
NASA
Jeff Chancellor
RADIATION SCIENTIST, INSRP
Kyle Herring
NASA PUBLIC AFFAIRS

1
00:00:07,269 --> 00:00:04,309
well welcome uh to uh west end high

2
00:00:09,990 --> 00:00:07,279
school up in uh let's see your guys are

3
00:00:12,310 --> 00:00:10,000
up in walnut grove alabama my home state

4
00:00:14,150 --> 00:00:12,320
anyway um i'm kyle hearing with the nasa

5
00:00:16,470 --> 00:00:14,160
public affairs office and i'm joined by

6
00:00:18,790 --> 00:00:16,480
jeff chancellor he is the

7
00:00:20,630 --> 00:00:18,800
radiation scientist for the

8
00:00:22,230 --> 00:00:20,640
national space biomedical research

9
00:00:25,189 --> 00:00:22,240
institute which is actually located in

10
00:00:27,429 --> 00:00:25,199
downtown houston uh we're about 30 miles

11
00:00:29,429 --> 00:00:27,439
southeast of houston and we're sitting

12
00:00:30,390 --> 00:00:29,439
inside mission control this is the space

13
00:00:32,069 --> 00:00:30,400

station

14
00:00:34,310 --> 00:00:32,079
flight control room

15
00:00:36,709 --> 00:00:34,320
that oversees all of the activities

16
00:00:38,869 --> 00:00:36,719
aboard the orbiting complex and the

17
00:00:39,750 --> 00:00:38,879
space station right now

18
00:00:42,470 --> 00:00:39,760
is

19
00:00:45,510 --> 00:00:42,480
about midway across an atlantic ocean

20
00:00:47,590 --> 00:00:45,520
pass headed toward south africa at about

21
00:00:49,190 --> 00:00:47,600
240 miles up

22
00:00:51,270 --> 00:00:49,200
and uh we're

23
00:00:53,350 --> 00:00:51,280
ready to take questions and michael here

24
00:00:55,670 --> 00:00:53,360
are you out there

25
00:00:58,790 --> 00:00:55,680
yes i am good morning everyone how are

26
00:01:00,150 --> 00:00:58,800
you guys doing we're doing great michael

27
00:01:01,990 --> 00:01:00,160
excellent

28
00:01:03,750 --> 00:01:02,000
all right we have some very excited high

29
00:01:06,710 --> 00:01:03,760
school students from west end high

30
00:01:08,310 --> 00:01:06,720
school in walnut grove alabama and

31
00:01:09,910 --> 00:01:08,320
they're going to say hi and they've got

32
00:01:12,070 --> 00:01:09,920
lots of questions for you guys right

33
00:01:13,910 --> 00:01:12,080
there in the international space station

34
00:01:15,830 --> 00:01:13,920
flight control room

35
00:01:17,749 --> 00:01:15,840
students can you guys say hi

36
00:01:28,390 --> 00:01:17,759
hello hi

37
00:01:35,429 --> 00:01:29,670
all right so go ahead with your

38
00:01:35,439 --> 00:01:38,469

come here

39
00:01:46,389 --> 00:01:40,550
come over here with a microphone ask him

40
00:01:49,910 --> 00:01:48,389
hi can you hear me

41
00:01:51,429 --> 00:01:49,920
uh yeah we can hear you if you can get

42
00:01:54,230 --> 00:01:51,439
close as close to the microphone as you

43
00:01:55,990 --> 00:01:54,240
can that'll help us

44
00:01:57,670 --> 00:01:56,000
uh what happens if you run out of gas

45
00:01:59,429 --> 00:01:57,680
and spice

46
00:02:01,109 --> 00:01:59,439
what happens if you run out of gas in

47
00:02:02,310 --> 00:02:01,119
space

48
00:02:04,550 --> 00:02:02,320
well

49
00:02:05,830 --> 00:02:04,560
it probably won't end in a very positive

50
00:02:08,869 --> 00:02:05,840
result

51
00:02:10,869 --> 00:02:08,879
eventually you will de-orbit and fall

52
00:02:12,550 --> 00:02:10,879
back into the

53
00:02:13,670 --> 00:02:12,560
earth and probably disintegrate in the

54
00:02:16,229 --> 00:02:13,680
atmosphere

