1
00:00:21,830 --> 00:00:20,150
the international space station is a

2
00:00:23,670 --> 00:00:21,840
state-of-the-art research laboratory

3
00:00:26,550 --> 00:00:23,680
that allows scientific research to be

4
00:00:28,470 --> 00:00:26,560
performed in the microgravity of space

5
00:00:30,150 --> 00:00:28,480
research in this unique microgravity

6
00:00:32,470 --> 00:00:30,160
environment is advancing our knowledge

7
00:00:34,310 --> 00:00:32,480
of biology chemistry physics and

8
00:00:35,830 --> 00:00:34,320
physiology

9
00:00:37,750 --> 00:00:35,840
scientists from all over the world are

10
00:00:39,670 --> 00:00:37,760
using facilities on this high-flying

11
00:00:41,110 --> 00:00:39,680
international laboratory that is packed

12
00:00:43,670 --> 00:00:41,120
with some of the most sophisticated

13
00:00:45,830 --> 00:00:43,680

technologies ever designed

14
00:00:48,150 --> 00:00:45,840
station research brings new discoveries

15
00:00:50,229 --> 00:00:48,160
furthers technology development expands

16
00:00:55,189 --> 00:00:50,239
our limits of exploration and improves

17
00:00:58,470 --> 00:00:57,189
hi my name is janjit ginsler and i work

18
00:01:00,630 --> 00:00:58,480
on the international space station

19
00:01:02,310 --> 00:01:00,640
program at the nasa johnson space center

20
00:01:03,910 --> 00:01:02,320
in my day-to-day work i get to work with

21
00:01:05,350 --> 00:01:03,920
scientists and engineers who actually

22
00:01:07,350 --> 00:01:05,360
build hardware that flies to the

23
00:01:09,510 --> 00:01:07,360
international space station i also get

24
00:01:11,830 --> 00:01:09,520
to work on outreach projects

25
00:01:14,149 --> 00:01:11,840
today i'm at the ames research center

26
00:01:16,950 --> 00:01:14,159
out in california and with me i have dr

27
00:01:18,070 --> 00:01:16,960
sanjoy som who's going to be launching a

28
00:01:19,510 --> 00:01:18,080
really cool experiment to the

29
00:01:20,789 --> 00:01:19,520
international space station later on

30
00:01:22,469 --> 00:01:20,799
this year

31
00:01:23,749 --> 00:01:22,479
so sanjoy why don't you introduce

32
00:01:26,469 --> 00:01:23,759
yourself

33
00:01:28,390 --> 00:01:26,479
sure can do welcome to ames jane hi

34
00:01:30,550 --> 00:01:28,400
everyone my name is sanjoy and i have

35
00:01:32,630 --> 00:01:30,560
multiple jobs here at nasa ames on the

36
00:01:35,109 --> 00:01:32,640
one side i'm a scientist studying life

37
00:01:36,710 --> 00:01:35,119
in extreme environments on the other end

38
00:01:38,550 --> 00:01:36,720

i'm an engineer working for the fruit

39
00:01:40,710 --> 00:01:38,560
fly lab project which is launching this

40
00:01:43,030 --> 00:01:40,720
fall at international space station

41
00:01:45,510 --> 00:01:43,040
myself and my colleague julie are two

42
00:01:47,030 --> 00:01:45,520
systems engineer for fruitfly lab that

43
00:01:48,710 --> 00:01:47,040
means we're in charge of making sure

44
00:01:50,950 --> 00:01:48,720
that the science requirements are

45
00:01:52,550 --> 00:01:50,960
translated to the engineering hardware

46
00:01:54,069 --> 00:01:52,560
and that the engineering hardware is

47
00:01:55,830 --> 00:01:54,079
then qualified for flight to the

48
00:01:57,429 --> 00:01:55,840
international space station

49
00:01:59,670 --> 00:01:57,439
wow that sounds really cool it's

50
00:02:01,910 --> 00:01:59,680
fascinating work

51
