



1
00:00:07,390 --> 00:00:09,070
My name is Lewis Wooten.

2
00:00:09,100 --> 00:00:10,980
I'm currently the Director of

3
00:00:10,980 --> 00:00:12,980
the Missions Operations Laboratory in

4
00:00:12,980 --> 00:00:14,980
the Engineering Directorate here

5
00:00:14,980 --> 00:00:16,980
at Marshall Space Flight Center.

6
00:00:16,980 --> 00:00:18,980
Our Mission Operations Lab is primarily

7
00:00:18,980 --> 00:00:22,160
focused on the International Space

8
00:00:22,160 --> 00:00:24,900
Station Payload Operations and Integration.

9
00:00:24,900 --> 00:00:28,560
Our job is to integrate all the research

10
00:00:28,560 --> 00:00:31,380
with payload developers from around the globe

11
00:00:31,380 --> 00:00:33,910
to ensure that their research is conducted

12
00:00:33,910 --> 00:00:37,510
in a very timely and efficient manner,

13
00:00:37,510 --> 00:00:41,200

so our group works twenty-four hours a

14

00:00:41,200 --> 00:00:44,050

day, seven days a week, 365 days

15

00:00:44,050 --> 00:00:46,050

a year. As long as Space Station

16

00:00:46,050 --> 00:00:48,600

is up there and crew is up there,

17

00:00:48,600 --> 00:00:51,040

we are in the Payload Operations and

18

00:00:51,040 --> 00:00:53,660

Integration center here at Marshall.

19

00:00:53,660 --> 00:00:55,570

That's the primary focus.

20

00:00:55,570 --> 00:00:59,350

We also are beginning to develop the

21

00:00:59,350 --> 00:01:01,350

SLS engineering support center,

22

00:01:01,350 --> 00:01:07,000

which is a center set up for the design

23

00:01:07,000 --> 00:01:09,000

of the SLS when we do

24

00:01:09,000 --> 00:01:12,820

launch and flight operations for SLS.

25

00:01:12,820 --> 00:01:16,360

We will support the team at KSC

26
00:01:16,360 --> 00:01:19,280
and the flight control team at JSC

27
00:01:19,280 --> 00:01:21,910
as we launch SLS.

28
00:01:21,910 --> 00:01:24,820
Our group is extraordinarily busy.

29
00:01:24,820 --> 00:01:27,150
We also have some very small projects

30
00:01:27,150 --> 00:01:29,310
that we're doing mission operations on.

31
00:01:29,340 --> 00:01:32,310
We plan to do the one for ISAT

32
00:01:32,310 --> 00:01:34,240
and also one of the secondary payloads that

33
00:01:34,240 --> 00:01:38,250
will fly on the Expedition Mission 1

34
00:01:38,250 --> 00:01:42,180
for SLS called the NEA Scout.

35
00:01:49,410 --> 00:01:52,290
My education, well, I have a bachelor's

36
00:01:52,290 --> 00:01:55,330
degree in mathematics, what we call

37
00:01:55,330 --> 00:01:58,190
the pure mathematics, from Fort Valley State

38
00:01:58,190 --> 00:02:02,930

in Fort Valley, Georgia and following

39
00:02:02,930 --> 00:02:05,170
that, I spent two years teaching high school

40
00:02:05,170 --> 00:02:11,120
that was in the mid to late 1970s

41
00:02:11,120 --> 00:02:15,600
in a place called Thomaston, Georgia.

42
00:02:15,600 --> 00:02:17,600
After that, I went through graduate

43
00:02:17,600 --> 00:02:19,600
school at Atlanta University, which is now called

44
00:02:19,600 --> 00:02:21,600
Clark Atlanta University; those two

45
00:02:21,600 --> 00:02:24,620
universities merged together, I think some

46
00:02:24,620 --> 00:02:25,730
time in the 1990s.

47
00:02:25,730 --> 00:02:28,210
I have a master's degree in applied

48
00:02:28,210 --> 00:02:33,680
mathematics from Clark Atlanta University,

49
00:02:33,680 --> 00:02:37,380
and after completing that degree in 1980,

50
00:02:37,380 --> 00:02:39,380
I became a member of the Marshall

51

00:02:39,380 --> 00:02:40,540

Space Flight Center team.