55
00:02:18,790 --> 00:02:16,239
or perish in the

56
00:02:20,790 --> 00:02:18,800
impact yeah it's not quite the same as

57
00:02:22,550 --> 00:02:20,800
running out of gas i guess in your car

58
00:02:24,070 --> 00:02:22,560
because you you would obviously just

59
00:02:25,670 --> 00:02:24,080
pull over the side of the road but the

60
00:02:27,110 --> 00:02:25,680
station

61
00:02:29,350 --> 00:02:27,120
you know orbital mechanics keep the

62
00:02:30,550 --> 00:02:29,360
station at the altitude that it's at and

63
00:02:32,630 --> 00:02:30,560

every once in a while we can fire

64
00:02:35,750 --> 00:02:32,640
thruster jets and and maintain that

65
00:02:36,949 --> 00:02:35,760
altitude so it's it stays pretty stable

66
00:02:39,110 --> 00:02:36,959
and

67
00:02:41,030 --> 00:02:39,120
we bring fuel up with some visiting

68
00:02:41,830 --> 00:02:41,040
cargo vehicles every once in a while so

69
00:02:43,830 --> 00:02:41,840
uh

70
00:02:45,830 --> 00:02:43,840
it's not likely that that's gonna happen

71
00:02:47,430 --> 00:02:45,840
unless we decide that it's gonna happen

72
00:02:48,830 --> 00:02:47,440
at the end of the station's life on

73
00:02:50,790 --> 00:02:48,840
orbit

74
00:02:52,710 --> 00:02:50,800
exactly

75
00:02:55,430 --> 00:02:52,720
so when the space station is in orbit

76
00:02:58,710 --> 00:02:55,440
it's basically in a perpetual um free

77
00:03:02,070 --> 00:02:58,720
fall and the constant acceleration or to

78
00:03:06,790 --> 00:03:02,080
the uh sideways motion keeps it from

79
00:03:10,869 --> 00:03:09,430
all right that's turn

80
00:03:12,630 --> 00:03:10,879
ask question

81
00:03:13,990 --> 00:03:12,640
colton

82
00:03:14,869 --> 00:03:14,000
i ask

83
00:03:18,070 --> 00:03:14,879
okay

84
00:03:20,550 --> 00:03:18,080
you gotta get right here though

85
00:03:21,830 --> 00:03:20,560
can you hear me yes

86
00:03:24,309 --> 00:03:21,840
okay

87
00:03:26,869 --> 00:03:24,319
what are the estimate radiation exposure

88
00:03:28,869 --> 00:03:26,879

for astronauts journeying to mars living

89
00:03:30,869 --> 00:03:28,879
on its surface for a year and a half and

90
00:03:33,430 --> 00:03:30,879
then returning home

91
00:03:35,589 --> 00:03:33,440
um well the uh the projections for that

92
00:03:37,589 --> 00:03:35,599
exposure are

93
00:03:41,910 --> 00:03:37,599
um

94
00:03:43,430 --> 00:03:41,920
but it will be for the entire mission it

95
00:03:45,990 --> 00:03:43,440
will be right at what

96
00:03:47,750 --> 00:03:46,000
is the career limit for extra exposure

97
00:03:49,990 --> 00:03:47,760
for someone who is designated a

98
00:03:51,990 --> 00:03:50,000
radiation worker

99
00:03:53,509 --> 00:03:52,000
so it's uh right now it's

100
00:03:54,630 --> 00:03:53,519
borderline being

101
00:03:57,270 --> 00:03:54,640
um

102
00:03:58,710 --> 00:03:57,280
a safe mission in terms of the radiation

103
00:04:00,630 --> 00:03:58,720
exposure

104
00:04:02,550 --> 00:04:00,640
but those are still the all the all the

105
00:04:04,149 --> 00:04:02,560
uh the mathematics and models are still

106
00:04:05,830 --> 00:04:04,159
being um

107
00:04:07,830 --> 00:04:05,840
worked out to determine exactly what

108
00:04:11,030 --> 00:04:07,840
it'll be

109
00:04:12,550 --> 00:04:11,040
and that's just the nominal exposure

110
00:04:13,990 --> 00:04:12,560
and this is michael here at the digital

111
00:04:15,990 --> 00:04:14,000
