
2
CAUTION

1
00:00:04,550 --> 00:00:02,119
it's really important that we send a

2
00:00:05,840 --> 00:00:04,560
rover that's clean and we make sure that

3
00:00:07,400 --> 00:00:05,850
it doesn't contaminate Mars

4
00:00:09,709 --> 00:00:07,410
my name is moojiji Stricker and I

5
00:00:11,839 --> 00:00:09,719
protect Mars from Earth bacteria the

6
00:00:14,570 --> 00:00:11,849
next Mars rover is slated to go to Mars

7
00:00:16,039 --> 00:00:14,580
collect samples so that eventually we

8
00:00:17,870 --> 00:00:16,049
can bring those samples back to earth

9
00:00:20,750 --> 00:00:17,880
and determine for the very first time

10
00:00:22,460 --> 00:00:20,760
did life exist on Mars there's nothing

11
00:00:24,230 --> 00:00:22,470
that we can build that sterile simply

12
00:00:26,060 --> 00:00:24,240
take swabs and wipes of the spacecraft

13
00:00:28,310 --> 00:00:26,070

as it's being built it gets put in an

14
00:00:30,019 --> 00:00:28,320
oven it gets put in various chambers and

15
00:00:32,030 --> 00:00:30,029
clean room so that we can maintain that

16
00:00:33,799 --> 00:00:32,040
level of cleanliness if we do find

17
00:00:35,600 --> 00:00:33,809
something on Mars we have to make sure

18
00:00:37,130 --> 00:00:35,610
it's something that actually came from

19
00:00:38,810 --> 00:00:37,140
Mars and not something up hitched a ride

20
00:00:41,990 --> 00:00:38,820
this is the place where the magic

21
00:00:44,959 --> 00:00:42,000
happens oh definitely in this lab we

22
00:00:46,970 --> 00:00:44,969
look specifically at spores so spores

23
00:00:49,279 --> 00:00:46,980
are those hardy microorganisms that can

24
00:00:51,020 --> 00:00:49,289
actually survive if it made it on the

25
00:00:54,439 --> 00:00:51,030
spacecraft of the journey through space

26
00:00:56,450 --> 00:00:54,449
through the vacuum it's very humbling to

27
00:00:58,369 --> 00:00:56,460
be a part of this big project because

28
00:01:00,080 --> 00:00:58,379
there are hundreds of people that have

29
00:01:02,209 --> 00:01:00,090
to come together and build a spacecraft

30
00:01:04,640 --> 00:01:02,219
there is no one person that can say I

31
00:01:07,160 --> 00:01:04,650
did this I made this happen it's always

32
00:01:09,560 --> 00:01:07,170
a we I owe it all to Carl Sagan and

33
00:01:11,330 --> 00:01:09,570
watching the cosmos I remember being a

34
00:01:13,399 --> 00:01:11,340
little kid going to the public library

35
00:01:15,050 --> 00:01:13,409
and renting that VHS and from that

36
00:01:17,570 --> 00:01:15,060
moment the light bulb turned on it

37
00:01:19,580 --> 00:01:17,580
actually was a start of my passion of

38
00:01:21,679 --> 00:01:19,590

science communications we are citizens

39
00:01:24,499 --> 00:01:21,689
of our universe you have to be good

40
00:01:26,179 --> 00:01:24,509
ambassadors when we are exploring other

41
00:01:33,100 --> 00:01:26,189
planets that are moved so it's the right

42
00:01:38,380 --> 00:01:35,110
NASA's Jet Propulsion Laboratory in

43
00:01:41,530 --> 00:01:38,390
Southern California JPL is where the

44
00:01:44,350 --> 00:01:41,540
Mars 2020 mission and perseverance rover

45
00:01:47,170 --> 00:01:44,360
are managed getting to Mars is a test of

46
00:01:49,450 --> 00:01:47,180
perseverance in itself there are so many

47
00:01:51,610 --> 00:01:49,460
incredible stories from the thousands of

48
00:01:54,160 --> 00:01:51,620
people who are part of the mission today

49
00:01:57,490 --> 00:01:54,170
we're with one of the many faces behind

50
00:01:59,650 --> 00:01:57,500
the spacecraft mujika Stricker is the

51
00:02:02,350 --> 00:01:59,660
planet Protection Airi League for Mars

52
00:02:05,020 --> 00:02:02,360
2020 she's making sure the perseverance

53
00:02:08,199 --> 00:02:05,030
Rover carries as few microbes as

54
00:02:10,120 --> 00:02:08,209
possible from Earth to Mars she joins us