52

00:02:40,540 --> 00:02:42,290

I started in the Orbital Mechanics branch here,

53

00:02:42,290 --> 00:02:44,290

and that was a little less than a

54

00:02:44,290 --> 00:02:48,880

year before we actually had the

55

00:02:48,880 --> 00:02:50,340

first Space Shuttle flight.

56

00:02:58,720 --> 00:03:02,010

I grew up in south Georgia on a farm

57

00:03:02,010 --> 00:03:08,420

as a kid, and this was in the 1960s,

58

00:03:08,420 --> 00:03:13,360

and back then schools weren't integrated and

59

00:03:13,360 --> 00:03:16,230

I was one of the first students to integrate

60

00:03:16,230 --> 00:03:19,590

a school there that I went to.

61

00:03:19,590 --> 00:03:25,520

But I'll never forget this Sunday afternoon.

62

00:03:25,520 --> 00:03:31,440

It's hot, humid, and on Sunday afternoons,

63

00:03:31,440 --> 00:03:34,490

generally had to go to church and have dinner,

64

00:03:34,490 --> 00:03:36,250

me and my cousins and our brothers and

65

00:03:36,250 --> 00:03:38,250

sisters spent all our time out in a cow

66

00:03:38,250 --> 00:03:41,240

pasture playing softball having fun.

67

00:03:41,240 --> 00:03:42,920

But I'll never forget on this given

68

00:03:42,920 --> 00:03:45,720

day I wasn't out there with them.

69

00:03:45,720 --> 00:03:49,610

I was inside the house glued to a TV

70

00:03:49,610 --> 00:03:52,310

set, no air conditioning, whatever,

71

00:03:52,310 --> 00:03:54,690

but no one did have it back then.

72

00:03:54,690 --> 00:03:56,520

I'll never forget that day because that

73

00:03:56,520 --> 00:04:02,370

was July 21, 1969, and that

74

00:04:02,370 --> 00:04:06,270

was the day that man landed on the moon.

75

00:04:06,270 --> 00:04:08,920

That touched me in a very, very special

76

00:04:08,920 --> 00:04:10,760

way back then.

77

00:04:10,760 --> 00:04:14,040

That was in the afternoon that they

78

00:04:14,040 --> 00:04:17,080

finally landed, it touched down

79

00:04:17,080 --> 00:04:19,080

on the Moon, and it

80

00:04:19,080 --> 00:04:21,080

was later, maybe about nine

81

00:04:21,080 --> 00:04:23,500

o'clock that evening when Neil

82

00:04:23,500 --> 00:04:28,770

Armstrong actually stepped out of the Lunar Module.

83

00:04:28,770 --> 00:04:30,380

My folks said,

84

00:04:30,380 --> 00:04:31,870

"Hey, you need to go to bed.

85

00:04:31,870 --> 00:04:33,870

We've got to get up in tomorrow

86

00:04:33,870 --> 00:04:35,870

because we work in the fields

87

00:04:35,870 --> 00:04:37,870

during the day and you have

88

00:04:37,870 --> 00:04:39,690

to get up at sunrise" and all that kind of thing.

89

00:04:39,690 --> 00:04:42,080

Anyway, I got up the next day

90

00:04:42,080 --> 00:04:44,080

and I was out there, whatever we

91

00:04:44,080 --> 00:04:46,080

were doing in the fields, thinking,

92

00:04:46,080 --> 00:04:48,270

and I'm looking up in the sky

93

00:04:48,270 --> 00:04:50,249

not paying attention to what I'm doing

94

00:04:50,250 --> 00:04:51,510

because I'm thinking about what

95

00:04:51,510 --> 00:04:52,690

in the world are they doing on

96

00:04:52,690 --> 00:04:55,609

the moon right now.

97

00:04:55,610 --> 00:04:58,770

I remember saying to myself,

98

00:04:58,770 --> 00:05:03,180

"Gee, how it would be great to be a part of that."