learning network does it so does that

112
00:04:18,870 --> 00:04:16,000
mean that for the spacecraft itself you

113
00:04:21,509 --> 00:04:18,880

have to make sure that it has um the

114
00:04:23,830 --> 00:04:21,519
right protection for such a journey

115
00:04:25,430 --> 00:04:23,840
since it's such a long trip

116
00:04:27,189 --> 00:04:25,440
exactly

117
00:04:29,189 --> 00:04:27,199
they they study

118
00:04:30,550 --> 00:04:29,199
exotic materials in

119
00:04:32,550 --> 00:04:30,560
and are

120
00:04:34,390 --> 00:04:32,560
configure the vehicle in ways so that

121
00:04:36,150 --> 00:04:34,400
there is as much equipment and mass

122
00:04:39,749 --> 00:04:36,160
between the astronauts in the space

123
00:04:48,469 --> 00:04:39,759
environment to help shield them from uh

124
00:04:52,390 --> 00:04:50,550
next question

125
00:04:55,590 --> 00:04:52,400
how did the recent solar flares affect

126
00:05:00,469 --> 00:04:58,070
i don't think it affected them in in any

127
00:05:02,310 --> 00:05:00,479
way at all because of the fact that the

128
00:05:04,469 --> 00:05:02,320
the space station is in orbit within the

129
00:05:07,110 --> 00:05:04,479
earth's magnetic field it acts kind of

130
00:05:09,270 --> 00:05:07,120
as a uh a shield and deflected most of

131
00:05:11,990 --> 00:05:09,280
the radiation off of the surface of the

132
00:05:14,950 --> 00:05:12,000
earth there was some additional exposure

133
00:05:16,469 --> 00:05:14,960
from the protons that came from the the

134
00:05:20,150 --> 00:05:16,479
solar event being trapped in the earth's

135
00:05:21,990 --> 00:05:20,160
magnetic field but the shielding of the

136
00:05:23,749 --> 00:05:22,000
iss and i believe one of the more

137
00:05:25,670 --> 00:05:23,759
heavier shielded areas is the u.s lab

138
00:05:27,590 --> 00:05:25,680

where they do most of their daily

139
00:05:30,550 --> 00:05:27,600
routine

140
00:05:33,990 --> 00:05:32,070
safety for them to operate without

141
00:05:37,590 --> 00:05:34,000
having to change any of their

142
00:05:42,710 --> 00:05:41,189
if uh if too much radiation as uh is on

143
00:05:44,550 --> 00:05:42,720
the astronauts how would you get them

144
00:05:47,029 --> 00:05:44,560
home quickly

145
00:05:48,550 --> 00:05:47,039
i'm sorry say that again

146
00:05:50,310 --> 00:05:48,560
if they were exposed to too much

147
00:05:51,430 --> 00:05:50,320
radiation how would you get them home

148
00:05:53,830 --> 00:05:51,440
quickly

149
00:05:55,670 --> 00:05:53,840
well there is a a vehicle

150
00:05:57,749 --> 00:05:55,680
docked to the space station they can use

151
00:05:59,430 --> 00:05:57,759
that as an escape

152
00:06:01,110 --> 00:05:59,440
vehicle to de-orbit and get back to

153
00:06:19,510 --> 00:06:01,120
earth and have

154
00:06:23,590 --> 00:06:21,270
what happens if you break a bone in

155
00:06:24,870 --> 00:06:23,600
space

156
00:06:26,230 --> 00:06:24,880
i'm sorry

157
00:06:28,550 --> 00:06:26,240
i think the question was what happens if

158
00:06:30,710 --> 00:06:28,560
you break a bone in space

159
00:06:31,909 --> 00:06:30,720
um well

160
00:06:33,350 --> 00:06:31,919
what do you mean in terms of what

161
00:06:38,150 --> 00:06:33,360
happens if what

162
00:06:38,160 --> 00:06:42,710
how do you take care of the bone

163
00:06:46,550 --> 00:06:44,550

there are um

164
00:06:49,350 --> 00:06:46,560
there are astronauts who are designated

165