55
00:02:12,130 --> 00:02:10,130
live from the remote planetary

56
00:02:15,100 --> 00:02:12,140
protection lab at Kennedy Space Center

57
00:02:17,710 --> 00:02:15,110
she is there by herself and will answer

58
00:02:20,020 --> 00:02:17,720
some questions now if you have any

59
00:02:22,000 --> 00:02:20,030
questions you'd like to ask you can

60
00:02:25,000 --> 00:02:22,010
leave them right here in the YouTube

61
00:02:28,449 --> 00:02:25,010
chat or post them to social media with

62
00:02:29,910 --> 00:02:28,459
the ask NASA hashtag thanks for talking

63
00:02:34,000 --> 00:02:29,920

to us today mu

64
00:02:35,979 --> 00:02:34,010
thanks for having me so to start off why

65
00:02:41,110 --> 00:02:35,989
are you at the Kennedy Space Center in

66
00:02:43,390 --> 00:02:41,120
Florida so the hardware comes from JPL

67
00:02:45,670 --> 00:02:43,400
from all around the United States and

68
00:02:48,759 --> 00:02:45,680
around the world and it's integrated and

69
00:02:50,050 --> 00:02:48,769
tested at JPL in part but we still have

70
00:02:52,630 --> 00:02:50,060
to bring it here to the Kennedy Space

71
00:02:54,610 --> 00:02:52,640
Center finish up tests put it on a

72
00:02:55,960 --> 00:02:54,620
rocket and launch it to Mars so that's

73
00:02:59,520 --> 00:02:55,970
why we're here we're getting toward that

74
00:03:02,920 --> 00:02:59,530
late stage we're pretty close to launch

75
00:03:05,979 --> 00:03:02,930
now you're a planetary protection lead

76
00:03:10,630 --> 00:03:05,989
that is a pretty cool title so what does

77
00:03:13,570 --> 00:03:10,640
your job entail so my job entails making

78
00:03:16,720 --> 00:03:13,580
sure and my team also with me make sure

79
00:03:19,479 --> 00:03:16,730
that we can build test launch and land

80
00:03:22,600 --> 00:03:19,489
we're in a way that keeps the spacecraft

81
00:03:24,699 --> 00:03:22,610
clean the perserverence rover will carry

82
00:03:26,620 --> 00:03:24,709
a limited amount of biological

83
00:03:28,990 --> 00:03:26,630
contamination from Earth and we have to

84
00:03:31,110 --> 00:03:29,000
make sure that it's low so that we can

85
00:03:35,140 --> 00:03:31,120
preserve the natural environment on Mars

86
00:03:39,430 --> 00:03:35,150
and kind of do that why is it important

87
00:03:41,380 --> 00:03:39,440
to keep it so clean yeah besides it

88
00:03:42,970 --> 00:03:41,390

being the right thing to do as you go

89
00:03:44,750 --> 00:03:42,980
there obviously you don't want to

90
00:03:47,210 --> 00:03:44,760
contaminate the environment that you're

91
00:03:49,729 --> 00:03:47,220
luring and trying to understand its past

92
00:03:52,100 --> 00:03:49,739
right so besides it being the right

93
00:03:53,720 --> 00:03:52,110
thing to do it's also part of an issue

94
00:03:56,240 --> 00:03:53,730
international treaty that we've signed

95
00:03:58,729 --> 00:03:56,250
so the United States is a signatory to

96
00:04:01,850 --> 00:03:58,739
an international treaty called outer

97
00:04:03,800 --> 00:04:01,860
space treaty and that treaty mandates

98
00:04:05,600 --> 00:04:03,810
that we have to limit the total amount

99
00:04:09,830 --> 00:04:05,610
of microorganisms that we send on our

100
00:04:12,080 --> 00:04:09,840
spacecraft speaking of the rover it was

101
00:04:13,670 --> 00:04:12,090
recently named perseverance and I want

102
00:04:17,240 --> 00:04:13,680
to get your thoughts what does the name

103
00:04:19,279 --> 00:04:17,250
mean to you personally yeah

104
00:04:21,319 --> 00:04:19,289
perseverance I was so excited when that

105
00:04:23,960 --> 00:04:21,329
name was chosen there were amazing

106
00:04:27,170 --> 00:04:23,970
candidates but perseverance in itself is

107
00:04:30,020 --> 00:04:27,180
really resonates with me in addition to

108
00:04:31,640 --> 00:04:30,030
building this complicated Rover that

