



1
00:00:04,950 --> 00:00:03,110
hi everybody josh barley here inside

2
00:00:06,389 --> 00:00:04,960
mission control houston i'm joined by my

3
00:00:07,749 --> 00:00:06,399
friend camille elaine how are you doing

4
00:00:08,950 --> 00:00:07,759
camille i'm great thank you you know all

5
00:00:10,070 --> 00:00:08,960
this week we're talking about and

6
00:00:11,190 --> 00:00:10,080
actually all this month more

7
00:00:13,030 --> 00:00:11,200
appropriately we're talking about the

8
00:00:14,549 --> 00:00:13,040
anniversaries of valentina tereshkova

9
00:00:16,470 --> 00:00:14,559
who was the first female in space and

10
00:00:18,310 --> 00:00:16,480
sally ryan it was the first american in

11
00:00:19,429 --> 00:00:18,320
space one was 50 years ago and once 30

12
00:00:20,470 --> 00:00:19,439
years ago

13
00:00:21,990 --> 00:00:20,480

um

14

00:00:23,750 --> 00:00:22,000

who more appropriate to talk about it

15

00:00:24,950 --> 00:00:23,760

than you you know your background is

16

00:00:26,310 --> 00:00:24,960

quite extensive when it comes to

17

00:00:28,390 --> 00:00:26,320

education you've got a bachelor of

18

00:00:30,310 --> 00:00:28,400

science in mechanical engineering from

19

00:00:32,229 --> 00:00:30,320

howard university a master of science in

20

00:00:34,389 --> 00:00:32,239

mechanical engineering from florida a m

21

00:00:35,990 --> 00:00:34,399

university master of science in

22

00:00:37,830 --> 00:00:36,000

aerospace engineering from university of

23

00:00:38,790 --> 00:00:37,840

maryland and a doctorate in educational

24

00:00:40,389 --> 00:00:38,800

leadership from the university of

25

00:00:42,310 --> 00:00:40,399

houston so you've had some some

26

00:00:43,590 --> 00:00:42,320

schooling in science

27

00:00:45,190 --> 00:00:43,600

but i think what's even cooler she's

28

00:00:46,709 --> 00:00:45,200

actually a private pilot

29

00:00:48,150 --> 00:00:46,719

which is amazing to me but one of you

30

00:00:49,750 --> 00:00:48,160

look at these these anniversaries you

31

00:00:51,430 --> 00:00:49,760

know what does it mean to you and what

32

00:00:53,830 --> 00:00:51,440

are kind of your thoughts on it

33

00:00:56,950 --> 00:00:53,840

um i think in the last 30 to 50 years

34

00:00:59,590 --> 00:00:56,960

we've made significant strides and and

35

00:01:02,549 --> 00:00:59,600

um we've come a long way with the

36

00:01:05,350 --> 00:01:02,559

inclusion of women in human spaceflight

37

00:01:08,469 --> 00:01:05,360

um to date i think we've had about 57

38

00:01:09,670 --> 00:01:08,479

women from diverse backgrounds both

39

00:01:12,469 --> 00:01:09,680

cultural

40

00:01:13,350 --> 00:01:12,479

social national different nationalities

41

00:01:14,789 --> 00:01:13,360

who have

42

00:01:17,590 --> 00:01:14,799

flown in space

43

00:01:19,429 --> 00:01:17,600

from american perspective since dr sally

44

00:01:21,190 --> 00:01:19,439

ride we've had the first

45

00:01:24,230 --> 00:01:21,200

african-american woman

46

00:01:25,510 --> 00:01:24,240

dr mae jemison in 1992

47

00:01:28,710 --> 00:01:25,520

who flew

48

00:01:31,350 --> 00:01:28,720

our own senate director dr ellen ochoa

49

00:01:34,310 --> 00:01:31,360

who's the first hispanic uh woman

50

00:01:36,310 --> 00:01:34,320

american woman to fly in space in 1993

51
00:01:39,510 --> 00:01:36,320
and then the first asian-american woman

52
00:01:40,870 --> 00:01:39,520
and dr kalpana challa who flew in 1997

53
00:01:44,550 --> 00:01:40,880
for the first time we lost her in

54
00:01:49,030 --> 00:01:44,560
colombia but um these women have really

55
00:01:51,910 --> 00:01:49,040
blazed a trail and inspired countless um

