00:02:47,519
being used by nasa as to what type of

83
00:02:51,430 --> 00:02:49,280
research needs to be conducted on the

84
00:02:53,910 --> 00:02:51,440
international space station per se and

85
00:02:56,949 --> 00:02:53,920
so at ames we more or less overseeing

86
00:02:58,550 --> 00:02:56,959
the projects and as you mentioned

87
00:03:00,710 --> 00:02:58,560
biosafe space technology at the

88
00:03:02,550 --> 00:03:00,720

university of colorado in boulder is the

89
00:03:04,869 --> 00:03:02,560
pedal developer

90
00:03:06,390 --> 00:03:04,879
all right and sheila you talked about

91
00:03:08,390 --> 00:03:06,400
we've learned a little bit so far tell

92
00:03:10,869 --> 00:03:08,400
us what we've learned

93
00:03:13,190 --> 00:03:10,879
okay we we flew on spacex one which was

94
00:03:14,550 --> 00:03:13,200
our first opportunity as well as space

95
00:03:17,430 --> 00:03:14,560
expeditions

96
00:03:20,229 --> 00:03:17,440
and that gave us a lot of groundwork we

97
00:03:21,990 --> 00:03:20,239
we found that the organisms were

98
00:03:23,670 --> 00:03:22,000
a little bit more resistant to

99
00:03:25,430 --> 00:03:23,680
antimicrobials as we had found in our

100
00:03:27,430 --> 00:03:25,440
ground-based studies

101
00:03:29,110 --> 00:03:27,440
we found we were able to compare their

102
00:03:30,390 --> 00:03:29,120
growth rates to those experiments that

103
00:03:33,350 --> 00:03:30,400
we were doing

104
00:03:35,190 --> 00:03:33,360
comparably on ground we also found out

105
00:03:36,390 --> 00:03:35,200
that we could bring live samples back

106
00:03:38,390 --> 00:03:36,400
and test them

107
00:03:40,229 --> 00:03:38,400
at our home lab that those samples that

108
00:03:41,830 --> 00:03:40,239
had been exposed to flight

109
00:03:43,589 --> 00:03:41,840
and so there was a lot of the basic

110
00:03:45,990 --> 00:03:43,599
information that we were able to to

111
00:03:47,430 --> 00:03:46,000
garner from that first flight and so on

112
00:03:49,750 --> 00:03:47,440
this one we're adding a second

113
00:03:51,990 --> 00:03:49,760

antimicrobial and a couple of new

114
00:03:53,830 --> 00:03:52,000
analyses sort of as an extension of

115
00:03:55,509 --> 00:03:53,840
those initial studies you've been here a

116
00:03:57,190 --> 00:03:55,519
few days now tell us about the work

117
00:03:59,589 --> 00:03:57,200
you're doing right now to get this

118
00:04:01,670 --> 00:03:59,599
payload ready okay the first part of our

119
00:04:03,990 --> 00:04:01,680
team arrived in the middle of last week

120
00:04:06,630 --> 00:04:04,000
the second half of the team arrived on

121
00:04:08,309 --> 00:04:06,640
friday and basically we set up the lab

122
00:04:10,229 --> 00:04:08,319
that was in very good shape for us

123
00:04:11,990 --> 00:04:10,239
already we had a lot of equipment that

124
00:04:14,070 --> 00:04:12,000
we brought from home

125
00:04:16,629 --> 00:04:14,080
basically got all of the equipment

126
00:04:19,110 --> 00:04:16,639
sterilized media made and then on

127
00:04:21,110 --> 00:04:19,120
saturday what happens here is we

128
00:04:23,670 --> 00:04:21,120
actually build the experiments within

129
00:04:25,430 --> 00:04:23,680
the hardware provided by a bioserve and

130
00:04:28,070 --> 00:04:25,440
it's at least a two-step if not a

131
00:04:30,469 --> 00:04:28,080
three-step process and on saturday we

132
00:04:32,230 --> 00:04:30,479
started building those experiments and

133
00:04:33,909 --> 00:04:32,240
the next two stages of that building

134
00:04:35,670 --> 00:04:33,919
process will be much more closely

135
00:04:38,070 --> 00:04:35,680
juxtaposed to launch

136
00:04:39,990 --> 00:04:38,080
so we'll spend 30 plus maybe days in

137
00:04:42,550 --> 00:04:40,000
space then come back right right so this

138
00:04:43,909 --> 00:04:42,560

experiment will be it has a couple of

139
00:04:45,670 --> 00:04:43,919
growth windows while on the

140
00:04:46,870 --> 00:04:45,680
international space station but the

141
00:04:49,749 --> 00:04:46,880
experiment will stay there for the

142
00:04:52,469 --> 00:04:49,759
duration of space x4 and return on space

143
00:04:56,469 --> 00:04:52,479
x4 more micros fati

144
00:04:59,909 --> 00:04:56,479
yes hopefully uh i mean we expecting

145
00:05:01,830 --> 00:04:59,919
micro 9 to come up on spacex

146
00:05:03,430 --> 00:05:01,840
so we'll be

147
00:05:05,830 --> 00:05:03,440
actually also using the same model

148
00:05:08,629 --> 00:05:05,840
organism which is east but it will be

149
00:05:11,590 --> 00:05:08,639
different type of objectives and

150
00:05:13,189 --> 00:05:11,600
scientific i guess investigation

151
00:05:14,390 --> 00:05:13,199
all right well it sounds like

152
00:05:16,390 --> 00:05:14,400
interesting work interesting

153
00:05:18,070 --> 00:05:16,400
investigations we can't wait to learn