109
00:04:33,680 --> 00:04:31,650
takes a lot of perseverance on the

110
00:04:36,050 --> 00:04:33,690
day-to-day it also took a lot of

111
00:04:38,270 --> 00:04:36,060
perseverance in every one of our lives

112
00:04:40,670 --> 00:04:38,280
in my own life just to get to where I am

113
00:04:43,550 --> 00:04:40,680

today you have to persevere through so

114
00:04:46,430 --> 00:04:43,560
many struggles a lot of schooling just

115
00:04:49,010 --> 00:04:46,440
to get to to be part of this so

116
00:04:52,550 --> 00:04:49,020
perseverance has many many meetings and

117
00:04:54,589 --> 00:04:52,560
all great meetings for me they're very -

118
00:04:56,210 --> 00:04:54,599
lots of layers and I want to know

119
00:04:57,680 --> 00:04:56,220
actually how did you get where you are

120
00:05:00,439 --> 00:04:57,690
today like what did you study in school

121
00:05:04,159 --> 00:05:00,449
what kind of jobs led to you to where

122
00:05:06,409 --> 00:05:04,169
you are now yeah so I started off with

123
00:05:08,210 --> 00:05:06,419
an undergraduate degree a bachelor's

124
00:05:10,189 --> 00:05:08,220
degree in physics where I studied

125
00:05:12,560 --> 00:05:10,199
atmospheric sciences at Hampton

126
00:05:16,159 --> 00:05:12,570
University in Virginia and there I

127
00:05:18,740 --> 00:05:16,169
started morphing into the love of plasma

128
00:05:20,089 --> 00:05:18,750
physics and for my masters in ph.d

129
00:05:23,089 --> 00:05:20,099
actually studied at Drexel University

130
00:05:25,120 --> 00:05:23,099
and made plasma devices that would

131
00:05:27,860 --> 00:05:25,130
sterilize different spacecraft materials

132
00:05:29,659 --> 00:05:27,870
so it was a very natural progression to

133
00:05:32,089 --> 00:05:29,669
move into planetary protection because

134
00:05:34,070 --> 00:05:32,099
you need to make sure you can clean your

135
00:05:38,800 --> 00:05:34,080
hardware and keep it clean so that's

136
00:05:41,420 --> 00:05:38,810
what my entire PhD dissertation is about

137
00:05:43,490 --> 00:05:41,430
that's great so now that I'm done with

138
00:05:45,800 --> 00:05:43,500

my questions I'm going to see what

139
00:05:49,310 --> 00:05:45,810
people have on social media to ask you

140
00:05:52,250 --> 00:05:49,320
Monisha on twitter asks with respect to

141
00:05:54,469 --> 00:05:52,260
at nasa personal mission what were the

142
00:05:55,630 --> 00:05:54,479
top technology challenges in the whole

143
00:05:59,180 --> 00:05:55,640
effort

144
00:06:01,070 --> 00:05:59,190
Wow so there are I'm sure if you ask

145
00:06:02,690 --> 00:06:01,080
this question to any person they'll have

146
00:06:04,910 --> 00:06:02,700
a completely different answer depending

147
00:06:06,680 --> 00:06:04,920
on their perspective so I'll speak just

148
00:06:08,870 --> 00:06:06,690
to my perspective of planetary

149
00:06:10,730 --> 00:06:08,880
protection when you look at the

150
00:06:13,460 --> 00:06:10,740
technology challenges that we have the

151
00:06:15,800 --> 00:06:13,470
biggest thing is looking at the new and

152
00:06:17,180 --> 00:06:15,810
unique materials that is ultimately a

153
00:06:20,270 --> 00:06:17,190
great thing right we have these

154
00:06:23,570 --> 00:06:20,280
materials that can make processors work

155
00:06:26,690 --> 00:06:23,580
more quickly that really optimize our

156
00:06:28,550 --> 00:06:26,700
ability to do great science the thing is

157
00:06:30,800 --> 00:06:28,560
a lot of that is has material

158
00:06:33,080 --> 00:06:30,810
compatibility issues so back in the day

159
00:06:35,180 --> 00:06:33,090
when Viking was built and launched

160
00:06:38,000 --> 00:06:35,190
before it was launched it was actually

161
00:06:40,520 --> 00:06:38,010
put together and pushed into an oven so

162
00:06:43,100 --> 00:06:40,530
that it would be sterilized as entire