00:06:52,790 --> 00:06:49,360
as the the crew medical officer and they

166
00:06:57,029 --> 00:06:54,230
assistance in either

167
00:06:59,029 --> 00:06:57,039
stabilizing them if and determining

168
00:07:00,790 --> 00:06:59,039
in communications with the the flight

169
00:07:02,070 --> 00:07:00,800
surgeon who monitors the health of the

170
00:07:05,350 --> 00:07:02,080
crew during the entire mission as

171
00:07:10,870 --> 00:07:07,749
stabilize the the bone or the break in

172
00:07:12,790 --> 00:07:10,880
space or deodorant and bring them for uh

173
00:07:13,990 --> 00:07:12,800
medical tension here in a hospital on

174
00:07:16,390 --> 00:07:14,000
earth

175
00:07:17,830 --> 00:07:16,400
that's a good question it's one of those

176
00:07:18,710 --> 00:07:17,840
specific details you don't think about

177
00:07:20,870 --> 00:07:18,720
until

178
00:07:22,070 --> 00:07:20,880
a high school kid asks

179
00:07:23,430 --> 00:07:22,080
excellent yeah and they do have to be

180
00:07:25,830 --> 00:07:23,440
careful when they're open space because

181
00:07:28,150 --> 00:07:25,840
it is very easy to move around up on the

182
00:07:30,469 --> 00:07:28,160
space station so they need to be

183
00:07:32,710 --> 00:07:30,479
very mindful of how they're orienting

184
00:07:34,629 --> 00:07:32,720
their body while they're up in space now

185
00:07:36,150 --> 00:07:34,639
for the students at west end high school

186
00:07:38,150 --> 00:07:36,160
i was wondering if we could possibly

187
00:07:40,469 --> 00:07:38,160
line up that way i would be able to get

188
00:07:42,550 --> 00:07:40,479

one question after another very smoothly

189
00:07:44,790 --> 00:07:42,560
and remember to speak up so we can

190
00:07:54,230 --> 00:07:44,800
definitely hear the question

191
00:07:58,790 --> 00:07:56,390
if you get a cut in space

192
00:08:01,589 --> 00:07:58,800
does your blood just spew out like a

193
00:08:03,670 --> 00:08:01,599
shotgun or does it come out and run down

194
00:08:07,990 --> 00:08:03,680
your arm

195
00:08:11,029 --> 00:08:08,000
because there is a

196
00:08:13,510 --> 00:08:11,039
there is literally no gravity so it

197
00:08:15,670 --> 00:08:13,520
it pulls up and will float actually in

198
00:08:17,510 --> 00:08:15,680
the air so that is actually problematic

199
00:08:18,790 --> 00:08:17,520
so they have to provide some way to be

200
00:08:20,629 --> 00:08:18,800
able to capture

201
00:08:22,710 --> 00:08:20,639
the blood so it doesn't get into the air

202
00:08:24,469 --> 00:08:22,720
circulation system

203
00:08:26,230 --> 00:08:24,479
very minor things that occur here on

204
00:08:34,630 --> 00:08:26,240
earth are actually even more dangerous

205
00:08:38,469 --> 00:08:36,230
we've got a few that's got to leave

206
00:08:40,389 --> 00:08:38,479
right now and we'll be right back i've

207
00:08:41,829 --> 00:08:40,399
got to open up room there's several

208
00:08:43,909 --> 00:08:41,839
students still going to stay with you

209
00:08:47,750 --> 00:08:43,919
guys so uh we'll be

210
00:08:52,310 --> 00:08:49,350
all right

211
00:08:57,110 --> 00:08:52,320
we're gonna ask some questions

212
00:09:03,990 --> 00:09:01,350
uh uh are you a texas longhorn fan

213
00:09:05,590 --> 00:09:04,000

uh no i am an aggie

214
00:09:07,750 --> 00:09:05,600
and i'm looking forward to playing the

215
00:09:08,949 --> 00:09:07,760
uh the crimson tide next year and kyle

216