56
00:01:54,389 --> 00:01:51,920
women who have come behind them and

57
00:01:57,190 --> 00:01:54,399
willed for generations from a global

58
00:01:59,670 --> 00:01:57,200
perspective we've had a number of women

59
00:02:03,030 --> 00:01:59,680
who have flown in space from japan

60
00:02:05,350 --> 00:02:03,040
canada europe china of course russia

61
00:02:07,749 --> 00:02:05,360
and we've had an iranian-american space

62
00:02:10,309 --> 00:02:07,759
tourist so we've made significant

63
00:02:12,150 --> 00:02:10,319

strides um including women in human

64

00:02:14,550 --> 00:02:12,160

space flight you know we try to always

65

00:02:15,990 --> 00:02:14,560

reach out to students and and kids who

66

00:02:17,270 --> 00:02:16,000

are going into science and whenever you

67

00:02:19,270 --> 00:02:17,280

take a look back at the school that

68

00:02:21,110 --> 00:02:19,280

you've gone through you know what made

69

00:02:22,710 --> 00:02:21,120

you pick the courses that you that you

70

00:02:25,589 --> 00:02:22,720

took and when did you know

71

00:02:29,190 --> 00:02:25,599

um i was really good in math and science

72

00:02:30,949 --> 00:02:29,200

in my early years of schooling and um i

73

00:02:31,750 --> 00:02:30,959

had a passion

74

00:02:37,750 --> 00:02:31,760

for

75

00:02:39,990 --> 00:02:37,760

i also

76
00:02:42,390 --> 00:02:40,000
was very passionate about space from an

77
00:02:44,470 --> 00:02:42,400
early age i grew up in the caribbean a

78
00:02:46,949 --> 00:02:44,480
small island nation of trinidad and

79
00:02:47,990 --> 00:02:46,959
tobago and i remember at the age of six

80
00:02:50,309 --> 00:02:48,000
and seven

81
00:02:53,110 --> 00:02:50,319
sitting on the trunk of my dad's car

82
00:02:55,190 --> 00:02:53,120
many nights and just being awe inspired

83
00:02:58,630 --> 00:02:55,200
by the vastness of space not really

84
00:03:01,350 --> 00:02:58,640
knowing what that was all about um but

85
00:03:03,990 --> 00:03:01,360
being really mechanical and analytical

86
00:03:06,630 --> 00:03:04,000
in my thinking when i decided that i was

87
00:03:08,229 --> 00:03:06,640
going to go to college of course i

88
00:03:09,990 --> 00:03:08,239

decided to study aeronautical

89

00:03:11,750 --> 00:03:10,000

engineering because of my passion for

90

00:03:13,910 --> 00:03:11,760

airplanes

91

00:03:16,470 --> 00:03:13,920

but then when i migrated to the states

92

00:03:19,110 --> 00:03:16,480

as a freshman and i'm dating myself

93

00:03:22,790 --> 00:03:19,120

the challenger accident happened and

94

00:03:25,750 --> 00:03:22,800

that just changed my life like in those

95

00:03:27,830 --> 00:03:25,760

moments i decided this is what i wanted

96

00:03:29,990 --> 00:03:27,840

to do so i switched from aeronautical

97

00:03:32,869 --> 00:03:30,000

engineering to aerospace engineering and

98

00:03:35,589 --> 00:03:32,879

you read my bio so the rest is history

99

00:03:37,830 --> 00:03:35,599

um spent 18-year career designing

100

00:03:40,309 --> 00:03:37,840

rockets and spacecraft systems both the

101
00:03:41,750 --> 00:03:40,319
department of defense and nasa so

102
00:03:43,270 --> 00:03:41,760
whenever you talk to boys and girls that

103
00:03:45,830 --> 00:03:43,280
are going into you know if they they

104
00:03:47,270 --> 00:03:45,840
kind of have a hankering for for science

105
00:03:49,030 --> 00:03:47,280
is that really the key it's just for

106
00:03:50,470 --> 00:03:49,040
them to to go with what interests them

107
00:03:51,750 --> 00:03:50,480
what you know what their passion is

108
00:03:53,990 --> 00:03:51,760
rather than trying to say okay you know

109
00:03:56,149 --> 00:03:54,000