163
00:06:45,980 --> 00:06:43,110

system the thing is with this entire

164
00:06:48,380 --> 00:06:45,990
shift in technologies a great shift in

165
00:06:50,960 --> 00:06:48,390
technologies many materials aren't

166
00:06:53,060 --> 00:06:50,970
compatible to high temperatures so my

167
00:06:55,130 --> 00:06:53,070
big technology challenge is keeping up

168
00:06:56,720 --> 00:06:55,140
with the evolution of materials to make

169
00:06:58,700 --> 00:06:56,730
sure we can continue to keep it clean

170
00:07:00,800 --> 00:06:58,710
and we have really great options

171
00:07:03,680 --> 00:07:00,810
actually for the 2020 mission including

172
00:07:05,240 --> 00:07:03,690
vapor hydrogen peroxide so if you go to

173
00:07:06,680 --> 00:07:05,250
your store the drugstore and you go to

174
00:07:08,750 --> 00:07:06,690
the first date aisle that hydrogen

175
00:07:10,010 --> 00:07:08,760
peroxide that you see on the shelf it's

176
00:07:12,740 --> 00:07:10,020
kind of like that except more

177
00:07:14,870 --> 00:07:12,750
concentrated and vaporized and basically

178
00:07:16,970 --> 00:07:14,880
that can sterilize any material that's

179
00:07:18,380 --> 00:07:16,980
compatible with that process so there

180
00:07:21,740 --> 00:07:18,390
are a lot of great challenges that we've

181
00:07:23,990 --> 00:07:21,750
overcome every single day it was kind of

182
00:07:26,150 --> 00:07:24,000
speaking of the store Shotoku tech on

183
00:07:30,260 --> 00:07:26,160
twitter asks is this where all the

184
00:07:33,860 --> 00:07:30,270
disinfectant wipes have gone that's a

185
00:07:36,020 --> 00:07:33,870
great question so we add JPL and within

186
00:07:38,480 --> 00:07:36,030
NASA right we love calculating and

187
00:07:40,940 --> 00:07:38,490
planning ahead and so this mission has

188
00:07:42,950 --> 00:07:40,950

been in the works for over seven years

189
00:07:44,330 --> 00:07:42,960
but at least myself personally I've been

190
00:07:46,940 --> 00:07:44,340
working with the mission for seven years

191
00:07:48,890 --> 00:07:46,950
and early on in the mission we have to

192
00:07:51,080 --> 00:07:48,900
determine how many supplies that we need

193
00:07:53,330 --> 00:07:51,090
including disinfectants right and just

194
00:07:55,310 --> 00:07:53,340
disinfecting wipes and so that was

195
00:07:57,650 --> 00:07:55,320
calculated early on and so we didn't

196
00:08:00,560 --> 00:07:57,660
take any extra disinfectant wipes in

197
00:08:02,690 --> 00:08:00,570
fact we just have just enough for what

198
00:08:05,060 --> 00:08:02,700
we need to do so that we're not taking

199
00:08:07,780 --> 00:08:05,070
away from the the efforts that and the

200
00:08:10,790 --> 00:08:07,790
places where they really need

201
00:08:13,490 --> 00:08:10,800
planning ahead now Daniel on Twitter

202
00:08:16,930 --> 00:08:13,500
asks what did any earth microbes just

203
00:08:19,250 --> 00:08:16,940
die when leaving the Earth's atmosphere

204
00:08:22,760 --> 00:08:19,260
yeah and another all these great

205
00:08:25,550 --> 00:08:22,770
questions I love it um so yes and no

206
00:08:27,050 --> 00:08:25,560
right there are classes of microbes so

207
00:08:29,870 --> 00:08:27,060
if you saw in that little blurb of the

208
00:08:32,839 --> 00:08:29,880
video we look in particular for

209
00:08:35,620 --> 00:08:32,849
bacterial endospores because all the

210
00:08:38,570 --> 00:08:35,630
normal bacteria on your skin the staff

211
00:08:40,850 --> 00:08:38,580
they won't survive in the vacuum of

212
00:08:42,050 --> 00:08:40,860
space just fully exposed of course if

213
00:08:44,149 --> 00:08:42,060

they were protected like in the

214
00:08:46,550 --> 00:08:44,159
International Space Station possibly

215
00:08:49,130 --> 00:08:46,560
right but out in the exposed vacuum of

216
00:08:50,870 --> 00:08:49,140