00:02:04,069 --> 00:02:01,920
hi everyone welcome to the actual fruit

52
00:02:06,709 --> 00:02:04,079
fly lab within the science laboratories

53
00:02:09,510 --> 00:02:06,719
at nasa ames research center this is my

54
00:02:11,589 --> 00:02:09,520
colleague dr hosamani he is a scientist

55
00:02:14,070 --> 00:02:11,599
with the fruitful lab mission

56
00:02:16,550 --> 00:02:14,080
it is very important for us engineers to

57
00:02:18,869 --> 00:02:16,560
talk to the scientists regularly to make

58
00:02:21,430 --> 00:02:18,879
sure that their hypotheses that they are

59
00:02:23,589 --> 00:02:21,440
testing on the space station is captured

60
00:02:24,949 --> 00:02:23,599
by my engineering hardware so i just

61
00:02:26,869 --> 00:02:24,959
want to emphasize that when you're in

62
00:02:28,550 --> 00:02:26,879
school it's not only about the academics

63
00:02:29,670 --> 00:02:28,560

right learn how to communicate with your

64
00:02:31,430 --> 00:02:29,680
colleagues because that's going to be

65
00:02:33,750 --> 00:02:31,440
extremely important in your professional

66
00:02:36,309 --> 00:02:33,760
career so now we're going to show you

67
00:02:38,390 --> 00:02:36,319
the hardware that dr hausamani's flies

68
00:02:39,910 --> 00:02:38,400
are going to be going to be living in

69
00:02:41,350 --> 00:02:39,920
and that we're launching this fall to

70
00:02:42,949 --> 00:02:41,360
the international space station come

71
00:02:44,630 --> 00:02:42,959
check it out

72
00:02:45,910 --> 00:02:44,640
okay so now we're still in the fruit fly

73
00:02:47,830 --> 00:02:45,920
lab and we're going to talk about the

74
00:02:49,430 --> 00:02:47,840
hardware that is used to satisfy the

75
00:02:52,070 --> 00:02:49,440
scientific requirements that were given

76
00:02:53,350 --> 00:02:52,080
to us by dr hozamani and his team now

77
00:02:54,630 --> 00:02:53,360
before we do that let's talk a little

78
00:02:56,949 --> 00:02:54,640
bit about the international space

79
00:02:59,030 --> 00:02:56,959
station and where we'll be located

80
00:03:01,190 --> 00:02:59,040
the location in the international space

81
00:03:02,949 --> 00:03:01,200
station within which our observation

82
00:03:05,270 --> 00:03:02,959
system needs to fit in has already been

83
00:03:07,350 --> 00:03:05,280
given to us that means we cannot build

84
00:03:09,270 --> 00:03:07,360
it in any kind of shape or form it needs

85
00:03:11,190 --> 00:03:09,280
to fit in slight slots that already

86
00:03:13,030 --> 00:03:11,200
exist on the space station

87
00:03:15,110 --> 00:03:13,040
these slots are the same on the

88
00:03:16,630 --> 00:03:15,120

centrifuge which is right next to where

89
00:03:19,030 --> 00:03:16,640
we're going to be living

90
00:03:21,350 --> 00:03:19,040
so the flies go into the observation

91
00:03:23,270 --> 00:03:21,360
system the observation system goes into

92
00:03:25,270 --> 00:03:23,280
the what's called a biorack in which

93
00:03:26,630 --> 00:03:25,280
they will sit in space this is in

94
00:03:28,470 --> 00:03:26,640
microgravity

95
00:03:31,110 --> 00:03:28,480
right next to it is a centrifuge that

96
00:03:33,670 --> 00:03:31,120
will house also the observation unit and

97
00:03:35,030 --> 00:03:33,680
sets and the whole thing will spin

98
00:03:37,350 --> 00:03:35,040
the reason it's spinning is that it's

99
00:03:40,070 --> 00:03:37,360
