



1
00:00:07,130 --> 00:00:05,150
okay hi everybody this is a Josh Byerly

2
00:00:09,169 --> 00:00:07,140
here inside Mission Control Houston I am

3
00:00:12,140 --> 00:00:09,179
sitting here with doug wheelock an

4
00:00:14,150 --> 00:00:12,150
astronaut he flew back on sts-1 20 which

5
00:00:16,220 --> 00:00:14,160
was space shuttle Discovery back in two

6
00:00:17,660 --> 00:00:16,230
thousand seven performed a series of

7
00:00:19,040 --> 00:00:17,670
spacewalks and then he also became

8
00:00:21,800 --> 00:00:19,050
commander of the International Space

9
00:00:24,859 --> 00:00:21,810
Station back in 2010 as part of

10
00:00:26,300 --> 00:00:24,869
expedition 25 so he's going to be happy

11
00:00:27,560 --> 00:00:26,310
to take your questions he's the smarter

12
00:00:29,179 --> 00:00:27,570
of the two of us they'll probably be

13
00:00:30,410 --> 00:00:29,189

answering most of them so if you guys

14

00:00:32,319 --> 00:00:30,420

want to go ahead and get it kicked off

15

00:00:37,670 --> 00:00:32,329

we'll we'll be happy to talk with you

16

00:00:40,190 --> 00:00:37,680

right thank you hello Dave everybody

17

00:00:42,619 --> 00:00:40,200

there in acworth georgia I kind of

18

00:00:44,959 --> 00:00:42,629

missed that there that part of the

19

00:00:47,180 --> 00:00:44,969

country I went to school did my graduate

20

00:00:48,920 --> 00:00:47,190

work at Georgia Tech so spent a little

21

00:00:51,340 --> 00:00:48,930

at the time there in atlanta area so

22

00:00:59,900 --> 00:00:51,350

it's good to be talking to you today

23

00:01:03,110 --> 00:00:59,910

thank you describe your spacewalk

24

00:01:06,350 --> 00:01:03,120

experience during the emergency shutdown

25

00:01:09,080 --> 00:01:06,360

of the ISS just pulley system were you

26
00:01:14,960 --> 00:01:09,090
afraid wow that's a great question what

27
00:01:17,420 --> 00:01:14,970
is your name my name is Caitlin Caitlin

28
00:01:19,359 --> 00:01:17,430
that's a great question Caitlin I get to

29
00:01:21,950 --> 00:01:19,369
actually get that question a lot from

30
00:01:25,640 --> 00:01:21,960
from kids because we're all kind of I'm

31
00:01:28,010 --> 00:01:25,650
a kid at heart as well myself but you do

32
00:01:29,120 --> 00:01:28,020
fear you do have some fears when you're

33
00:01:30,590 --> 00:01:29,130
when you're getting ready to do

34
00:01:32,510 --> 00:01:30,600
something like this because it wasn't

35
00:01:35,030 --> 00:01:32,520
something that we had trained for and so

36
00:01:37,850 --> 00:01:35,040
we had trained the skills that we needed

37
00:01:40,700 --> 00:01:37,860
to take outside to change out this pump

38
00:01:42,560 --> 00:01:40,710

module that you were referring to and we

39

00:01:44,480 --> 00:01:42,570

had worked together as a team before but

40

00:01:46,219 --> 00:01:44,490

we were facing something that was a

41

00:01:48,380 --> 00:01:46,229

little bit unknown for us that we hadn't

42

00:01:50,840 --> 00:01:48,390

had a chance to practice so so I

43

00:01:54,649 --> 00:01:50,850

wouldn't call it fear I I would say that

44

00:01:56,810 --> 00:01:54,659

you you manage that to where you you

45

00:01:58,399 --> 00:01:56,820

have to pull together as a team because

46

00:01:59,749 --> 00:01:58,409

everybody has their strengths and

47

00:02:03,380 --> 00:01:59,759

weaknesses much like you do in school

48

00:02:05,469 --> 00:02:03,390

when you're on a on a team in school or

49

00:02:09,290 --> 00:02:05,479

a sports team or something like that

50

00:02:12,470 --> 00:02:09,300

when you're facing an objective that's

51
00:02:14,110 --> 00:02:12,480
impossible to overcome by yourself you

52
00:02:17,080 --> 00:02:14,120
have to pull together as a team

53
00:02:19,509 --> 00:02:17,090
so I think that we were I i call it

54
00:02:22,059 --> 00:02:19,519
heightened senses heightened sensitivity

55
00:02:24,880 --> 00:02:22,069
to what was going on and I was certainly

56
00:02:27,309 --> 00:02:24,890
aware that what we were doing was had

57
00:02:30,330 --> 00:02:27,319
some dangers out there and so we we

58
00:02:32,080 --> 00:02:30,340
managed those by talking about them and

59
00:02:35,710 --> 00:02:32,090
discussing how we're going to overcome

60
00:02:38,589 --> 00:02:35,720
those things so I was a little bit

61
00:02:40,360 --> 00:02:38,599
afraid I have to tell you that but but

62
00:02:41,860 --> 00:02:40,370
when I looked at our team and the team

63
00:02:43,930 --> 00:02:41,870

we'd put together here in Mission

64

00:02:47,110 --> 00:02:43,940

Control I knew that we are in capable

65

00:02:48,819 --> 00:02:47,120

hands with very very smart people that

66

00:02:51,580 --> 00:02:48,829

knew this equipment and so I helped us

67

00:02:54,009 --> 00:02:51,590

overcome our fears as a team and pull

68

00:02:55,569 --> 00:02:54,019

together and and really turn it into

69

00:03:07,180 --> 00:02:55,579

something there was a wonderful

70

00:03:10,839 --> 00:03:07,190

experience are there emergency escape

71

00:03:13,210 --> 00:03:10,849

vehicles for the astronauts yes there

72

00:03:16,059 --> 00:03:13,220

are emergency escape vehicles so we have

73

00:03:17,800 --> 00:03:16,069

we call them lifeboats sometimes on the

74

00:03:22,629 --> 00:03:17,810