space they would not survive but we do

217
00:08:53,930 --> 00:08:50,880
look for bacterial and uh spores or

218
00:08:56,540 --> 00:08:53,940
spores because those things are capable

219
00:09:00,440 --> 00:08:56,550
of staying in this dormant like shell

220
00:09:02,780 --> 00:09:00,450
state and it can even withstand being

221
00:09:05,000 --> 00:09:02,790
dormant for tens of millions of years

222
00:09:07,100 --> 00:09:05,010
and until the conditions are favorable

223
00:09:09,650 --> 00:09:07,110
it will stay dormant and then it could

224
00:09:12,350 --> 00:09:09,660
germinate and grow so we specifically

225
00:09:14,870 --> 00:09:12,360
look for those spores to make sure that

226
00:09:17,620 --> 00:09:14,880
they don't make its way to Mars because

227
00:09:23,030 --> 00:09:17,630
it could survive the journey the cold

228
00:09:25,400 --> 00:09:23,040
vacuum of space now Maximillian has a

229
00:09:30,260 --> 00:09:25,410
question for you did your a job exist

230
00:09:33,230 --> 00:09:30,270
during Apollo oh that's a great question

231
00:09:37,520 --> 00:09:33,240
so our job actually started somewhere

232
00:09:42,950 --> 00:09:37,530
around 1967 actually exactly 1987 when

233
00:09:44,810 --> 00:09:42,960
the outer space was signed and from that

234
00:09:46,579 --> 00:09:44,820
moment actually before then and during

235
00:09:49,640 --> 00:09:46,589
the Apollo time right there was things

236
00:09:52,040 --> 00:09:49,650
like quarantine that was kind of a

237
00:09:53,810 --> 00:09:52,050
prevalent knowledge that everybody knew

238
00:09:55,400 --> 00:09:53,820

that if you're coming from outer space

239
00:09:57,650 --> 00:09:55,410
and you're coming back then you probably

240
00:10:00,140 --> 00:09:57,660
need to isolate yourself just in case

241
00:10:03,230 --> 00:10:00,150
something is there but at least when we

242
00:10:04,850 --> 00:10:03,240
sign that international treaty 1967 that

243
00:10:07,220 --> 00:10:04,860
is when planetary protection was

244
00:10:09,230 --> 00:10:07,230
officially a thing and that's why biking

245
00:10:13,670 --> 00:10:09,240
was the first mission that PPE planetary

246
00:10:15,800 --> 00:10:13,680
protection was implemented on now how

247
00:10:18,079 --> 00:10:15,810
will the perseverance rover prepare for

248
00:10:18,820 --> 00:10:18,089
sample return does it put it in a box

249
00:10:20,440 --> 00:10:18,830
with samples

250
00:10:24,160 --> 00:10:20,450
on the ground for pickup that's what

251
00:10:26,680 --> 00:10:24,170
Thomas s on youtube wants to know yeah

252
00:10:28,540 --> 00:10:26,690
so the architecture at Sam's today and

253
00:10:32,320 --> 00:10:28,550
right now it's not an official project

254
00:10:34,810 --> 00:10:32,330
so big asterisk right but what we're

255
00:10:36,730 --> 00:10:34,820
gonna do for the 2020 mission is collect

256
00:10:38,350 --> 00:10:36,740
the samples on the surface of Mars and

257
00:10:40,990 --> 00:10:38,360
every once in a while there's going to

258
00:10:42,790 --> 00:10:41,000
be a caching Depot of a bunch of tubes

259
00:10:45,340 --> 00:10:42,800
that are gonna be deposited on the

260
00:10:47,380 --> 00:10:45,350
surface of Mars waiting for a future

261
00:10:52,060 --> 00:10:47,390
mission to come and pick it up to

262
00:10:54,760 --> 00:10:52,070
eventually send back to earth now I have

263
00:10:57,430 --> 00:10:54,770

one from Hannah from YouTube she says

264
00:11:00,460 --> 00:10:57,440
I'm from Mexico and I'm only a teenager

265
00:11:04,510 --> 00:11:00,470
what can I do to work in the future as a

266
00:11:07,270 --> 00:11:04,520
chemist at NASA wow that's a really

267
00:11:10,960 --> 00:11:07,280
great question the the thing is with

268
00:11:12,430 --> 00:11:10,970
NASA as a whole we the NASA believes an

269
00:11:15,640 --> 00:11:12,440