the end of my career i want to be here

110
00:03:58,229 --> 00:03:56,159
is it more important to say well here's

111
00:04:01,589 --> 00:03:58,239
what i really like to do and is that the

112
00:04:03,589 --> 00:04:01,599
key yes it is the key i i think you have

113
00:04:06,030 --> 00:04:03,599

to follow the things that you're

114

00:04:08,470 --> 00:04:06,040

passionate about um

115

00:04:11,270 --> 00:04:08,480

specifically for girls though

116

00:04:13,030 --> 00:04:11,280

encouraging them to go into science

117

00:04:14,470 --> 00:04:13,040

requires exposure

118

00:04:17,509 --> 00:04:14,480

right and so

119

00:04:21,110 --> 00:04:17,519

having opportunities as a high schooler

120

00:04:23,350 --> 00:04:21,120

to go and work in a lab alongside a

121

00:04:25,670 --> 00:04:23,360

professional scientist or researcher

122

00:04:28,469 --> 00:04:25,680

engineer and getting that exposure and

123

00:04:31,510 --> 00:04:28,479

those opportunities to see what the real

124

00:04:33,830 --> 00:04:31,520

world of science and engineering is like

125

00:04:36,629 --> 00:04:33,840

has been shown to really sustain the

126

00:04:39,270 --> 00:04:36,639

interest of females

127

00:04:40,469 --> 00:04:39,280

continuing their careers in those areas

128

00:04:42,469 --> 00:04:40,479

so you work in the program science

129

00:04:43,909 --> 00:04:42,479

office i do you know sort of the uh the

130

00:04:45,510 --> 00:04:43,919

brain trust of all the science we've got

131

00:04:46,710 --> 00:04:45,520

going on on board uh the orbiting

132

00:04:47,749 --> 00:04:46,720

laboratory whenever you take a look at

133

00:04:49,110 --> 00:04:47,759

it you know you were talking about all

134

00:04:50,950 --> 00:04:49,120

the different uh you know legendary

135

00:04:52,070 --> 00:04:50,960

females that we've had one of them just

136

00:04:53,909 --> 00:04:52,080

walked back in the room anna fisher's

137

00:04:55,110 --> 00:04:53,919

over there's our capcom today

138

00:04:56,790 --> 00:04:55,120

she's part of the original group of

139

00:04:58,150 --> 00:04:56,800

astronauts but we've had

140

00:04:59,909 --> 00:04:58,160

dozens of astronauts that have flown up

141

00:05:02,230 --> 00:04:59,919

to the space station females and males

142

00:05:03,590 --> 00:05:02,240

obviously uh peggy whitson was a

143

00:05:04,950 --> 00:05:03,600

commander of the space station back on

144

00:05:05,830 --> 00:05:04,960

expedition

145

00:05:06,870 --> 00:05:05,840

yeah

146

00:05:08,870 --> 00:05:06,880

whenever you take a look at the space

147

00:05:10,550 --> 00:05:08,880

station itself and a lot of these pis

148

00:05:13,029 --> 00:05:10,560

and principal investigators are are

149

00:05:14,310 --> 00:05:13,039

females and two very diverse

150

00:05:16,310 --> 00:05:14,320

you know when we look at the experiments

151

00:05:17,990 --> 00:05:16,320

what what do you think is probably the

152

00:05:19,350 --> 00:05:18,000

most promising thing that that the space

153

00:05:21,430 --> 00:05:19,360

station offers

154

00:05:22,469 --> 00:05:21,440

uh for scientists and researchers and

155

00:05:24,230 --> 00:05:22,479

all the things that are going on what

156

00:05:26,390 --> 00:05:24,240

they're working on i think it's the

157

00:05:28,710 --> 00:05:26,400

amazing discoveries and breakthroughs

158

00:05:30,070 --> 00:05:28,720

that we have had and continue to have on

159

00:05:32,710 --> 00:05:30,080

the space station

160

00:05:34,710 --> 00:05:32,720

you know all the biological chemical and

161

00:05:36,950 --> 00:05:34,720

physical processes

162

00:05:39,670 --> 00:05:36,960

that

163