99

00:05:03,180 --> 00:05:07,090

But from where I was at that time,

100

00:05:07,090 --> 00:05:12,560

I kind of get emotional telling this,

101
00:05:12,560 --> 00:05:15,070
but being a part of that was about

102
00:05:15,090 --> 00:05:16,820
as far as the moon itself,

103
00:05:16,820 --> 00:05:20,210
it just wasn't in the plan.

104
00:05:20,210 --> 00:05:26,090
I said that and I'll never forget,

105
00:05:26,090 --> 00:05:32,600
it was 1980, April 14th, I came through

106
00:05:32,600 --> 00:05:40,170
the Gate 9, but that was the day

107
00:05:40,170 --> 00:05:43,960
that I was starting my NASA career.

108
00:05:43,960 --> 00:05:45,960
It looked like there was some big time

109
00:05:45,960 --> 00:05:50,760
warp in between. I asked for

110
00:05:50,760 --> 00:05:54,350
that and now it was happening.

111
00:05:54,350 --> 00:05:56,350
Did I do anything specific, special to

112
00:05:56,350 --> 00:05:58,580
make that happen?

113
00:05:58,580 --> 00:06:02,380

I don't think so, I just was.

114

00:06:02,380 --> 00:06:05,180

And I remember saying to myself,

115

00:06:05,180 --> 00:06:07,420

because it dawned back on me,

116

00:06:07,420 --> 00:06:10,590

I said, "Thank God that dreams come true."

117

00:06:10,590 --> 00:06:15,130

So, when I got here,

118

00:06:15,130 --> 00:06:17,830

I didn't think that I got here on my own,

119

00:06:17,830 --> 00:06:23,090

I had a specific purpose of being here

120

00:06:23,090 --> 00:06:24,690

that changed my whole attitude

121

00:06:24,690 --> 00:06:26,570

about being here.

122

00:06:26,570 --> 00:06:29,410

No, you're here for a mission,

123

00:06:29,410 --> 00:06:31,410

you are here, so the thing I

124

00:06:31,410 --> 00:06:33,410

said to myself is do not

125

00:06:33,410 --> 00:06:40,150

mess this up because it is a gift

126

00:06:40,160 --> 00:06:44,280

and it has been a gift ever since.

127

00:06:51,970 --> 00:06:56,430

I remember applying for a job

128

00:06:56,430 --> 00:07:01,760

because Bob Shurney said they were hiring.

129

00:07:01,760 --> 00:07:03,760

I filled out an application, turned

130

00:07:03,760 --> 00:07:08,530

turned it in, and I didn't hear anymore.

131

00:07:08,530 --> 00:07:11,220

Eventually, I got an offer in the

132

00:07:11,220 --> 00:07:18,560

mail without an interview.

133

00:07:18,580 --> 00:07:22,070

There were other jobs,

134

00:07:22,070 --> 00:07:24,200

I was getting ready to come out of

135

00:07:24,200 --> 00:07:25,570

graduate school, I had interviewed

136

00:07:25,570 --> 00:07:27,570

with other companies and

137

00:07:27,570 --> 00:07:28,920

they had offered me positions,

138

00:07:28,920 --> 00:07:30,000

but this one just said on this date,

139

00:07:30,000 --> 00:07:32,170

would you accept a position

140

00:07:32,170 --> 00:07:35,740

at Marshall Space Flight Center at this grade?

141

00:07:35,740 --> 00:07:44,560

I felt that I was supposed to be here,

142

00:07:44,560 --> 00:07:51,080

I want not to mess this up because

143

00:07:51,080 --> 00:07:53,080

it was something that I asked

144

00:07:53,080 --> 00:07:55,450

for and it was given to me.

145

00:07:55,450 --> 00:07:57,450

There were people who would say,

146

00:07:57,450 --> 00:08:01,070

you know, you may have a

147

00:08:01,070 --> 00:08:03,070

hard time at NASA because people

148

00:08:03,070 --> 00:08:05,070

are not going to accept you and all

149

00:08:05,070 --> 00:08:08,090

of those things, you will

150

00:08:08,090 --> 00:08:10,090

have a difficult time.

151
00:08:10,090 --> 00:08:12,090
That was completely the opposite

152
00:08:12,090 --> 00:08:14,400
when I got here.