space station but we do have enough

75

00:03:24,430 --> 00:03:22,639

seats return seats to be able to

76

00:03:27,069 --> 00:03:24,440

evacuate the space station if we needed

77

00:03:30,159 --> 00:03:27,079

to fortunately we haven't had to do that

78

00:03:31,599 --> 00:03:30,169

over the past 10 years we've been our 10

79

00:03:34,690 --> 00:03:31,609

to 12 years we've been on the space

80

00:03:36,789 --> 00:03:34,700

station we have Soyuz vehicles right now

81

00:03:39,400 --> 00:03:36,799

that are used as our lifeboats and so

82

00:03:42,309 --> 00:03:39,410

there are six crew members onboard the

83

00:03:45,569 --> 00:03:42,319

space station and each Soyuz vehicle

84

00:03:48,879 --> 00:03:45,579

Soyuz capsule major Russian designed

85

00:03:52,360 --> 00:03:48,889

spaceship each of those Soyuz capsules

86

00:03:55,720 --> 00:03:52,370

has three seats and so I think you can

87

00:03:57,580 --> 00:03:55,730

maybe see that on your screen the so

88

00:03:59,289 --> 00:03:57,590

there is enough room for everybody to

89

00:04:05,979 --> 00:03:59,299

have a seat in a ride home if there's an

90

00:04:08,140 --> 00:04:05,989

emergency on the space station my name

91

00:04:10,900 --> 00:04:08,150

is winter one and how do you feel about

92

00:04:14,319 --> 00:04:10,910

commercial airlines I mean space

93

00:04:18,339 --> 00:04:14,329

stations & the space s XD i think the

94

00:04:19,979 --> 00:04:18,349

SpaceX Dragon is awesome and and I think

95

00:04:22,360 --> 00:04:19,989

it's really really exciting because

96

00:04:25,839 --> 00:04:22,370

because we're being we're beginning to

97

00:04:27,430 --> 00:04:25,849

see like a an increased interest and

98

00:04:30,780 --> 00:04:27,440

resurgence in the

99

00:04:33,100 --> 00:04:30,790

commercial area of space and so and so

100

00:04:34,600 --> 00:04:33,110

NASA is pretty good at pushing the

101
00:04:37,120 --> 00:04:34,610
boundaries and going to the next

102
00:04:38,680 --> 00:04:37,130
greatest thing and we're planning that

103
00:04:41,800 --> 00:04:38,690
we're planning to go out beyond the

104
00:04:44,770 --> 00:04:41,810
space station now and so now with a with

105
00:04:47,170 --> 00:04:44,780
all with getting people and cargo back

106
00:04:49,420 --> 00:04:47,180
and forth from the space station we're

107
00:04:51,100 --> 00:04:49,430
going to rely more and more on these

108
00:04:53,740 --> 00:04:51,110
commercial vehicles which i think is

109
00:04:56,560 --> 00:04:53,750
wonderful and of course you may have

110
00:04:59,050 --> 00:04:56,570
been watching NASA TV or the news even

111
00:05:02,020 --> 00:04:59,060
with a with the SpaceX Dragon that's now

112
00:05:03,430 --> 00:05:02,030
attached the space station and I think

113
00:05:06,340 --> 00:05:03,440

you can see a picture of it there and

114

00:05:09,220 --> 00:05:06,350

it's I think it's very very exciting

115

00:05:13,000 --> 00:05:09,230

because we're beginning to see increased

116

00:05:17,110 --> 00:05:13,010

interest in the commercial area of space

117

00:05:19,930 --> 00:05:17,120

and and space transports supplying the

118

00:05:22,300 --> 00:05:19,940

space station and eventually transport

119

00:05:24,550 --> 00:05:22,310

of humans back and forth to the space

120

00:05:27,100 --> 00:05:24,560

station I think it's very exciting and I

121

00:05:29,350 --> 00:05:27,110

think you're going to see it's a really

122

00:05:31,300 --> 00:05:29,360

great very exciting time for you kids

123

00:05:32,740 --> 00:05:31,310

that are in school now because I think

124

00:05:35,800 --> 00:05:32,750

you're going to be seeing an increased

125

00:05:38,710 --> 00:05:35,810

interest in in both your the curriculum

126

00:05:40,510 --> 00:05:38,720

that you see in school and also a better

127

00:05:43,440 --> 00:05:40,520

and tighter connection between our

128

00:05:46,330 --> 00:05:43,450

commercial companies and our education

129

00:05:48,010 --> 00:05:46,340

department as well so you may see some

130

00:05:50,140 --> 00:05:48,020

additional things coming into the

131

00:05:55,330 --> 00:05:50,150

schools and from the commercial base as

132

00:05:57,510 --> 00:05:55,340

well so I think it's very exciting what

133

00:06:00,250 --> 00:05:57,520

is the American Astronomical Society

134

00:06:03,310 --> 00:06:00,260

flight achievement and what did you do

135

00:06:05,290 --> 00:06:03,320

to deserve you oh there's an award you

136

00:06:07,810 --> 00:06:05,300

probably saw it probably saw it on my

137

00:06:13,600 --> 00:06:07,820

bio but it was a it was an award them

138

00:06:17,050 --> 00:06:13,610

that's a society that that focuses on

139

00:06:20,050 --> 00:06:17,060

space and space exploration and travel

140

00:06:22,420 --> 00:06:20,060

and and plans for going different places

141

00:06:25,870 --> 00:06:22,430

and what it would take to get there and

142

00:06:28,390 --> 00:06:25,880

back in two thousand seven we had I was

143

00:06:31,659 --> 00:06:28,400

onboard the station on I flew up on the

144

00:06:35,170 --> 00:06:31,669

space shuttle discovery and we had a

145

00:06:38,050 --> 00:06:35,180

torn solar array we tried to deploy the

146

00:06:39,920 --> 00:06:38,060