00:05:41,830 --> 00:05:39,680

a function of our terrestrial in

164

00:05:44,550 --> 00:05:41,840

environment is a function of the

165

00:05:47,189 --> 00:05:44,560

gravitational force right our ecosystem

166

00:05:49,990 --> 00:05:47,199

functions because of that gravitational

167

00:05:53,510 --> 00:05:50,000

force and so when you take that variable

168

00:05:56,230 --> 00:05:53,520

out of the equation then amazing things

169

00:05:59,110 --> 00:05:56,240

happen to those same processes both in

170

00:06:00,870 --> 00:05:59,120

biology chemistry and physics and so the

171

00:06:03,670 --> 00:06:00,880

space station really serves as a

172

00:06:06,790 --> 00:06:03,680

platform for us to do the investigations

173

00:06:09,029 --> 00:06:06,800

in those areas and and see what those

174

00:06:11,270 --> 00:06:09,039

changes are and and have those

175

00:06:13,909 --> 00:06:11,280

discoveries and breakthroughs that you

176
00:06:16,710 --> 00:06:13,919
know we didn't know um really could

177
00:06:19,909 --> 00:06:16,720
happen or exist and a perfect perfect

178
00:06:21,590 --> 00:06:19,919
example of that is microbial virulence

179
00:06:25,510 --> 00:06:21,600
you know when we flew the salmonella

180
00:06:27,590 --> 00:06:25,520
bacteria and as a result of

181
00:06:29,510 --> 00:06:27,600
the microgravity environment it became

182
00:06:31,430 --> 00:06:29,520
more virulent or the disease-causing

183
00:06:32,870 --> 00:06:31,440
potency increased

184
00:06:35,029 --> 00:06:32,880
and so

185
00:06:37,270 --> 00:06:35,039
researchers also were able to identify

186
00:06:40,309 --> 00:06:37,280
the genetic pathway that cross caused

187
00:06:42,790 --> 00:06:40,319
that virulence and so they as a result

188
00:06:45,590 --> 00:06:42,800

potentially could develop vaccines

189

00:06:48,550 --> 00:06:45,600

for those bacteria-causing diseases that

190

00:06:49,589 --> 00:06:48,560

will have an impact on our life here on

191

00:06:51,510 --> 00:06:49,599

earth

192

00:06:53,670 --> 00:06:51,520

another one is

193

00:06:56,870 --> 00:06:53,680

after 40 or 50 years of human

194

00:07:00,230 --> 00:06:56,880

spaceflight we recently discovered um

195

00:07:02,950 --> 00:07:00,240

the vision degradation of astronaut

196

00:07:05,350 --> 00:07:02,960

astronauts and so just recently we

197

00:07:08,950 --> 00:07:05,360

started that investigation called ocular

198

00:07:11,110 --> 00:07:08,960

health examining um how that vision

199

00:07:14,230 --> 00:07:11,120

degrades during long duration space

200

00:07:17,029 --> 00:07:14,240

flights and so all these investigations

201

00:07:20,950 --> 00:07:17,039

um in addition to the countermeasures

202

00:07:23,029 --> 00:07:20,960

that researchers develop as a result um

203

00:07:25,670 --> 00:07:23,039

will have significant impacts and

204

00:07:27,350 --> 00:07:25,680

benefits to improving the quality of our

205

00:07:29,270 --> 00:07:27,360

life here on earth so last question is

206

00:07:30,950 --> 00:07:29,280

kind of a big one out of all the things

207

00:07:32,550 --> 00:07:30,960

we've done on the space station you know

208

00:07:34,469 --> 00:07:32,560

what is your favorite experiment you

209

00:07:36,469 --> 00:07:34,479

have to explain what it is but what is

210

00:07:37,670 --> 00:07:36,479

what's your favorite i have two okay

211

00:07:39,830 --> 00:07:37,680

i'll give you two

212

00:07:41,510 --> 00:07:39,840

the first is ams the alpha magnetic

213

00:07:44,390 --> 00:07:41,520

spectrometer which is the largest

214

00:07:46,710 --> 00:07:44,400

particle physics detector in space and

215

00:07:48,790 --> 00:07:46,720