153
00:08:14,400 --> 00:08:17,340
I met some wonderful people,

154
00:08:17,340 --> 00:08:21,070
they took me under their wings,

155
00:08:21,070 --> 00:08:24,830
I worked hard, they respected that,

156
00:08:24,830 --> 00:08:28,560
and they really helped me along the way.

157
00:08:28,560 --> 00:08:30,840
It was a great group of people,

158
00:08:30,840 --> 00:08:32,840
and this whole NASA career that

159
00:08:32,840 --> 00:08:35,160
I've been in has been one

160
00:08:35,160 --> 00:08:37,830
heck of a ride.

161
00:08:37,830 --> 00:08:41,000
but it all started back on that hot

162
00:08:41,000 --> 00:08:48,530
summer day, January 21, 1969.

163
00:08:48,530 --> 00:08:53,060

I think about 1,700 hours when

164

00:08:53,060 --> 00:08:56,040
man landed on the moon.

165

00:08:56,040 --> 00:08:59,230
And I asked to be here.

166

00:09:08,120 --> 00:09:11,200
It is a gift, so I basically say

167

00:09:11,200 --> 00:09:13,200
ask and it shall be given,

168

00:09:13,200 --> 00:09:15,200
but when it's given to you,

169

00:09:15,200 --> 00:09:17,200
you need to honor that gift,

170

00:09:17,200 --> 00:09:19,200
respect that gift,

171

00:09:19,200 --> 00:09:24,420
not to squander that gift.

172

00:09:32,430 --> 00:09:35,080
The state of STEM in America today

173

00:09:35,080 --> 00:09:38,080
is not where we need to be,

174

00:09:38,110 --> 00:09:40,110
and even in the African American community,

175

00:09:40,110 --> 00:09:44,580
it is even worse.

176

00:09:44,580 --> 00:09:46,580

There are some facts out there on the

177

00:09:46,580 --> 00:09:49,550

Department of Education website

178

00:09:49,580 --> 00:09:54,450

that has a lot of interesting statistics

179

00:09:54,450 --> 00:09:56,450

about where we are, where we're

180

00:09:56,450 --> 00:09:59,580

going with respect to STEM.

181

00:09:59,580 --> 00:10:02,360

I can say this, that creativity,

182

00:10:02,360 --> 00:10:06,830

innovation through STEM is going to be

183

00:10:06,850 --> 00:10:11,189

the driving force, the force that

184

00:10:11,190 --> 00:10:14,710

really moves the American economy.

185

00:10:14,710 --> 00:10:16,710

To say that, to be the force

186

00:10:16,710 --> 00:10:19,600

to move the American economy

187

00:10:19,610 --> 00:10:21,889

I mean that by that four

188

00:10:21,890 --> 00:10:24,890

letter word called jobs.

189

00:10:24,890 --> 00:10:28,289

If we don't engage in these

190

00:10:28,290 --> 00:10:32,009

STEM activities, we are

191

00:10:32,010 --> 00:10:35,680

going to be left behind.

192

00:10:35,680 --> 00:10:40,300

So it's extraordinarily important

193

00:10:40,300 --> 00:10:42,810

that our future economy, how

194

00:10:42,830 --> 00:10:44,970

we grow as a group,

195

00:10:44,970 --> 00:10:48,230

that it's effected by involvement

196

00:10:48,240 --> 00:10:52,010

in the STEM activities.

197

00:10:52,010 --> 00:10:57,050

I know that President Obama, when he started,

198

00:10:57,110 --> 00:11:00,220

he realized that we need to

199

00:11:00,220 --> 00:11:03,080

create twenty, over I don't know

200

00:11:03,100 --> 00:11:05,670

how many million STEM jobs in

201
00:11:05,670 --> 00:11:08,710
order to basically look at the American

202
00:11:08,710 --> 00:11:11,180
economy where it will be in 2022.

203
00:11:11,180 --> 00:11:13,180
Now, some investments have been

204
00:11:13,180 --> 00:11:16,060
made there to try to make that happen.