going to impose an artificial gravity

100
00:03:41,750 --> 00:03:40,080
like we have on earth to the flies okay

101
00:03:43,270 --> 00:03:41,760
so now that we know how we're housed on

102
00:03:44,710 --> 00:03:43,280
the international space station let's

103
00:03:47,350 --> 00:03:44,720
talk about the constraints for our

104
00:03:50,630 --> 00:03:47,360
hardware the first constraint is that we

105
00:03:52,070 --> 00:03:50,640
have to reuse the house of the flies

106
00:03:53,830 --> 00:03:52,080
this cassette

107
00:03:56,470 --> 00:03:53,840
is where the flies will be living for

108
00:03:58,309 --> 00:03:56,480
the duration of their mission in space

109
00:04:00,229 --> 00:03:58,319
this cassette was flown on the space

110
00:04:02,390 --> 00:04:00,239
shuttle in 2006 and one of the

111
00:04:03,990 --> 00:04:02,400
constraints was that you need to reuse

112
00:04:06,149 --> 00:04:04,000
the same hardware

113
00:04:07,990 --> 00:04:06,159

this blue tray you find in here is

114
00:04:09,350 --> 00:04:08,000
actually the food for the flies and

115
00:04:11,750 --> 00:04:09,360
that's important for an additional

116
00:04:15,030 --> 00:04:11,760
constraint we'll talk about in a bit

117
00:04:16,229 --> 00:04:15,040
so we need to build a unit that houses

118
00:04:17,990 --> 00:04:16,239
this same

119
00:04:20,150 --> 00:04:18,000
cassette on the international space

120
00:04:22,150 --> 00:04:20,160
station satisfying one of the scientific

121
00:04:23,749 --> 00:04:22,160
requirements given to us by the team

122
00:04:25,990 --> 00:04:23,759
that is they want to monitor the

123
00:04:28,710 --> 00:04:26,000
behavior of the flies in space

124
00:04:31,270 --> 00:04:28,720
that means we need a camera and if you

125
00:04:33,350 --> 00:04:31,280
put this inside a box with a camera it's

126
00:04:35,110 --> 00:04:33,360
not going to work very well why because

127
00:04:36,629 --> 00:04:35,120
there are no lights so we want to put

128
00:04:38,870 --> 00:04:36,639
lights in there as well but let's be

129
00:04:40,870 --> 00:04:38,880
smart about it let's install lights that

130
00:04:43,270 --> 00:04:40,880
simulate the day night cycles that the

131
00:04:44,150 --> 00:04:43,280
fly would live through if they were on

132
00:04:46,790 --> 00:04:44,160
earth

133
00:04:48,230 --> 00:04:46,800
that's called the circadian cycle now if

134
00:04:49,909 --> 00:04:48,240
you just use the big bulb that would

135
00:04:51,670 --> 00:04:49,919
stress them out and stress is not good

136
00:04:54,230 --> 00:04:51,680
otherwise they don't behave the way the

137
00:04:55,590 --> 00:04:54,240
same way as they would on earth so how

138
00:04:58,070 --> 00:04:55,600

do we put

139
00:05:00,390 --> 00:04:58,080
this cassette inside a box with the

140
00:05:02,870 --> 00:05:00,400
camera and with the lights

141
00:05:04,629 --> 00:05:02,880
this box then needs to fit inside the

142
00:05:06,550 --> 00:05:04,639
racks that are already existing on the

143
00:05:10,390 --> 00:05:06,560
international space station

144
00:05:12,469 --> 00:05:10,400
so the important dimensions are your box

145
00:05:14,950 --> 00:05:12,479
cannot be much wider than this

146
00:05:17,029 --> 00:05:14,960
and probably only three times as tall as

147
00:05:18,710 --> 00:05:17,039
this cassette

148
00:05:20,390 --> 00:05:18,720
so another important constraint when

149
00:05:23,029 --> 00:05:20,400