up to date it's been up there for almost

216

00:07:51,350 --> 00:07:48,800

two years and it's gotten over 16

217

00:07:53,029 --> 00:07:51,360

billion hits of cosmic rays

218

00:07:53,909 --> 00:07:53,039

um and so

219

00:07:56,710 --> 00:07:53,919

that

220

00:07:59,110 --> 00:07:56,720

instrument and the in from the data we

221

00:08:01,990 --> 00:07:59,120

get from that instrument could answer

222

00:08:04,629 --> 00:08:02,000

the question of what is the origins of

223

00:08:07,029 --> 00:08:04,639

of our universe and from a physical and

224

00:08:11,029 --> 00:08:07,039

spiritual perspective i think human

225

00:08:13,830 --> 00:08:11,039

beings are curious about that how did we

226

00:08:14,790 --> 00:08:13,840

evolve um and so i think

227

00:08:19,589 --> 00:08:14,800

the

228

00:08:20,710 --> 00:08:19,599

that investigation is really really

229

00:08:23,830 --> 00:08:20,720

promising

230

00:08:27,350 --> 00:08:23,840

the second one is um sally ride earth

231

00:08:29,110 --> 00:08:27,360

cam yeah developed by dr sally ride and

232

00:08:31,589 --> 00:08:29,120

it's one of the longest running

233

00:08:33,110 --> 00:08:31,599

investigations it first started back in

234

00:08:35,190 --> 00:08:33,120

expedition 2.

235

00:08:37,829 --> 00:08:35,200

and what she

236

00:08:41,110 --> 00:08:37,839

facilitated was the opportunity for

237

00:08:43,509 --> 00:08:41,120

middle school students to be able to

238

00:08:46,230 --> 00:08:43,519

program the earth cam camera that's on

239

00:08:49,190 --> 00:08:46,240

board the space station to take images

240

00:08:51,750 --> 00:08:49,200

of various geological features of our

241

00:08:54,550 --> 00:08:51,760

earth and use that in their studies of

242

00:08:57,509 --> 00:08:54,560

science of math of pre-engineering

243

00:08:59,670 --> 00:08:57,519

geography social science studies and

244

00:09:02,150 --> 00:08:59,680

history and so it's

245

00:09:05,030 --> 00:09:02,160

and it's one of our global education

246

00:09:07,509 --> 00:09:05,040

programs so we've been able to reach

247

00:09:09,670 --> 00:09:07,519

countless millions of students around

248

00:09:11,509 --> 00:09:09,680

the world just with that investigation

249

00:09:12,949 --> 00:09:11,519

so that's really one of my favorites

250

00:09:14,949 --> 00:09:12,959

well even if sally or i would have never

251
00:09:16,150 --> 00:09:14,959
been the first american female in space

252
00:09:20,470 --> 00:09:16,160
that is

253
00:09:22,070 --> 00:09:20,480
students and they touch it you know all

254
00:09:23,590 --> 00:09:22,080
the time absolutely i think that's

255
00:09:24,949 --> 00:09:23,600
probably one of my favorite ones too so

256
00:09:26,710 --> 00:09:24,959
thanks for joining us can we always

257
00:09:28,150 --> 00:09:26,720
always good always good to talk to you

258
00:09:30,150 --> 00:09:28,160
camille elaine

259
00:09:31,990 --> 00:09:30,160
if you would like to learn more about uh

260
00:09:33,350 --> 00:09:32,000
the office that camille works in which

261
00:09:34,710 --> 00:09:33,360
the program science office and all the

262
00:09:36,150 --> 00:09:34,720
experiments that they help run onboard

263
00:09:38,750 --> 00:09:36,160

the international space station just log

264

00:09:40,310 --> 00:09:38,760

on to the nasa website at

265

00:09:42,389 --> 00:09:40,320

www.nasa.gov

266

00:09:43,509 --> 00:09:42,399

station take a look at the left hand

267

00:09:44,949 --> 00:09:43,519

side of the page under research and

268

00:09:46,230 --> 00:09:44,959

technology and you can take a look at

269

00:09:48,630 --> 00:09:46,240

all the different experiments that the