205
00:11:16,100 --> 00:11:19,100
I think he put over 850 million in STEM

206
00:11:19,110 --> 00:11:22,230
education, and actually, there have been

207
00:11:22,230 --> 00:11:24,230
some positive results, but still

208
00:11:24,230 --> 00:11:29,410
there's a lag from where we need to be.

209
00:11:29,410 --> 00:11:34,080
For instance, the African American community

210
00:11:34,080 --> 00:11:37,850
probably makes up eleven percent of

211
00:11:37,850 --> 00:11:46,150
the workforce and they only make up about

212
00:11:46,150 --> 00:11:48,890
four percent of the STEM workforce.

213
00:11:48,890 --> 00:11:52,130

That's an improvement from the 1970s,

214

00:11:52,130 --> 00:11:54,130

like two percent, but it still is not

215

00:11:54,130 --> 00:11:58,899

comparative and representative of the population

216

00:11:58,900 --> 00:12:02,000

of where that group is.

217

00:12:02,000 --> 00:12:05,810

So, STEM is extraordinarily important and

218

00:12:05,810 --> 00:12:08,290

it is important to our economy and

219

00:12:08,290 --> 00:12:11,190

it is it important how we play into

220

00:12:11,190 --> 00:12:13,190

the future economy, but we need

221

00:12:13,190 --> 00:12:17,600

to change the stigma around STEM.

222

00:12:17,600 --> 00:12:22,560

People say, "We don't study that stuff

223

00:12:22,560 --> 00:12:26,870

because it's hard."

224

00:12:26,870 --> 00:12:31,160

Well, if you tell young people something

225

00:12:31,160 --> 00:12:32,810

is hard, it will be hard.

226

00:12:32,810 --> 00:12:34,830

When I played basketball in high school,

227

00:12:34,860 --> 00:12:36,860

there used to be a poem we would recite,

228

00:12:36,890 --> 00:12:38,589

“it’s all in the state of mind.”

229

00:12:38,590 --> 00:12:40,390

It was kind of one of the things that

230

00:12:40,390 --> 00:12:42,390

said if you like the win but don’t think

231

00:12:42,390 --> 00:12:43,990

you can, the more that there’s a

232

00:12:43,990 --> 00:12:45,990

chance that you won’t.

233

00:12:45,990 --> 00:12:49,880

It’s all in the state of mind.

234

00:12:49,880 --> 00:12:56,000

The thing is that we have to teach our

235

00:12:56,000 --> 00:13:00,570

young people that it is not hard, you know.

236

00:13:00,590 --> 00:13:03,340

I remember teaching high school mathematics

237

00:13:03,340 --> 00:13:07,430

and I taught actually twenty-five years, part-time

238

00:13:07,430 --> 00:13:09,430

at Alabama A&M University, I taught

239

00:13:09,430 --> 00:13:12,300

calculus, and one of those things I would hear

240

00:13:12,300 --> 00:13:16,530

consistenly was why do I need to learn this stuff

241

00:13:16,530 --> 00:13:20,910

I'm never going to use this anywhere.

242

00:13:20,910 --> 00:13:27,230

I think that, I used to say learning mathematics

243

00:13:27,230 --> 00:13:34,830

will help change how your brain is wired,

244

00:13:34,830 --> 00:13:37,920

how you think about things, it will

245

00:13:37,920 --> 00:13:41,080

change the way you look at things.

246

00:13:41,080 --> 00:13:43,670

Learning science, technology, those things

247

00:13:43,670 --> 00:13:45,670

change the wiring diagrams in your mind and

248

00:13:45,670 --> 00:13:49,630

therefore it makes you become more

249

00:13:49,630 --> 00:13:53,690

of a problem-solver and an innovator.

250

00:13:53,690 --> 00:13:56,920

Whether you use that or not, but it is

251

00:13:56,920 --> 00:13:59,190

how you condition your mind.

252

00:13:59,190 --> 00:14:05,900

At a very early age, our young people's minds

253

00:14:05,900 --> 00:14:10,410

need to get conditioned to think scientifically,

254

00:14:10,410 --> 00:14:13,360

to think mathematically.