00:09:12,230 --> 00:09:08,959
field

217
00:09:16,790 --> 00:09:14,630
yeah i'm i'm a university of alabama

218
00:09:18,949 --> 00:09:16,800
graduate so i'm sorry

219
00:09:21,110 --> 00:09:18,959
that's what i'm talking about roll time

220
00:09:22,790 --> 00:09:21,120
roll tide

221
00:09:25,190 --> 00:09:22,800
and jeff and i are still friends so

222
00:09:27,829 --> 00:09:25,200
we're still we're still okay exactly

223
00:09:29,350 --> 00:09:27,839
we're going to have fun next year

224
00:09:31,509 --> 00:09:29,360
it'll be an interesting game next year

225
00:09:33,509 --> 00:09:31,519
as we we learn the new

226
00:09:35,190 --> 00:09:33,519
sec environment but i think the crimson

227
00:09:36,949 --> 00:09:35,200
tide is in for a surprise when they come

228
00:09:42,550 --> 00:09:36,959
to cal field next year the year after

229
00:09:46,949 --> 00:09:44,230
what do you do every day while living on

230
00:09:49,110 --> 00:09:46,959
the space station

231
00:09:51,190 --> 00:09:49,120
um well i have never lived on the space

232
00:09:53,350 --> 00:09:51,200
station i'm not an astronaut but

233
00:09:54,550 --> 00:09:53,360
they do science experiments they

234
00:09:56,470 --> 00:09:54,560
maintain

235
00:09:57,509 --> 00:09:56,480
the integrity of the space station keep

236
00:10:01,030 --> 00:09:57,519
it

237
00:10:03,910 --> 00:10:01,990
and

238
00:10:06,630 --> 00:10:03,920

perform uh

239
00:10:08,870 --> 00:10:06,640
experiments for either biomedical

240
00:10:09,829 --> 00:10:08,880
problems or

241
00:10:11,910 --> 00:10:09,839
other

242
00:10:13,829 --> 00:10:11,920
science that they've been asked to

243
00:10:15,350 --> 00:10:13,839
perform while they're in space i think

244
00:10:20,949 --> 00:10:15,360
the the mission duration right now is

245
00:10:24,710 --> 00:10:22,630
but i would definitely love to live on

246
00:10:28,069 --> 00:10:24,720
the iss for six months i think we all

247
00:10:31,990 --> 00:10:30,150
next question how much medical training

248
00:10:34,069 --> 00:10:32,000
do the astronauts and cosmonauts get

249
00:10:35,269 --> 00:10:34,079
before they go up to space to the space

250
00:10:36,470 --> 00:10:35,279
station

251
00:10:39,110 --> 00:10:36,480
um

252
00:10:39,990 --> 00:10:39,120
well they trained for many months and

253
00:10:42,790 --> 00:10:40,000
for

254
00:10:45,110 --> 00:10:42,800
sometimes a year or more prior to

255
00:10:47,269 --> 00:10:45,120
a mission

256
00:10:49,110 --> 00:10:47,279
and whether or not there is a a doctor

257
00:10:52,310 --> 00:10:49,120
on board depends on the crew selection

258
00:10:55,269 --> 00:10:52,320
but there is always a crew medical

259
00:10:58,829 --> 00:10:55,279
officer who has the capabilities to

260
00:11:02,310 --> 00:10:58,839
provide emergency medical

261
00:11:04,550 --> 00:11:02,320
um in case of um you know to stabilize a

262
00:11:05,990 --> 00:11:04,560
crew member is injured and they are on

263
00:11:07,670 --> 00:11:06,000

in constant communication with the

264
00:11:09,670 --> 00:11:07,680
flight surgeon here in mission control

265
00:11:11,430 --> 00:11:09,680
who monitors her health

266
00:11:14,710 --> 00:11:11,440
um 24 hours a day seven days a week for

267
00:11:16,310 --> 00:11:14,720
the entire mission

268
00:11:17,910 --> 00:11:16,320
okay i think we have two more before

269
00:11:20,470 --> 00:11:17,920
they have to go

270
00:11:26,470 --> 00:11:22,630