working with biological specimens in

150
00:05:25,350 --> 00:05:23,039
space is temperature flies operate

151
00:05:27,350 --> 00:05:25,360
operate best between 20 and 25 degrees

152
00:05:29,189 --> 00:05:27,360
celsius and if you leave your lights and

153
00:05:31,350 --> 00:05:29,199
camera on for too long it's gonna get

154
00:05:33,430 --> 00:05:31,360
too hot so we need to think carefully

155
00:05:35,189 --> 00:05:33,440
about what is the timing of the cameras

156
00:05:37,270 --> 00:05:35,199
and the lights such that all the

157
00:05:39,510 --> 00:05:37,280
scientific requirements are met and our

158
00:05:41,749 --> 00:05:39,520
flies are still alive

159
00:05:44,070 --> 00:05:41,759
now if it gets too hot one way to

160
00:05:45,990 --> 00:05:44,080
dissipate away that heat is using fans

161
00:05:47,510 --> 00:05:46,000
so we could put one big powerful fan

162
00:05:49,430 --> 00:05:47,520
that removes all the heats and that

163
00:05:51,029 --> 00:05:49,440

would be good but the problem is is that

164
00:05:52,469 --> 00:05:51,039
we are constrained by the amount of

165
00:05:53,670 --> 00:05:52,479
power we can use

166
00:05:55,909 --> 00:05:53,680
that's because international space

167
00:05:57,350 --> 00:05:55,919
station uses solar panels and there's a

168
00:05:58,629 --> 00:05:57,360
lot of really exciting science and

169
00:06:01,430 --> 00:05:58,639
engineering work that's done on the

170
00:06:03,270 --> 00:06:01,440
station all of all of them want power so

171
00:06:05,189 --> 00:06:03,280
there's only a specific amount that is

172
00:06:06,790 --> 00:06:05,199
dedicated to us so we can't use a lot we

173
00:06:09,029 --> 00:06:06,800
have to be very judicious in how the

174
00:06:10,469 --> 00:06:09,039
power is used

175
00:06:12,870 --> 00:06:10,479
one constraint that we have on the space

176
00:06:14,150 --> 00:06:12,880
station is the astronaut time they have

177
00:06:15,590 --> 00:06:14,160
a bunch of experiment that they're

178
00:06:17,749 --> 00:06:15,600
working on so they only have a small

179
00:06:18,790 --> 00:06:17,759
amount of time dedicated to hours

180
00:06:20,870 --> 00:06:18,800
and where they're going to be really

181
00:06:22,790 --> 00:06:20,880
helpful for us is to change the food for

182
00:06:24,550 --> 00:06:22,800
the flies because the food in this

183
00:06:26,790 --> 00:06:24,560
cassette is not enough to sustain the

184
00:06:29,590 --> 00:06:26,800
flies for the entire duration of the

185
00:06:31,510 --> 00:06:29,600
mission so what we have done is built a

186
00:06:33,430 --> 00:06:31,520
piece of hardware like this it's called

187
00:06:35,270 --> 00:06:33,440
the food change our platform which is

188
00:06:36,950 --> 00:06:35,280

especially specifically designed for the

189
00:06:39,510 --> 00:06:36,960
astronauts to change the food here

190
00:06:41,270 --> 00:06:39,520
quickly and efficiently the way it works

191
00:06:44,390 --> 00:06:41,280
is that you put the cassette inside this

192
00:06:45,909 --> 00:06:44,400
changeout platform like so and then a

193
00:06:47,510 --> 00:06:45,919
real changeout platform would have the

194
00:06:49,270 --> 00:06:47,520
new fly cassette

195
00:06:51,350 --> 00:06:49,280
in here i'm sorry the new

196
00:06:54,309 --> 00:06:51,360
the new food in here and then the

197
00:06:56,950 --> 00:06:54,319
astronauts will use this bar and push in