solar array that we moved from one part

147

00:06:43,700 --> 00:06:39,930

of the station to another

148

00:06:46,189 --> 00:06:43,710

and when we went to deploy it tore much

149

00:06:48,170 --> 00:06:46,199

like a like a piece of paper almost and

150

00:06:51,670 --> 00:06:48,180

we are worried that it was going to tear

151

00:06:54,590 --> 00:06:51,680

completely in half and so rather than

152

00:06:57,920 --> 00:06:54,600

continue to deploy process we stopped it

153

00:06:59,870 --> 00:06:57,930

and we built actually like stitches you

154

00:07:01,999 --> 00:06:59,880

may have somebody there in the room may

155

00:07:04,100 --> 00:07:02,009

have had stitches before in your skin

156

00:07:08,090 --> 00:07:04,110

you just kind of so something up or

157

00:07:10,640 --> 00:07:08,100

sewing up a piece of material we we made

158

00:07:12,980 --> 00:07:10,650

stitches inside of the we took whatever

159

00:07:15,350 --> 00:07:12,990

material we could find and our mission

160

00:07:17,990 --> 00:07:15,360

control team helped us find locate those

161

00:07:19,640 --> 00:07:18,000

things on board the space station we

162

00:07:22,990 --> 00:07:19,650

made these stitches and we went outside

163

00:07:26,689 --> 00:07:23,000

and we sewed up the solar array and so

164

00:07:28,909 --> 00:07:26,699

so when we got back it was it was pretty

165

00:07:31,010 --> 00:07:28,919

daring feat and look for of course for

166

00:07:32,570 --> 00:07:31,020

us on board the space station we just

167

00:07:35,830 --> 00:07:32,580

did like we were told and we had the

168

00:07:38,830 --> 00:07:35,840

really really smart and very very

169

00:07:41,420 --> 00:07:38,840

creative people here on the ground that

170

00:07:43,159 --> 00:07:41,430

that came up with this solution and this

171

00:07:45,200 --> 00:07:43,169

so they helped us build these things and

172

00:07:50,839 --> 00:07:45,210

we fix that and so when we got back to

173

00:07:54,620 --> 00:07:50,849

earth the Astronomical Society issued an

174

00:07:59,779 --> 00:07:54,630

award to our EV a team for the repair of

175

00:08:02,500 --> 00:07:59,789

this solar array so thank you are you

176

00:08:05,689 --> 00:08:02,510

going to be part of the Mars mission

177

00:08:08,839 --> 00:08:05,699

well I'll probably be too old but what's

178

00:08:12,620 --> 00:08:08,849

exciting is you know I think we're

179

00:08:15,110 --> 00:08:12,630

hoping to go to Mars what maybe 25 or 30

180

00:08:17,300 --> 00:08:15,120

years something like that I'm hoping

181

00:08:18,620 --> 00:08:17,310

that we'll see i'm hoping them i'll

182

00:08:20,839 --> 00:08:18,630

probably be in a rocking chair with a

183

00:08:22,850 --> 00:08:20,849

glass of sweet tea or something

184

00:08:25,129 --> 00:08:22,860

somewhere watching but what's very

185

00:08:27,080 --> 00:08:25,139

exciting i think about usually

186

00:08:29,839 --> 00:08:27,090

astronauts when they're selected to fly

187

00:08:31,909 --> 00:08:29,849

in space they're usually in their 30s

188

00:08:33,709 --> 00:08:31,919

maybe like mid 30s or something like

189

00:08:37,339 --> 00:08:33,719

that so you know it's very exciting is

190

00:08:40,430 --> 00:08:37,349

that the first people that will see on

191

00:08:42,980 --> 00:08:40,440

Mars are probably somewhere in our

192

00:08:45,079 --> 00:08:42,990

classrooms right now maybe somebody

193

00:08:47,269 --> 00:08:45,089

there in the classroom you're sitting in

194

00:08:49,760 --> 00:08:47,279

right now maybe somebody in that very

195

00:08:52,280 --> 00:08:49,770

room will be the first person that will

196

00:08:53,810 --> 00:08:52,290

see on the surface of Mars and that

197

00:08:56,660 --> 00:08:53,820

that's very exciting to

198

00:08:58,850 --> 00:08:56,670

you know thinking that'll maybe 25 or 30

199

00:09:00,080 --> 00:08:58,860

years in the future that may be right

200

00:09:02,570 --> 00:09:00,090

there where you're sitting there's an

201
00:09:04,100 --> 00:09:02,580
astronaut in that room and you'll be

202
00:09:06,590 --> 00:09:04,110
sitting here 30 years from now and I'll

203
00:09:07,940 --> 00:09:06,600
be in my rocking chair and listening to

204
00:09:12,730 --> 00:09:07,950
you tell the story about what it was

205
00:09:16,280 --> 00:09:12,740
like to go to Mars hey that sounds good

206
00:09:18,920 --> 00:09:16,290
how has 178 days and I was faced

207
00:09:21,440 --> 00:09:18,930
effector buddy your house oh that's a

208
00:09:23,390 --> 00:09:21,450
really good question 178 days in space

209
00:09:26,620 --> 00:09:23,400
there are a lot of there are some things

210
00:09:28,880 --> 00:09:26,630
that I was anticipating and I expected

211
00:09:31,400 --> 00:09:28,890
you're you're a little bit your

212
00:09:34,010 --> 00:09:31,410
vestibular system that kind of helps you

213
00:09:36,890 --> 00:09:34,020

balance while you're standing up was was

214

00:09:38,480 --> 00:09:36,900

affected and I was expecting that I was

215

00:09:40,580 --> 00:09:38,490

expecting a little bit of you know a

216

00:09:42,830 --> 00:09:40,590

little bit of queasiness and my stomach

217

00:09:45,020 --> 00:09:42,840

when when I got you back used to gravity

218

00:09:47,210 --> 00:09:45,030