international collaboration and it's

270
00:11:17,650 --> 00:11:15,650
evidenced by our 2020 Rover right there

271
00:11:20,050 --> 00:11:17,660
are seven different payload instruments

272
00:11:22,750 --> 00:11:20,060
and several of them come from Norway

273
00:11:27,130 --> 00:11:22,760
from Spain and our international

274
00:11:28,630 --> 00:11:27,140
partners France the UK are vital because

275
00:11:31,830 --> 00:11:28,640
it doesn't matter really with the

276
00:11:35,230 --> 00:11:31,840
borders what matters is your scientific

277
00:11:37,180 --> 00:11:35,240
technology and just ready readiness to

278
00:11:39,580 --> 00:11:37,190
learn and and help us get to the next

279
00:11:41,800 --> 00:11:39,590
hurdle of understanding and so it's

280
00:11:44,770 --> 00:11:41,810
great that you're a young future

281
00:11:46,510 --> 00:11:44,780
scientist from Mexico I would say still

282
00:11:48,040 --> 00:11:46,520
keep an eye out on NASA obviously

283
00:11:50,740 --> 00:11:48,050
because international collaborations are

284
00:11:54,160 --> 00:11:50,750
happening all the time just be

285
00:11:56,440 --> 00:11:54,170
passionate about your work study and app

286
00:11:58,570 --> 00:11:56,450
in your own way follow of course the

287
00:12:00,820 --> 00:11:58,580
Giants but also figure out what makes

288
00:12:02,770 --> 00:12:00,830

you excited because that will be your

289
00:12:06,700 --> 00:12:02,780
thing your expertise to really make you

290
00:12:07,840 --> 00:12:06,710
shine and be appealing for NASA that is

291
00:12:11,260 --> 00:12:07,850
a great answer

292
00:12:13,510 --> 00:12:11,270
so Turek Ally on u2 asks what are the

293
00:12:17,890 --> 00:12:13,520
procedures for checking the Sanitation

294
00:12:21,250 --> 00:12:17,900
of the rover ah so there are many steps

295
00:12:25,480 --> 00:12:21,260
that we use to check how clean the rover

296
00:12:28,810 --> 00:12:25,490
is in fact we've taken over 10,000 wipes

297
00:12:31,680 --> 00:12:28,820
and swabs of the spacecraft of the rover

298
00:12:34,050 --> 00:12:31,690
itself the launch vehicle

299
00:12:35,460 --> 00:12:34,060
of the descent stage at rocket jetpack

300
00:12:38,460 --> 00:12:35,470
that's gonna help it land on the surface

301
00:12:40,920 --> 00:12:38,470
of Mars we have over 10,000 swabs and

302
00:12:43,410 --> 00:12:40,930
wipes of those particular surfaces and

303
00:12:45,660 --> 00:12:43,420
we grow them up in the lab and we

304
00:12:47,580 --> 00:12:45,670
actually make sure that not only is it

305
00:12:49,650 --> 00:12:47,590
clean because we would prefer to see

306
00:12:52,410 --> 00:12:49,660
nothing grow on the plates right but

307
00:12:55,590 --> 00:12:52,420
sometimes things pop up and we actually

308
00:12:59,310 --> 00:12:55,600
can identify what it is you can actually

309
00:13:01,410 --> 00:12:59,320
see whether or not it's a spore or a non

310
00:13:02,760 --> 00:13:01,420
spore of spore-forming microorganism you

311
00:13:04,920 --> 00:13:02,770
can find a lot of really interesting

312
00:13:08,520 --> 00:13:04,930
things about what is living in the

313
00:13:10,350 --> 00:13:08,530

cleanroom environment now kind of Lily

314
00:13:12,060 --> 00:13:10,360
Jean hole has a follow-up question for

315
00:13:16,200 --> 00:13:12,070
that from YouTube she asked how long do

316
00:13:20,610 --> 00:13:16,210
you spend on a typical job whoo on a

317
00:13:21,540 --> 00:13:20,620
typical job within NASA or within the

318
00:13:23,310 --> 00:13:21,550
2020 mission

319
00:13:26,450 --> 00:13:23,320
well maybe I'll answer from the

320
00:13:30,240 --> 00:13:26,460
perspective of let's do 2020 mission

321
00:13:32,250 --> 00:13:30,250
yeah yeah so it's a pad so depending on

322
00:13:34,410 --> 00:13:32,260
the the mission life cycle right there

323
00:13:38,010 --> 00:13:34,420