198
00:06:57,830 --> 00:06:56,960
the new food and pushing out the old

199
00:07:02,790 --> 00:06:57,840
food

200
00:07:04,870 --> 00:07:02,800
flies which we can then preserve for a

201
00:07:06,150 --> 00:07:04,880
scientific examination back here on

202
00:07:07,830 --> 00:07:06,160
earth

203
00:07:09,909 --> 00:07:07,840
okay so now that the astronauts have the

204
00:07:11,990 --> 00:07:09,919
new food inside the cassette they need

205
00:07:14,390 --> 00:07:12,000
to be able to reinstall that quickly

206
00:07:16,150 --> 00:07:14,400
inside the observation system so the

207
00:07:18,150 --> 00:07:16,160
observation system needs to have a door

208
00:07:20,150 --> 00:07:18,160
that opens efficiently that we can put

209
00:07:22,790 --> 00:07:20,160
the cassette in close it and then you're

210
00:07:24,150 --> 00:07:22,800
done so no screws no screwdrivers

211
00:07:26,469 --> 00:07:24,160
nothing so that's an important

212
00:07:28,870 --> 00:07:26,479
constraint astronaut time

213
00:07:30,550 --> 00:07:28,880

okay now you know all our constraints

214
00:07:32,150 --> 00:07:30,560
that we need to operate under in order

215
00:07:33,670 --> 00:07:32,160
to satisfy all the scientific

216
00:07:35,990 --> 00:07:33,680
requirements into our engineering

217
00:07:44,710 --> 00:07:36,000
hardware it is now your turn to design

218
00:07:47,909 --> 00:07:46,070
now that you've had a chance to design

219
00:07:49,270 --> 00:07:47,919
your fruit flight observation system

220
00:07:50,710 --> 00:07:49,280
let's see how that compares to what the

221
00:07:52,469 --> 00:07:50,720
engineers put together that's going to

222
00:07:54,629 --> 00:07:52,479
fly onto the international space station

223
00:07:56,550 --> 00:07:54,639
later this year

224
00:07:59,189 --> 00:07:56,560
all right so here's what we did

225
00:08:01,110 --> 00:07:59,199
let's start with our cassette

226
00:08:03,350 --> 00:08:01,120
remember that's where the flies live and

227
00:08:06,629 --> 00:08:03,360
we have our food tray inside and like

228
00:08:07,749 --> 00:08:06,639
any engineering drawing i need my axes

229
00:08:11,110 --> 00:08:07,759
excellent

230
00:08:13,749 --> 00:08:11,120
and then we are constrained by the shape

231
00:08:15,510 --> 00:08:13,759
of the observation system such that this

232
00:08:17,670 --> 00:08:15,520
can go inside

233
00:08:20,390 --> 00:08:17,680
within which

234
00:08:22,790 --> 00:08:20,400
the house of the flies is inserted

235
00:08:25,589 --> 00:08:22,800
inside it we're going to have our camera

236
00:08:28,230 --> 00:08:25,599
up there with a fish eye lens such that

237
00:08:29,749 --> 00:08:28,240
the fisheye lens can capture

238
00:08:32,870 --> 00:08:29,759

the entire

239
00:08:34,550 --> 00:08:32,880
flies are living

240
00:08:35,670 --> 00:08:34,560
now in terms of lighting remember i told

241
00:08:38,790 --> 00:08:35,680
you it was a bit tricky because we don't

242
00:08:42,630 --> 00:08:41,269
that shine brightly onto the flies so

243
00:08:46,470 --> 00:08:42,640
the way that we did it let me just

244
00:08:48,310 --> 00:08:46,480
redraw redraw that same image up there

245
00:08:50,710 --> 00:08:48,320
the cassette here

246
00:08:52,949 --> 00:08:50,720
is that we actually enclosed

247
00:08:55,670 --> 00:08:52,959
the bulbs on the underside so that they

248
00:08:56,710 --> 00:08:55,680
shine

249