and and I I had a little bit of that and

219

00:09:50,120 --> 00:09:47,220

I expected that but there were some

220

00:09:51,980 --> 00:09:50,130

things that I didn't really expect 11 my

221

00:09:55,250 --> 00:09:51,990

vision changed a little bit you may have

222

00:09:58,120 --> 00:09:55,260

talked in your classrooms about the

223

00:10:01,190 --> 00:09:58,130

effect long long term effects on vision

224

00:10:02,960 --> 00:10:01,200

for long-duration spaceflight and it's

225

00:10:05,150 --> 00:10:02,970

an interesting phenomena that we're

226

00:10:07,850 --> 00:10:05,160

still trying to understand in the

227

00:10:10,970 --> 00:10:07,860

medical field and essentially the

228

00:10:12,650 --> 00:10:10,980

mechanism there is your fluid shifts in

229

00:10:16,580 --> 00:10:12,660

your body and I had like increased

230

00:10:19,370 --> 00:10:16,590

pressure inside of my head and when you

231

00:10:20,960 --> 00:10:19,380

have that increased pressure it pushes

232

00:10:22,760 --> 00:10:20,970

on the back of your eyes and actually

233

00:10:25,280 --> 00:10:22,770

affects your optic nerve as well and so

234

00:10:27,530 --> 00:10:25,290

so we didn't I didn't really expect that

235

00:10:29,060 --> 00:10:27,540

man and then and now so it's been it's

236

00:10:31,970 --> 00:10:29,070

sort of a new avenue that we're looking

237

00:10:34,070 --> 00:10:31,980

at medically to fly long duration in

238

00:10:35,270 --> 00:10:34,080

space another thing that was really

239

00:10:37,400 --> 00:10:35,280

surprising there's actually kind of

240

00:10:39,950 --> 00:10:37,410

funny was when you're on the space

241

00:10:42,760 --> 00:10:39,960

station everything is floating and so

242

00:10:45,170 --> 00:10:42,770

you have very little reference for like

243

00:10:47,060 --> 00:10:45,180

speeds like different kinds of speeds

244

00:10:49,070 --> 00:10:47,070

and things so like when you're driving

245

00:10:51,410 --> 00:10:49,080

or even when you're out walking or

246

00:10:54,320 --> 00:10:51,420

riding a bike or something like that you

247

00:10:56,030 --> 00:10:54,330

have other people that are walking maybe

248

00:10:58,160 --> 00:10:56,040

the other direction or people that are

249

00:10:59,810 --> 00:10:58,170

crossing and of course when we're

250

00:11:01,670 --> 00:10:59,820

driving we have stop lights and stop

251
00:11:03,020 --> 00:11:01,680
signs and things and you have vehicles

252
00:11:05,060 --> 00:11:03,030
that are coming in the other way and

253
00:11:07,639 --> 00:11:05,070
going and there and everybody's at a

254
00:11:08,780 --> 00:11:07,649
different speed and so

255
00:11:11,509 --> 00:11:08,790
your brain gets used to everything

256
00:11:13,999 --> 00:11:11,519
floating so when you come back after six

257
00:11:18,199 --> 00:11:14,009
months it's really hard for your brain

258
00:11:20,449 --> 00:11:18,209
to kind of regain that that ability to

259
00:11:22,249 --> 00:11:20,459
understand like closure rates and

260
00:11:23,780 --> 00:11:22,259
opening rates when you say when you're

261
00:11:25,460 --> 00:11:23,790
driving they don't let us drive for

262
00:11:29,660 --> 00:11:25,470
about 45 days which is really really

263
00:11:31,819 --> 00:11:29,670

good so but but I remember even even 60

264

00:11:34,699 --> 00:11:31,829

days after I landed when I first started

265

00:11:37,489 --> 00:11:34,709

to drive a vehicle and I my daughter was

266

00:11:40,249 --> 00:11:37,499

sitting beside me and and I saw a red

267

00:11:42,199 --> 00:11:40,259

light about maybe a quarter or half a

268

00:11:44,059 --> 00:11:42,209

mile up in front of me and I I quickly

269

00:11:46,009 --> 00:11:44,069

tap the brakes and she said dad what are

270

00:11:47,600 --> 00:11:46,019

you doing and I said well I got a red

271

00:11:49,549 --> 00:11:47,610

light she goes but it's like a mile away

272

00:11:51,949 --> 00:11:49,559

you know so but on the space station

273

00:11:53,960 --> 00:11:51,959

you're traveling so fast and and things

274

00:11:56,749 --> 00:11:53,970

are floating inside that it's hard to

275

00:11:58,759 --> 00:11:56,759

get that relative speed sense of speed

276

00:12:00,439 --> 00:11:58,769

and so so that was an interesting

277

00:12:06,769 --> 00:12:00,449

phenomena that happens to your body when

278

00:12:09,079 --> 00:12:06,779

you're in space yes actually I wear

279

00:12:10,460 --> 00:12:09,089

these now there's probably some people

280

00:12:13,100 --> 00:12:10,470

in the room that wear glasses i wear

281

00:12:18,559 --> 00:12:13,110

these now they help me read but when i

282

00:12:21,379 --> 00:12:18,569

got back from space the the change in my

283

00:12:23,600 --> 00:12:21,389

vision everything for me everything was

284

00:12:26,629 --> 00:12:23,610

just a little slightly out of focus and

285

00:12:31,809 --> 00:12:26,639

so so now i wear these do I look good in

286

00:12:34,970 --> 00:12:31,819

them yeah thank you thank you and

287

00:12:38,179 --> 00:12:34,980

fortunately all the things that we do in

288

00:12:41,619 --> 00:12:38,189

space you can do with glasses on so it's

289

00:12:45,470 --> 00:12:41,629

not that not that difficult to adapt to

290

00:12:48,379 --> 00:12:45,480