are times where I'm spending all day

324
00:13:39,750 --> 00:13:38,020
every day in the cleanroom especially if

325
00:13:43,260 --> 00:13:39,760
we have a critical integration happening

326
00:13:45,960 --> 00:13:43,270
oh I have to spend sometimes five six

327
00:13:48,000 --> 00:13:45,970
hours in the cleanroom making sure that

328
00:13:50,040 --> 00:13:48,010
the hardware comes up and integrates

329
00:13:52,200 --> 00:13:50,050
into the spacecraft in a way that

330
00:13:54,660 --> 00:13:52,210
maintains the cleanliness other times

331
00:13:57,660 --> 00:13:54,670
I'm sitting at my computer on meetings

332
00:13:59,790 --> 00:13:57,670
on telecoms and making sure that we have

333
00:14:01,500 --> 00:13:59,800
all the right protocols in place so that

334
00:14:04,620 --> 00:14:01,510
we can continue to keep that spacecraft

335
00:14:06,630 --> 00:14:04,630
clean so a lot of meetings a lot of lab

336
00:14:10,020 --> 00:14:06,640
work and a lot of cleanroom work it was

337
00:14:12,630 --> 00:14:10,030
kind of my day to day and telephones are

338
00:14:15,270 --> 00:14:12,640

usually telephone conferences right yep

339
00:14:19,470 --> 00:14:15,280
hey thanks for that yeah telephone

340
00:14:20,670 --> 00:14:19,480
Toddlers and then the license like seven

341
00:14:23,460 --> 00:14:20,680
years I've been working on this for

342
00:14:25,950 --> 00:14:23,470
about seven years so what will I do

343
00:14:30,420 --> 00:14:25,960
after this just sadly sit and think

344
00:14:33,690 --> 00:14:30,430
about the samples to do with your time

345
00:14:36,180 --> 00:14:33,700
now for you to ask what have you learned

346
00:14:37,800 --> 00:14:36,190
from this pandemic that you can apply to

347
00:14:41,190 --> 00:14:37,810
Mars exploration

348
00:14:44,730 --> 00:14:41,200
oh yeah that's a it's a great question

349
00:14:47,490 --> 00:14:44,740
what I'm really excited about is what

350
00:14:49,889 --> 00:14:47,500
others have learned about the pandemic

351
00:14:52,100 --> 00:14:49,899
that is kind of similar to what I do in

352
00:14:54,810 --> 00:14:52,110
the day today I'm actually kind of

353
00:14:58,170 --> 00:14:54,820
interested to see how other people react

354
00:15:00,360 --> 00:14:58,180
to for example having face coverings

355
00:15:03,600 --> 00:15:00,370
face coverings are something that we do

356
00:15:05,850 --> 00:15:03,610
all the time in clean environments so

357
00:15:07,650 --> 00:15:05,860
going outside in the lab and seeing

358
00:15:09,510 --> 00:15:07,660
other people with space covers like whoa

359
00:15:10,860 --> 00:15:09,520
that's that's great that they're doing

360
00:15:12,900 --> 00:15:10,870
that it's the right thing to do it's

361
00:15:15,300 --> 00:15:12,910
being done sustainably especially for

362
00:15:17,160 --> 00:15:15,310
the face covers that you can wash so

363
00:15:19,320 --> 00:15:17,170

it's what's excites me is that other

364
00:15:21,269 --> 00:15:19,330
people are learning very indirectly

365
00:15:22,980 --> 00:15:21,279
about the importance of planetary

366
00:15:24,750 --> 00:15:22,990
protection because you're doing the same

367
00:15:26,519 --> 00:15:24,760
thing just from person to person you're

368
00:15:28,380 --> 00:15:26,529
making sure your microbes kind of stay

369
00:15:30,150 --> 00:15:28,390
with you and other people's microbes

370
00:15:32,100 --> 00:15:30,160
stays with them so you're just being

371
00:15:35,460 --> 00:15:32,110
responsible with your with the threat of

372
00:15:38,760 --> 00:15:35,470
your microbes and we have one more

373
00:15:40,110 --> 00:15:38,770
question James Driscoll on YouTube wants

374
00:15:42,180 --> 00:15:40,120
to talk about what you're wearing I see

375
00:15:44,460 --> 00:15:42,190
you are in a smock or what other things

376
00:15:45,990 --> 00:15:44,470
you are wear around the spacecraft we