00:08:59,350 --> 00:08:56,720
upwards

250
00:09:01,670 --> 00:08:59,360
and put a mirror up here that then

251
00:09:03,190 --> 00:09:01,680
diffuses the light uniformly

252
00:09:04,550 --> 00:09:03,200
onto the flies

253
00:09:08,230 --> 00:09:04,560
so that took quite a bit of trial and

254
00:09:10,630 --> 00:09:08,240
error and also we have the camera there

255
00:09:13,269 --> 00:09:10,640
that's then filming the flies

256
00:09:16,389 --> 00:09:13,279
and so in order to have the unit not

257
00:09:18,230 --> 00:09:16,399
warm up we actually used software to

258
00:09:20,790 --> 00:09:18,240
integrate with the hardware that turns

259
00:09:22,470 --> 00:09:20,800
on and off the cameras at times such

260
00:09:24,949 --> 00:09:22,480
that it doesn't get too hot in that and

261
00:09:27,030 --> 00:09:24,959
that took extensive lab trial as well to

262
00:09:28,630 --> 00:09:27,040
see how long we can record before it

263
00:09:30,550 --> 00:09:28,640

gets too hot

264
00:09:32,630 --> 00:09:30,560
the final constraint was to make it

265
00:09:34,949 --> 00:09:32,640
efficient and quick for the astronauts

266
00:09:36,550 --> 00:09:34,959
to change to remove the cassette change

267
00:09:37,829 --> 00:09:36,560
the food and put it back

268
00:09:39,750 --> 00:09:37,839
do you think we went with a solution

269
00:09:44,150 --> 00:09:39,760
that involves screwdrivers and bunch of

270
00:09:47,990 --> 00:09:46,230
i'm going to redraw the same thing

271
00:09:49,750 --> 00:09:48,000
in three dimensions to give you a better

272
00:09:53,430 --> 00:09:49,760
idea of what we did

273
00:09:53,440 --> 00:09:57,990
and so what we did is install hinges

274
00:10:02,069 --> 00:10:00,550
with our door

275
00:10:04,949 --> 00:10:02,079
and

276
00:10:08,389 --> 00:10:04,959
a little clip there on the side of which

277
00:10:11,430 --> 00:10:08,399
we have we installed a stiff

278
00:10:12,550 --> 00:10:11,440
rubber band that's then fixed

279
00:10:15,110 --> 00:10:12,560
at the end

280
00:10:17,590 --> 00:10:15,120
such that if you want to close the unit

281
00:10:19,190 --> 00:10:17,600
you close the door

282
00:10:21,430 --> 00:10:19,200
insert the rubber band

283
00:10:23,350 --> 00:10:21,440
your observation system is shut

284
00:10:24,710 --> 00:10:23,360
to open it just unhook the rubber band

285
00:10:26,550 --> 00:10:24,720
and the thing opens and then the

286
00:10:28,710 --> 00:10:26,560
cassette can come straight out and we

287
00:10:31,190 --> 00:10:28,720
can change the food this is an efficient

288
00:10:34,550 --> 00:10:31,200

and simple way and most importantly safe

289
00:10:37,269 --> 00:10:34,560
way for the astronauts to use our system

290
00:10:40,150 --> 00:10:37,279
now we have completed all our testing

291
00:10:41,350 --> 00:10:40,160
and our experiments can then operate

292
00:10:43,910 --> 00:10:41,360
safely on the international space

293
00:10:46,150 --> 00:10:43,920
station it's safe for the astronauts can

294
00:10:48,310 --> 00:10:46,160
survive the shake of the launch vehicle

295
00:10:50,630 --> 00:10:48,320
as well as the return and will guarantee

296
00:10:52,630 --> 00:10:50,640
the maximum science from the scientific

297
00:10:53,990 --> 00:10:52,640
requirements that were given to us by

298
00:10:55,590 --> 00:10:54,000
the scientists

299
00:10:56,870 --> 00:10:55,600
we're almost done with all our testing