255

00:14:13,360 --> 00:14:16,350

I was looking at like in China and they

256

00:14:16,350 --> 00:14:19,690

were saying American has made some progress

257

00:14:19,730 --> 00:14:23,590

our tenth graders now perform at the same

258

00:14:23,590 --> 00:14:26,170

level that third graders are performing

259

00:14:26,170 --> 00:14:29,140

at in China with respect to mathematics.

260

00:14:29,140 --> 00:14:33,710

You can't tell me third graders in China who could

261

00:14:33,710 --> 00:14:38,940

develop a mathematical capability that now our

262

00:14:38,940 --> 00:14:40,940

tenth graders are doing and that

263

00:14:40,940 --> 00:14:42,940

we can't do the same.

264

00:14:42,940 --> 00:14:45,380

It's not about the level of difficulty, it's about that.

265

00:14:45,380 --> 00:14:48,780

Some of STEM is just marketing too.

266

00:14:48,780 --> 00:14:51,120

How do we market STEM?

267

00:14:51,120 --> 00:14:55,140

How do we let people know that it's now

268

00:14:55,140 --> 00:14:57,750

a sexy and exciting thing to go into?

269

00:14:57,750 --> 00:15:02,170

There used to be a thing when I was a

270

00:15:02,170 --> 00:15:05,720

member, there would be a whole study about

271

00:15:05,720 --> 00:15:08,750

how you deal with math and anxiety

272

00:15:08,750 --> 00:15:11,650

that is the fear of math.

273

00:15:11,650 --> 00:15:15,110

So many young people have developed math

274

00:15:15,110 --> 00:15:18,930

anxiety based on their first exposure to it.

275

00:15:18,930 --> 00:15:22,830

Who was that first teacher that taught me this?

276

00:15:22,830 --> 00:15:26,860

A lot of times in elementary school, teachers are

277

00:15:26,860 --> 00:15:32,450

a generalist, they teach all subjects,

278

00:15:32,450 --> 00:15:35,980

and they have to teach some mathematics but

279

00:15:35,980 --> 00:15:39,260

they have an anxiety about it themselves and

280

00:15:39,260 --> 00:15:41,260

they pass that anxiety a lot of times

281

00:15:41,260 --> 00:15:43,150

on to our young people.

282

00:15:43,150 --> 00:15:45,150

The things we need to do in the African

283

00:15:45,150 --> 00:15:48,610

American community is still lagging in this

284

00:15:48,610 --> 00:15:51,590

even though yeah, we're making some

285

00:15:51,590 --> 00:15:54,970

progress, but it still has a long way to go.

286

00:15:54,970 --> 00:15:59,190

Even though twenty-seven percent of the

287

00:15:59,190 --> 00:16:01,720

African Americans who do study STEM are

288

00:16:01,720 --> 00:16:05,980

learning it from Historically Black Colleges and

289
00:16:05,980 --> 00:16:09,340
Universities and even though Historically Black Colleges

290
00:16:09,340 --> 00:16:11,340
and Universities only make up three

291
00:16:11,340 --> 00:16:13,340
percent of the universities in the country, they're

292
00:16:13,340 --> 00:16:17,420
producing twenty percent of the African

293
00:16:17,420 --> 00:16:20,440
Americans in the STEM program.

294
00:16:20,440 --> 00:16:24,800
All of those things need to be paid attention to and

295
00:16:24,800 --> 00:16:30,280
these things need to change because our future

296
00:16:30,280 --> 00:16:34,030
is based upon our ability to innovate, our ability

297
00:16:34,050 --> 00:16:38,549
to solve really challenging problems, and

298
00:16:38,550 --> 00:16:43,270
STEM is a requirement in order to do that.

299
00:16:43,350 --> 00:16:53,199
I think STEM, like anything, it starts in the

300
00:16:53,200 --> 00:16:58,760
home and it starts early, in the beginning to make

301
00:16:58,790 --> 00:17:05,060
children and young people comfortable with certain things.

302
00:17:05,090 --> 00:17:08,570
Young people are incredible.

303
00:17:08,570 --> 00:17:11,000
Their ability to learn and to adapt and to

304
00:17:11,030 --> 00:17:14,460
pick up things is amazing. Their minds are

305
00:17:14,460 --> 00:17:16,440
they pick up things relatively quick.