377
00:15:49,380 --> 00:15:46,000
kind of touched on that look tell us

378
00:15:53,040 --> 00:15:49,390
about your gear yeah so our gear is

379
00:15:55,050 --> 00:15:53,050
pretty cool I would say we call it the

380
00:15:57,960 --> 00:15:55,060
main suit that we wear it's called a

381
00:15:59,910 --> 00:15:57,970
bunny suit and this bunny suit protects

382
00:16:01,560 --> 00:15:59,920
the spacecraft from the number one

383
00:16:05,490 --> 00:16:01,570
source of contamination in the cleanroom

384
00:16:08,850 --> 00:16:05,500
which are humans so in the cleanroom we

385
00:16:12,150 --> 00:16:08,860
typically wear a face mask a hairnet the

386
00:16:14,519 --> 00:16:12,160
full bunny suit including boots on our

387
00:16:16,740 --> 00:16:14,529
feet because the second biggest source

388
00:16:18,090 --> 00:16:16,750

of contamination is the environment so

389
00:16:20,699 --> 00:16:18,100
you want to make sure you have clean

390
00:16:23,850 --> 00:16:20,709
shoes so that when you walk in you don't

391
00:16:26,190 --> 00:16:23,860
track in a bunch of dirt so we wear that

392
00:16:28,740 --> 00:16:26,200
on a day to day in the cleanroom when

393
00:16:31,790 --> 00:16:28,750
we're working with the most critical

394
00:16:33,990 --> 00:16:31,800
pieces of hardware the seals the tubes

395
00:16:36,990 --> 00:16:34,000
everything that will touch the Martian

396
00:16:40,230 --> 00:16:37,000
soil we actually add an extra level of a

397
00:16:42,780 --> 00:16:40,240
barrier we actually wear sterile goggles

398
00:16:44,940 --> 00:16:42,790
because everybody has eyelash mites and

399
00:16:46,579 --> 00:16:44,950
mites on their face whether or not you

400
00:16:49,590 --> 00:16:46,589
know it fun fact

401
00:16:51,960 --> 00:16:49,600
and so we have to keep those mites on

402
00:16:54,930 --> 00:16:51,970
our eyes and face separate from

403
00:16:56,610 --> 00:16:54,940
especially those critical parts so we

404
00:16:57,000 --> 00:16:56,620
have a whole other layer of sterile

405
00:16:59,430 --> 00:16:57,010
goggle

406
00:17:02,580 --> 00:16:59,440
sterile gloves and a sterile smock on

407
00:17:05,610 --> 00:17:02,590
top so lots of fun things that we

408
00:17:08,640 --> 00:17:05,620
planned from years ago that is really

409
00:17:11,010 --> 00:17:08,650
getting us to mission success that's

410
00:17:12,870 --> 00:17:11,020
great and I want to thank you so much

411
00:17:15,120 --> 00:17:12,880
for talking to us you have one of the

412
00:17:17,040 --> 00:17:15,130
coolest jobs I must say so

413
00:17:21,060 --> 00:17:17,050

thank you for joining us and thank you

414
00:17:25,110 --> 00:17:21,070
for your questions thanks Moo bye thanks

415
00:17:28,230 --> 00:17:25,120
hey now the launch period for Mars 2020

416
00:17:29,600 --> 00:17:28,240
opens on July 17th and the rover is

417
00:17:32,340 --> 00:17:29,610
slated to land on the Red Planet

418
00:17:34,530 --> 00:17:32,350
February 18 2021

419
00:17:37,550 --> 00:17:34,540
where the latest on the mission follow

420
00:17:40,080 --> 00:17:37,560
@nasa persevere on Twitter and Facebook

421
00:17:42,630 --> 00:17:40,090
you can watch all the behind the

422
00:17:46,230 --> 00:17:42,640
spacecraft video profiles on the NASA

423
00:17:48,720 --> 00:17:46,240
360 YouTube channel and we'll be doing q

424
00:17:51,330 --> 00:17:48,730
and A's with the Mars 2020 team members

425
00:17:53,700 --> 00:17:51,340
every Thursday at 1:00 p.m. Pacific time

426
00:17:56,430 --> 00:17:53,710
4:00 p.m. Eastern for the next few weeks

427
00:17:59,130 --> 00:17:56,440
and if you will explore the universe

428
00:18:02,700 --> 00:17:59,140
from the comfort of your home check out

429
00:18:06,570 --> 00:18:02,710
our NASA at home activities for families

430
00:18:11,550 --> 00:18:06,580
and kids of all ages you can find them