300
00:10:58,550 --> 00:10:56,880
really excited about the mission and

301
00:11:06,949 --> 00:10:58,560
we're launching this fall oh my goodness

302
00:11:10,389 --> 00:11:08,949
hi welcome back this is my favorite part

303
00:11:12,870 --> 00:11:10,399
of the interview where we get to learn a

304
00:11:14,069 --> 00:11:12,880
little bit more about sanjoy now sanjoy

305
00:11:16,310 --> 00:11:14,079
can you please tell us about your

306
00:11:17,990 --> 00:11:16,320
education background sure so i went to

307
00:11:19,190 --> 00:11:18,000
school in europe and in high school i've

308
00:11:20,790 --> 00:11:19,200
always been really passionate about

309
00:11:22,389 --> 00:11:20,800
space exploration but i was not very

310
00:11:24,710 --> 00:11:22,399
good at math and physics but i really

311
00:11:26,389 --> 00:11:24,720
enjoyed it so i took my courage and then

312
00:11:28,389 --> 00:11:26,399
applied to engineering school in america

313
00:11:29,750 --> 00:11:28,399

and i ended up at the florida institute

314
00:11:31,110 --> 00:11:29,760
of technology which is a small school

315
00:11:32,870 --> 00:11:31,120
down in florida right by the kennedy

316
00:11:34,470 --> 00:11:32,880
space center which is really exciting

317
00:11:36,949 --> 00:11:34,480
and i got my bachelor's degree in

318
00:11:38,630 --> 00:11:36,959
aerospace engineering and i realized

319
00:11:39,990 --> 00:11:38,640
that the more you know the more you

320
00:11:41,590 --> 00:11:40,000
actually don't know so i went to

321
00:11:43,269 --> 00:11:41,600
graduate school at the university of

322
00:11:45,030 --> 00:11:43,279
washington up in seattle where i got my

323
00:11:46,949 --> 00:11:45,040
master's degree in aeronautics and

324
00:11:48,710 --> 00:11:46,959
astronautics and then i decided to

325
00:11:50,470 --> 00:11:48,720
switch more to the scientific field so i

326
00:11:52,470 --> 00:11:50,480
did my phd in earth sciences and

327
00:11:55,430 --> 00:11:52,480
astrobiology and astrobiology is the

328
00:11:57,590 --> 00:11:55,440
science of life in space and so i came

329
00:11:59,750 --> 00:11:57,600
down to nasa ames to do my postdoc doing

330
00:12:01,590 --> 00:11:59,760
that that type of research and then i

331
00:12:02,870 --> 00:12:01,600
found this amazing opportunity using my

332
00:12:04,949 --> 00:12:02,880
engineering degrees working with

333
00:12:06,949 --> 00:12:04,959
fruitville lab so now i can do both my

334
00:12:08,870 --> 00:12:06,959
science and my engineering grouping my

335
00:12:10,870 --> 00:12:08,880
passion about life in space i

336
00:12:13,030 --> 00:12:10,880
essentially have my dream job today

337
00:12:14,949 --> 00:12:13,040
so sanjoy that was really great learning

338
00:12:16,470 --> 00:12:14,959

about your background now is there any

339
00:12:18,550 --> 00:12:16,480
advice that you can give to the high

340
00:12:20,230 --> 00:12:18,560
school students to help them enter into

341
00:12:21,829 --> 00:12:20,240
an engineering career field

342
00:12:23,350 --> 00:12:21,839
i would say the most important is follow

343
00:12:24,870 --> 00:12:23,360
follow your passion if you're passionate

344
00:12:26,310 --> 00:12:24,880
about the engineering field even if in

345
00:12:27,829 --> 00:12:26,320
high school you have some doubts about

346
00:12:29,750 --> 00:12:27,839
if you can do it or not just do it

347