306
00:17:16,440 --> 00:17:20,670
I've seen like six-month- old, seven-month-old babies

307
00:17:20,670 --> 00:17:23,690
working an iPhone, they know how it works,

308
00:17:23,690 --> 00:17:25,840
it's intuitive, and they just grab it and go,

309
00:17:25,840 --> 00:17:29,380
all this technology. It just depends on

310
00:17:29,380 --> 00:17:35,660
how the sort of steps is, how do we make learning

311
00:17:35,660 --> 00:17:41,860
how do we make it fun? I remember my

312
00:17:41,860 --> 00:17:46,720
granddaughter, she started reading around the age

313
00:17:46,720 --> 00:17:53,589

of three, and it wasn't because she was special

314

00:17:53,590 --> 00:17:57,310

or anything, but the things we played and the

315

00:17:57,310 --> 00:18:02,520

games we did in a part of her fun process, as

316

00:18:02,560 --> 00:18:06,040

a part of what she enjoyed doing, and

317

00:18:06,040 --> 00:18:09,810

learning became a part of that, okay.

318

00:18:09,810 --> 00:18:13,350

So, we start early, we take steps, then

319

00:18:13,350 --> 00:18:17,350

we have to make sure that as they enter

320

00:18:17,350 --> 00:18:22,040

elementary school and middle school that

321

00:18:22,100 --> 00:18:25,150

we have a curriculum that is designed to

322

00:18:25,150 --> 00:18:29,740

promote this kind of thinking and learning.

323

00:18:29,740 --> 00:18:33,950

And we have to market it in such a way

324

00:18:33,950 --> 00:18:40,430

and message it in such a way that that they

325

00:18:40,430 --> 00:18:45,890

actually gravitate toward it. Young people, I

326

00:18:45,890 --> 00:18:48,710

look at them and they can pick up a brand

327

00:18:48,710 --> 00:18:50,710

new video game or whatever and they go.

328

00:18:50,710 --> 00:18:53,800

They can grab these things and go just rapidly.

329

00:18:53,800 --> 00:19:01,710

So, it's how we actually give them a

330

00:19:01,710 --> 00:19:04,790

little more insight on the things behind the

331

00:19:04,790 --> 00:19:07,240

technology they're using, for them to

332

00:19:07,240 --> 00:19:11,350

understand it, and that starts changing how

333

00:19:11,380 --> 00:19:14,570

they mentally think about things. I don't

334

00:19:14,570 --> 00:19:18,550

want to call it brainwashing, but it's conditioning

335

00:19:18,550 --> 00:19:20,550

the mind, changing the wiring in the

336

00:19:20,550 --> 00:19:24,300

brain to think a certain way, to look at things

337

00:19:24,300 --> 00:19:27,830

systematically, to look at how we solve

338

00:19:27,830 --> 00:19:31,850

problems and how we actually do that. Those

339

00:19:31,850 --> 00:19:33,850

are the steps. As they get through middle

340

00:19:33,850 --> 00:19:37,080

school and high school, so often as you

341

00:19:37,080 --> 00:19:40,320

get through high school, it you haven't

342

00:19:40,330 --> 00:19:42,680

done a certain amount of things, you've

343

00:19:42,700 --> 00:19:44,700

actually written off a lot of things and

344

00:19:44,700 --> 00:19:49,420

it becomes a little late then to change it.