what are some genetics experiments that

271
00:11:27,509 --> 00:11:26,480
nasa is currently doing in space

272
00:11:28,389 --> 00:11:27,519
um

273
00:11:30,870 --> 00:11:28,399
well

274
00:11:32,949 --> 00:11:30,880
i am not a biologist and i'm afraid if i

275
00:11:34,550 --> 00:11:32,959
tried to explain any of those i would

276
00:11:36,630 --> 00:11:34,560
you would be worse off than you are

277
00:11:39,350 --> 00:11:36,640
right now by asking me but i do know

278
00:11:41,590 --> 00:11:39,360
they have many experiments going on um

279
00:11:43,670 --> 00:11:41,600
within the nasa community and with nsbri

280
00:11:47,590 --> 00:11:43,680
where they are looking at

281
00:11:50,310 --> 00:11:47,600
specific bio markers that will

282
00:11:52,069 --> 00:11:50,320
indicate susceptibility to certain

283
00:11:53,509 --> 00:11:52,079
stressors that the space environment can

284
00:11:58,389 --> 00:11:53,519
cause to accrue

285
00:11:58,399 --> 00:12:03,190
determine countermeasures or

286
00:12:10,230 --> 00:12:04,550
what health problems need to be

287
00:12:16,389 --> 00:12:13,269
does food taste different in space

288
00:12:19,430 --> 00:12:16,399

i'm sorry can you repeat the question

289
00:12:20,550 --> 00:12:19,440
is food tasted in space

290
00:12:23,269 --> 00:12:20,560
um

291
00:12:25,190 --> 00:12:23,279
i know that the the astronaut crew

292
00:12:27,829 --> 00:12:25,200
generally requests foods that are higher

293
00:12:29,430 --> 00:12:27,839
in salt and spices

294
00:12:31,190 --> 00:12:29,440
i think it the the

295
00:12:32,870 --> 00:12:31,200
reduced gravity environment suppresses

296
00:12:35,430 --> 00:12:32,880
the taste buds so they look for foods

297
00:12:36,710 --> 00:12:35,440
that have a stronger flavor so they can

298
00:12:38,790 --> 00:12:36,720
enjoy it

299
00:12:40,310 --> 00:12:38,800
but unfortunately i've never tasted food

300
00:12:41,990 --> 00:12:40,320
in space but i'm looking forward to

301
00:12:43,430 --> 00:12:42,000
maybe having that opportunity one day we

302
00:12:44,550 --> 00:12:43,440
have that opportunity to taste it on the

303
00:12:46,629 --> 00:12:44,560
ground before

304
00:12:48,710 --> 00:12:46,639
but we don't actually get up there to

305
00:12:50,230 --> 00:12:48,720
taste it but no you're exactly right

306
00:12:51,990 --> 00:12:50,240
that's what crews have said that their

307
00:12:53,430 --> 00:12:52,000
taste buds do change a little bit and

308
00:12:55,750 --> 00:12:53,440
spicier foods

309
00:12:57,430 --> 00:12:55,760
is more welcome i guess right right they

310
00:12:59,190 --> 00:12:57,440
have a and i think the foods that are

311
00:13:01,430 --> 00:12:59,200
prepared for them have a much higher

312
00:13:03,030 --> 00:13:01,440
salt content than what we're accustomed

313
00:13:05,269 --> 00:13:03,040

to and that is to

314
00:13:06,550 --> 00:13:05,279
to accommodate their uh

315
00:13:08,550 --> 00:13:06,560
their taste buds

316
00:13:10,069 --> 00:13:08,560
in many ways

317
00:13:11,750 --> 00:13:10,079
all right well west end high school

318
00:13:14,389 --> 00:13:11,760
thank you so much for all those awesome

319
00:13:16,550 --> 00:13:14,399
questions and uh thank you mr uh

320
00:13:19,829 --> 00:13:16,560
chancellor and mr herring uh we really

321
00:13:21,350 --> 00:13:19,839
appreciate being able to visit inside

322
00:13:22,150 --> 00:13:21,360
thank you thank you for having me thank