but but it's hard for it was hard for me

291

00:12:50,749 --> 00:12:48,389

to kind of refocus visually and it took

292

00:12:52,699 --> 00:12:50,759

me about a year and a half from my

293

00:12:55,039 --> 00:12:52,709

vision to come back to where it was

294

00:12:57,169 --> 00:12:55,049

stable and it didn't come all the way

295

00:12:59,660 --> 00:12:57,179

back but it did did have some effects

296

00:13:03,499 --> 00:12:59,670

and I actually was very happy that I was

297

00:13:07,840 --> 00:13:03,509

able to to a contribute to to our

298

00:13:11,119 --> 00:13:07,850

medical folks here at at NASA and also

299

00:13:12,919 --> 00:13:11,129

across our nation and occur and globally

300

00:13:15,559 --> 00:13:12,929

you know to help us understand this

301
00:13:16,879 --> 00:13:15,569
phenomenon so when we send like somebody

302
00:13:19,249 --> 00:13:16,889
sitting in that room that's going to go

303
00:13:20,319 --> 00:13:19,259
to Mars first person to Mars that may be

304
00:13:24,729 --> 00:13:20,329
a three year

305
00:13:28,169 --> 00:13:24,739
rip out into space and back and to Mars

306
00:13:30,819 --> 00:13:28,179
and so if we if we're seeing vision

307
00:13:32,859 --> 00:13:30,829
changes with only six months in space

308
00:13:34,900 --> 00:13:32,869
maybe we really need to take hard look

309
00:13:36,910 --> 00:13:34,910
at this and so so I feel like I've

310
00:13:40,869 --> 00:13:36,920
contribute contributed a little bit to

311
00:13:43,929 --> 00:13:40,879
science so thank you how does space

312
00:13:46,629 --> 00:13:43,939
travel safe the aging process was affect

313
00:13:50,069 --> 00:13:46,639

the aging process well there is a

314

00:13:53,829 --> 00:13:50,079

fountain of youth out there nautica the

315

00:13:56,889 --> 00:13:53,839

well interestingly enough it in some

316

00:13:59,259 --> 00:13:56,899

ways that makes you feel it makes you

317

00:14:02,079 --> 00:13:59,269

feel a little younger because you don't

318

00:14:04,539 --> 00:14:02,089

have you don't have gravity now so you

319

00:14:07,229 --> 00:14:04,549

you sleep better I think because you

320

00:14:10,030 --> 00:14:07,239

don't have pressure points now you don't

321

00:14:11,350 --> 00:14:10,040

very rarely got a sore back or a sore

322

00:14:13,269 --> 00:14:11,360

neck or something like that because

323

00:14:15,939 --> 00:14:13,279

you're you're kind of floating the

324

00:14:18,189 --> 00:14:15,949

sensation is like if you ever been in a

325

00:14:20,470 --> 00:14:18,199

swimming pool like a nice warm swimming

326

00:14:22,960 --> 00:14:20,480

pool and you just kind of close your

327

00:14:25,809 --> 00:14:22,970

eyes and just float that feeling that's

328

00:14:28,989 --> 00:14:25,819

what it feels like all day every day in

329

00:14:31,269 --> 00:14:28,999

space and so so that process I think it

330

00:14:33,850 --> 00:14:31,279

helps your body relax a little bit so I

331

00:14:36,009 --> 00:14:33,860

don't I don't think it makes you getting

332

00:14:37,600 --> 00:14:36,019

younger but it's certainly like reduces

333

00:14:39,729 --> 00:14:37,610

a little bit of the stresses normally

334

00:14:42,939 --> 00:14:39,739

that you'd face on your body now there

335

00:14:45,519 --> 00:14:42,949

are some ways that actually that sort of

336

00:14:46,929 --> 00:14:45,529

accelerate certain things in the aging

337

00:14:49,720 --> 00:14:46,939

process and one of those things that

338

00:14:52,179 --> 00:14:49,730

we're really looking hard at is bone

339

00:14:55,329 --> 00:14:52,189

loss you know bone demineralization and

340

00:14:58,359 --> 00:14:55,339

stuff like this where we it speeds up

341

00:14:59,919 --> 00:14:58,369

the process of breakdown of bone

342

00:15:02,919 --> 00:14:59,929

structure and of course we're trying to

343

00:15:05,650 --> 00:15:02,929

develop exercises and things like that

344

00:15:09,039 --> 00:15:05,660

that we can do that will help us kind of

345

00:15:11,559 --> 00:15:09,049

stave off the loss of bone density and

346

00:15:15,759 --> 00:15:11,569

things like that and so so in those kind

347

00:15:18,309 --> 00:15:15,769

of processes like bone loss the aging

348

00:15:21,159 --> 00:15:18,319

aging process is sort of sped up a

349

00:15:23,859 --> 00:15:21,169

little bit artificially but that helps

350

00:15:26,199 --> 00:15:23,869

us medically because we can actually use

351
00:15:29,109 --> 00:15:26,209
the astronaut that's experiencing bone

352
00:15:31,239 --> 00:15:29,119
loss sort of like someone that has like

353
00:15:32,960 --> 00:15:31,249
maybe like osteoporosis or something

354
00:15:35,869 --> 00:15:32,970
like that that actually has bone

355
00:15:37,939 --> 00:15:35,879
here on earth we can actually use the

356
00:15:41,030 --> 00:15:37,949
astronauts and studies and science

357
00:15:43,579 --> 00:15:41,040
experiments to to try to help us

358
00:15:46,460 --> 00:15:43,589
understand how that process takes place

359
00:15:48,980 --> 00:15:46,470
and how to how to treat people here on

360
00:15:51,019 --> 00:15:48,990
earth as well so so it's all part of the

361
00:15:52,879 --> 00:15:51,029
the science that we're gaining on board

362
00:15:54,949 --> 00:15:52,889