00:12:31,350 --> 00:12:29,760
because passion will drive you to a

348
00:12:32,949 --> 00:12:31,360
point where you can excel i was not very

349
00:12:34,550 --> 00:12:32,959
good and good at math and physics but in

350
00:12:35,750 --> 00:12:34,560
engineering school i did it so much that

351
00:12:37,829 --> 00:12:35,760
you just become good at it it's a

352
00:12:40,150 --> 00:12:37,839
natural process of learning so stay

353
00:12:42,069 --> 00:12:40,160
curious read a lot of books and then if

354
00:12:44,069 --> 00:12:42,079
you can even connect with scientists you

355
00:12:46,389 --> 00:12:44,079
know nasa scientists and engineers are

356
00:12:47,829 --> 00:12:46,399
happy to answer questions by email so if

357
00:12:50,150 --> 00:12:47,839
you're passionate about fruit fly lab

358
00:12:51,990 --> 00:12:50,160
for example check us out on nasa.gov and

359
00:12:53,590 --> 00:12:52,000
then find a mission and email us and

360
00:12:54,550 --> 00:12:53,600
we'll be more than happy to answer your

361
00:12:56,069 --> 00:12:54,560
questions

362
00:12:57,509 --> 00:12:56,079
okay well what kind of great advice do

363
00:12:59,829 --> 00:12:57,519

you would you have for students who

364
00:13:01,670 --> 00:12:59,839
actually want to come and work at nasa

365
00:13:03,350 --> 00:13:01,680
that step is usually done in college and

366
00:13:05,110 --> 00:13:03,360
so the advice i would give is that in

367
00:13:07,670 --> 00:13:05,120
addition to focusing on your academic

368
00:13:08,790 --> 00:13:07,680
credentials meet your your peers meet

369
00:13:11,030 --> 00:13:08,800
your colleagues connect with your

370
00:13:12,710 --> 00:13:11,040
professional societies meet with people

371
00:13:15,350 --> 00:13:12,720
who are more advanced than you and get

372
00:13:17,030 --> 00:13:15,360
mentors look at internships internships

373
00:13:18,230 --> 00:13:17,040
is the best way to get into nasa early

374
00:13:19,350 --> 00:13:18,240
in your career that's where you get to

375
00:13:21,110 --> 00:13:19,360
meet the scientists where you get to

376
00:13:23,509 --> 00:13:21,120
meet the engineers and with these

377
00:13:25,030 --> 00:13:23,519
connections you can then build to end up

378
00:13:26,710 --> 00:13:25,040
at nasa because those scientists and

379
00:13:28,470 --> 00:13:26,720
engineers you work with that will end up

380
00:13:30,550 --> 00:13:28,480
in recommendation letters from graduate

381
00:13:32,629 --> 00:13:30,560
school and so on so it's a process where

382
00:13:35,030 --> 00:13:32,639
your not only your academic skills are

383
00:13:36,629 --> 00:13:35,040
important but also your personal skills

384
00:13:38,470 --> 00:13:36,639
are important and internships is the

385
00:13:40,230 --> 00:13:38,480
best way to promote both

386
00:13:41,590 --> 00:13:40,240
wow that's really great advice for

387
00:13:43,269 --> 00:13:41,600
getting the student started out here at

388
00:13:45,350 --> 00:13:43,279

nasa you bet we look forward to seeing

389
00:13:46,629 --> 00:13:45,360
you all

390
00:13:48,629 --> 00:13:46,639
so if you liked working on this

391
00:13:50,389 --> 00:13:48,639
engineering project and want to pursue

392
00:13:52,389 --> 00:13:50,399
an engineering career check out some of

393
00:13:54,949 --> 00:13:52,399
the nasa design challenges that we have

394
00:13:56,790 --> 00:13:54,959
available also if you liked learning