the station you do get a little bit

363
00:15:56,660 --> 00:15:54,959

taller though yes you did you do

364

00:15:58,040 --> 00:15:56,670

actually because of that you know we

365

00:15:59,150 --> 00:15:58,050

have gravity pulling us down to the

366

00:16:01,369 --> 00:15:59,160

ground so when you're standing up right

367

00:16:02,869 --> 00:16:01,379

here on earth you have you you're stuck

368

00:16:04,069 --> 00:16:02,879

your feet feel like you're you're

369

00:16:05,869 --> 00:16:04,079

probably sitting in chairs right now

370

00:16:07,460 --> 00:16:05,879

suit so you think about it and you're

371

00:16:09,530 --> 00:16:07,470

you're just kind of stuck to the bottom

372

00:16:11,780 --> 00:16:09,540

of your chair and so you actually your

373

00:16:13,639 --> 00:16:11,790

spine is compressed a little bit so when

374

00:16:15,619 --> 00:16:13,649

you go to space and you remove gravity

375

00:16:17,269 --> 00:16:15,629

your body kind of stretches out a little

376

00:16:19,280 --> 00:16:17,279

bit yeah I actually grew about an inch

377

00:16:21,470 --> 00:16:19,290

and a half one is in space and take that

378

00:16:23,030 --> 00:16:21,480

good yeah but I wasn't able to keep that

379

00:16:26,449 --> 00:16:23,040

when I got back when I got back I I

380

00:16:30,619 --> 00:16:26,459

after about 15 days I shrunk down to my

381

00:16:33,460 --> 00:16:30,629

normal size so amazing why did you

382

00:16:41,900 --> 00:16:33,470

choose Georgia Tech to study aerospace

383

00:16:43,850 --> 00:16:41,910

engineer because I love Atlanta do

384

00:16:50,329 --> 00:16:43,860

anybody tech any tech fans there in the

385

00:16:53,360 --> 00:16:50,339

room some losses well I the reason I

386

00:16:55,069 --> 00:16:53,370

chose Georgia Tech for the period of

387

00:16:58,420 --> 00:16:55,079

time they were as Georgia Tech was a

388

00:17:01,309 --> 00:16:58,430

center of excellence for rotary wing

389

00:17:03,819 --> 00:17:01,319

technology and aerospace field and and

390

00:17:08,419 --> 00:17:03,829

at the time I was an active duty army

391

00:17:12,020 --> 00:17:08,429

pilot and so the army sent me there to

392

00:17:16,309 --> 00:17:12,030

study rotorcraft our helicopters and

393

00:17:17,630 --> 00:17:16,319

vertical lift technology and so and so I

394

00:17:20,090 --> 00:17:17,640

don't know if you knew this but Georgia

395

00:17:22,460 --> 00:17:20,100

Tech is a center of excellence for

396

00:17:26,299 --> 00:17:22,470

rotary wing technology and vertical lift

397

00:17:29,480 --> 00:17:26,309

technology so so a lot of my my thoughts

398

00:17:32,240 --> 00:17:29,490

on how making lunar landers or making

399

00:17:35,090 --> 00:17:32,250

spacecraft they can that can maneuver

400

00:17:37,490 --> 00:17:35,100

like a helicopter or aircraft like a

401
00:17:38,750 --> 00:17:37,500
helicopter maneuvering are some sort of

402
00:17:40,730 --> 00:17:38,760
hovercraft

403
00:17:42,050 --> 00:17:40,740
the Georgia Tech is a center of

404
00:17:45,230 --> 00:17:42,060
excellence for that so that's why i

405
00:17:49,430 --> 00:17:45,240
chose Georgia Tech and besides they're

406
00:17:50,810 --> 00:17:49,440
the ramblin wreck there's probably some

407
00:17:58,340 --> 00:17:50,820
Georgia fans in the room they're not

408
00:18:00,230 --> 00:17:58,350
smiling right now oh good Tori and your

409
00:18:03,110 --> 00:18:00,240
bio it said that you got the Russian

410
00:18:05,390 --> 00:18:03,120
Medal of Merit what did you do to get

411
00:18:07,100 --> 00:18:05,400
that well that was actually you know

412
00:18:09,290 --> 00:18:07,110
that was actually kind of a surprise and

413
00:18:12,050 --> 00:18:09,300

when that medal was awarded to me it was

414

00:18:15,580 --> 00:18:12,060

by given to me by the Russian ambassador

415

00:18:19,370 --> 00:18:15,590

to the US which is really cool and so

416

00:18:22,490 --> 00:18:19,380

but i participated in when i launched a

417

00:18:25,670 --> 00:18:22,500

space in 2010 i launched on a Russian

418

00:18:29,900 --> 00:18:25,680

Soyuz rocket and so I went to space and

419

00:18:32,000 --> 00:18:29,910

operated on this Russian spaceship and

420

00:18:35,150 --> 00:18:32,010

then came home in that very same capsule

421

00:18:36,950 --> 00:18:35,160

and so and and of course in order to get

422

00:18:40,010 --> 00:18:36,960

a chance to do that you go through a lot

423

00:18:44,660 --> 00:18:40,020

of training and a lot of integrated

424

00:18:46,190 --> 00:18:44,670

training and and and study with the

425

00:18:49,340 --> 00:18:46,200

Russians and with the Russian space

426
00:18:51,200 --> 00:18:49,350
agency and also with their wood they're

427
00:18:56,030 --> 00:18:51,210
great engineers over there and

428
00:18:57,830 --> 00:18:56,040
everything so so it was sort of a metal

429
00:19:01,280 --> 00:18:57,840
that was given to those astronauts that

430
00:19:03,320 --> 00:19:01,290
had done work preparing to fly in the

431
00:19:07,190 --> 00:19:03,330
Soyuz vehicle and then completing a

432
00:19:09,770 --> 00:19:07,200
flight on the vehicle so so i I just I

433
00:19:11,930 --> 00:19:09,780
studied learned my Russian which was

434
00:19:14,090 --> 00:19:11,940
hard for me probably I mean there's

435
00:19:15,980 --> 00:19:14,100
probably the hardest thing that I had to

436
00:19:19,130 --> 00:19:15,990
do is learn Russian that was really

437
00:19:20,960 --> 00:19:19,140
difficult for me but but learning that

438
00:19:23,000 --> 00:19:20,970

system and flying on that vehicle and

439

00:19:26,600 --> 00:19:23,010

and that's the reason they gave me that

440

00:19:29,240 --> 00:19:26,610

metal and I was very honored excellent

441

00:19:33,260 --> 00:19:29,250

okay go ahead okay how was it similar to

442

00:19:35,240 --> 00:19:33,270

live underwater compared to face a very

443

00:19:37,310 --> 00:19:35,250

very similar underwater you know we do

444

00:19:40,580 --> 00:19:37,320

you probably have seen we do our

445

00:19:45,710 --> 00:19:40,590

spacewalk training under water we also

446

00:19:48,350 --> 00:19:45,720

have we also have this extreme

447

00:19:51,130 --> 00:19:48,360

environments training that we were we on

448

00:19:54,040 --> 00:19:51,140

the Aquarius habitat underwater

449

00:19:57,280 --> 00:19:54,050

because you can take in underwater you

450

00:19:59,620 --> 00:19:57,290

can sort of replicate what it feels like

451
00:20:02,650 --> 00:19:59,630
in space now it's actually much easier

452
00:20:05,230 --> 00:20:02,660
to live and work in space and out on a

453
00:20:08,110 --> 00:20:05,240
space walk in space than it is in the

454
00:20:11,140 --> 00:20:08,120
pool so if you could do it in the pool

455
00:20:16,030 --> 00:20:11,150
you can most assuredly do it in space

456
00:20:17,380 --> 00:20:16,040
and so we we in the pool we actually go

457
00:20:19,330 --> 00:20:17,390
down to the level where we're going to

458
00:20:22,180 --> 00:20:19,340
work in these in our big suits and they

459
00:20:24,610 --> 00:20:22,190
get us neutrally buoyant so it feels

460
00:20:27,820 --> 00:20:24,620
like you're floating so they they add

461
00:20:29,800 --> 00:20:27,830
weights or foam to your to your suit and

462
00:20:31,600 --> 00:20:29,810
so they they hold you out and so you

463
00:20:33,250 --> 00:20:31,610

don't rise to the surface and you don't

464

00:20:36,250 --> 00:20:33,260

drop to the bottom so they get you

465

00:20:38,380 --> 00:20:36,260

what's called neutrally buoyant and that

466

00:20:41,230 --> 00:20:38,390

pool is actually in a place we call the

467

00:20:42,970 --> 00:20:41,240

neutral buoyancy laboratory which is

468

00:20:44,800 --> 00:20:42,980

right outside of Johnson Space Center

469

00:20:47,110 --> 00:20:44,810

here in Houston and we do all of our

470

00:20:50,050 --> 00:20:47,120

spacewalk training there and because

471

00:20:52,480 --> 00:20:50,060

it's a great analogy to floating

472

00:20:54,640 --> 00:20:52,490

around in space and of course in the

473

00:20:56,500 --> 00:20:54,650

pool you still have gravity so if you

474

00:20:58,810 --> 00:20:56,510

turn on your in your suit if you turn on

475

00:21:01,300 --> 00:20:58,820

your head in the pool you you can feel

476

00:21:02,380 --> 00:21:01,310

that you can so it doesn't feel real

477

00:21:04,150 --> 00:21:02,390

comfortable it feels like you're

478

00:21:06,670 --> 00:21:04,160

standing on your head and so you still

479

00:21:08,590 --> 00:21:06,680

have that feeling in the pool and you

480

00:21:10,990 --> 00:21:08,600

also have dragged so when you move your

481

00:21:13,450 --> 00:21:11,000

arm through the water you have you could

482

00:21:14,920 --> 00:21:13,460

feel the drag of the water on your arms

483

00:21:17,260 --> 00:21:14,930

and when you're trying to move your body

484

00:21:19,180 --> 00:21:17,270

and stuff so but when you get the space

485

00:21:21,460 --> 00:21:19,190

all of that is gone and so it's actually

486

00:21:24,490 --> 00:21:21,470

much easier to move around in space so

487

00:21:28,950 --> 00:21:24,500

it's a great analogy that we use to

488

00:21:36,070 --> 00:21:31,960

this curiosity's memory which affects

489

00:21:39,700 --> 00:21:36,080

your current data well I'm not privy to

490

00:21:43,360 --> 00:21:39,710

all that data but I'm sure that the

491

00:21:45,310 --> 00:21:43,370

memory glitch probably did did have a

492

00:21:47,080 --> 00:21:45,320

little bit of an impact on the data we

493

00:21:50,380 --> 00:21:47,090

were bringing down our gathering and

494

00:21:52,540 --> 00:21:50,390

then also telemetry back to earth but i

495

00:21:54,580 --> 00:21:52,550

believe that they've solved that that

496

00:21:57,730 --> 00:21:54,590

issue now i don't really have that all

497

00:21:59,470 --> 00:21:57,740

the details on that but what we usually

498

00:22:01,390 --> 00:21:59,480

do in our spaceships like this and i

499

00:22:04,340 --> 00:22:01,400

believe was the case with curiosity that

500

00:22:07,520 --> 00:22:04,350

we we build in some redundancy

501
00:22:09,110 --> 00:22:07,530
so we can we can actually like swap to a

502
00:22:12,860 --> 00:22:09,120
different channel or different string

503
00:22:14,570 --> 00:22:12,870
and then and then kind of try to fix or

504
00:22:16,730 --> 00:22:14,580
repair the the string that we had a

505
00:22:22,010 --> 00:22:16,740
glitch on and so I really don't know the

506
00:22:24,020 --> 00:22:22,020
details on that but I the last I heard

507
00:22:26,060 --> 00:22:24,030
that we were we've gotten back full

508
00:22:27,200 --> 00:22:26,070
functionality of our of our data so yeah

509
00:22:28,789 --> 00:22:27,210
one of the cool things about working at

510
00:22:30,560 --> 00:22:28,799
NASA is that there's different centers

511
00:22:33,260 --> 00:22:30,570
across the United States so there's some

512
00:22:34,580 --> 00:22:33,270
in Alabama some in Mississippi and out

513
00:22:35,900 --> 00:22:34,590

in California there's a place called the

514

00:22:37,520 --> 00:22:35,910

Jet Propulsion Laboratory and that's

515

00:22:39,890 --> 00:22:37,530

sort of the home of all the Mars rovers

516

00:22:41,930 --> 00:22:39,900

including curiosity so there's a room

517

00:22:44,029 --> 00:22:41,940

sort of a mini Mission Control out there

518

00:22:45,710 --> 00:22:44,039

that's where they actually drive and get

519

00:22:47,930 --> 00:22:45,720

the data down from curiosity so those

520

00:22:52,820 --> 00:22:47,940

guys are out there watching that 24

521

00:22:58,370 --> 00:22:52,830

hours a day out there what foreign

522

00:23:00,710 --> 00:22:58,380

languages do you speak well um I did

523

00:23:02,510 --> 00:23:00,720

speak pretty good Russian but it's it's

524

00:23:04,310 --> 00:23:02,520

kind of um you know when you don't

525

00:23:06,680 --> 00:23:04,320

practice it I don't know how many there

526
00:23:08,750 --> 00:23:06,690
in the room speak a foreign language but

527
00:23:11,480 --> 00:23:08,760
you know if you don't keep practiced at

528
00:23:14,120 --> 00:23:11,490
it it's difficult to keep that to keep

529
00:23:17,870 --> 00:23:14,130
that cutting edge you know so I would

530
00:23:20,419 --> 00:23:17,880
say right now I speak English Emma and I

531
00:23:22,159 --> 00:23:20,429
speak a little bit of Russian enough to

532
00:23:24,529 --> 00:23:22,169
get by I think I think I could survive

533
00:23:26,659 --> 00:23:24,539
you know and on the street and if you

534
00:23:29,240 --> 00:23:26,669
jump drop me off on the street in Moscow

535
00:23:31,010 --> 00:23:29,250
I could probably survive but people

536
00:23:33,100 --> 00:23:31,020
probably laughing at me but they would

537
00:23:36,770 --> 00:23:33,110
understand what I was trying to say so

538
00:23:40,100 --> 00:23:36,780

and barton creek stem academy we've got

539

00:23:42,880 --> 00:23:40,110

about time for one more question okay do

540

00:23:46,610 --> 00:23:42,890

you believe in extraterrestrials

541

00:23:52,100 --> 00:23:46,620

extending on a new on a different planet

542

00:23:53,419 --> 00:23:52,110

oh that's a loaded question I'm glad

543

00:23:58,640 --> 00:23:53,429

it's the last question I'm just kidding

544

00:23:59,930 --> 00:23:58,650

um you know i I've never first of all

545

00:24:01,310 --> 00:23:59,940

let me say that I've never seen an

546

00:24:02,960 --> 00:24:01,320

extraterrestrial I've never seen an

547

00:24:07,070 --> 00:24:02,970

alien or anything like that I've never

548

00:24:11,990 --> 00:24:07,080

seen a UFO but I do believe I do believe

549

00:24:14,630 --> 00:24:12,000

that we it that there are 0 most likely

550

00:24:16,909 --> 00:24:14,640

other life forms out there might not be

551
00:24:22,669 --> 00:24:16,919
something that we like understand

552
00:24:24,190 --> 00:24:22,679
visually as a life form so I I don't

553
00:24:26,390 --> 00:24:24,200
think I believe in like

554
00:24:29,360 --> 00:24:26,400
extraterrestrials like an ET the movie

555
00:24:33,230 --> 00:24:29,370
and stuff like that you know but I do i

556
00:24:35,120 --> 00:24:33,240
do find very very fascinating these you

557
00:24:37,640 --> 00:24:35,130
know earth-like planets that we're

558
00:24:40,039 --> 00:24:37,650
finding with with Hubble and the other

559
00:24:42,860 --> 00:24:40,049
telescopes that you know given the right

560
00:24:46,610 --> 00:24:42,870
circumstances that we could find like

561
00:24:49,250 --> 00:24:46,620
organics in in what we would refer to as

562
00:24:51,500 --> 00:24:49,260
soil or something like that that and

563
00:24:55,700 --> 00:24:51,510

maybe even a partial atmosphere where

564

00:24:58,430 --> 00:24:55,710

we're organic life or self you know

565

00:25:00,680 --> 00:24:58,440

single-celled kind of life or maybe even

566

00:25:02,480 --> 00:25:00,690

something a little more advanced could

567

00:25:05,720 --> 00:25:02,490

exist or plants or something like that

568

00:25:07,700 --> 00:25:05,730

so you know I'm not a I'm not a

569

00:25:11,180 --> 00:25:07,710

planetary scientist and I'm not a you

570

00:25:13,310 --> 00:25:11,190

know a chemist but but I have to believe

571

00:25:15,530 --> 00:25:13,320

that something like that probably is

572

00:25:19,310 --> 00:25:15,540

occurring somewhere somewhere in our in

573

00:25:20,360 --> 00:25:19,320

our in our universe so so but I don't

574

00:25:23,299 --> 00:25:20,370

think it looks like us i personally

575

00:25:26,720 --> 00:25:23,309

don't think that this life these

576

00:25:31,730 --> 00:25:26,730

life-forms would look like us but ok ok

577

00:25:36,810 --> 00:25:34,620

thank you guys great great questions and

578

00:25:38,190 --> 00:25:36,820

thanks for spending time with us today