345

00:19:49,420 --> 00:19:53,610

Our colleges also, how we set our curriculums

346

00:19:53,610 --> 00:19:58,500

and how we do things. I remember my nieces and

347

00:19:58,500 --> 00:20:02,580

nephews, my niece would make straight As

348

00:20:02,580 --> 00:20:05,520

because it was important to her to make straight

349

00:20:05,520 --> 00:20:12,410

As, it was a sense of pride. Her brothers, who

350

00:20:12,410 --> 00:20:15,090

are extraordinarily smart, didn't see the value

351

00:20:15,090 --> 00:20:18,090

of making straight As. What does that

352

00:20:18,090 --> 00:20:23,290

do for me, it's not fun, it's not entertaining

353

00:20:23,290 --> 00:20:28,250

to me. For her, it was just if you make straight

354

00:20:28,250 --> 00:20:31,470

As you get the ribbon and the little thing, that

355

00:20:31,470 --> 00:20:33,930

was important to her. To them, that wasn't

356

00:20:33,990 --> 00:20:37,610

important to them because I'm not having

357

00:20:37,610 --> 00:20:40,920

fun doing that. So the kids, how we can

358

00:20:40,920 --> 00:20:45,840

make, and relate how kids learn differently

359

00:20:45,840 --> 00:20:54,130

fun or more acceptable or more enjoyable.

360

00:20:54,130 --> 00:20:59,850

As we move forward, then we'll creating more

361

00:20:59,850 --> 00:21:02,690

of those going to college taking certain classes

362

00:21:02,690 --> 00:21:05,540

and they won't be viewed, they won't view

363

00:21:05,540 --> 00:21:09,060

and say I don't want to be an engineer, I don't want

364

00:21:09,060 --> 00:21:13,740

to be a physicist because that's hard. I'm not

365

00:21:13,740 --> 00:21:16,850

saying they all need to be scientists, physicists,

366

00:21:16,850 --> 00:21:22,480

engineers, all jobs are important, but I do

367

00:21:22,480 --> 00:21:26,080

not want someone not taking a job or going into

368

00:21:26,080 --> 00:21:29,120

a field because they think it's hard.

369

00:21:29,120 --> 00:21:31,550

They need to go into a field based on what

370

00:21:31,550 --> 00:21:33,550

they really want to do, not

371

00:21:33,550 --> 00:21:35,550

what they think is easier to do.

372

00:21:42,770 --> 00:21:47,770

I must admit, my parents were great mentors.

373

00:21:47,770 --> 00:21:50,930

They weren't educated people, but they

374

00:21:50,930 --> 00:21:53,190

believed in hard work, they believed in

375

00:21:53,190 --> 00:21:57,030

committing yourself in doing that. But, I

376

00:21:57,030 --> 00:22:00,730

remember when I integrated the school in

377

00:22:00,730 --> 00:22:05,960

the late 1960s, my school was small and I

378

00:22:05,960 --> 00:22:09,180

didn't have a Black teacher in high school,

379

00:22:09,180 --> 00:22:11,760

there wasn't a Black teacher at my high

380

00:22:11,760 --> 00:22:13,760

school the whole while. The teachers were

381

00:22:13,760 --> 00:22:18,310

fine, but we really didn't have a close

382

00:22:18,310 --> 00:22:22,920

connection, so after that, I went to a Historically

383

00:22:22,920 --> 00:22:25,440

Black College and University and that

384

00:22:25,440 --> 00:22:28,400

was my first time actually seeing a lot of

385

00:22:28,400 --> 00:22:32,380

Black professionals, being from the rural and

386

00:22:32,380 --> 00:22:35,960

whatever. I'll never forget this person because

387

00:22:35,960 --> 00:22:39,460

this person played such a key role in my

388

00:22:39,460 --> 00:22:41,460

life: she was the chairman of our mathematics

389

00:22:41,460 --> 00:22:44,850

department and her name was Dr. Richie

390

00:22:44,860 --> 00:22:49,610

White. She used to tell people, "This is my

391

00:22:49,610 --> 00:22:58,180

adopted son. I really believe that I haven't

392

00:22:58,180 --> 00:23:04,190

gotten a job or anything early on that she

393

00:23:04,190 --> 00:23:06,190

didn't play a role in. I believe she had a

394

00:23:06,190 --> 00:23:08,190

significant role in me getting a job at NASA

395

00:23:08,190 --> 00:23:13,880

without an interview. When I went to

396

00:23:13,880 --> 00:23:18,070

graduate school, she made sure the application

397

00:23:18,070 --> 00:23:21,000

was filled out and she filled out part of

398

00:23:21,000 --> 00:23:24,090

it. She just basically said this is what I

399

00:23:24,130 --> 00:23:26,959

want you to do. Maybe God put her in

400

00:23:26,960 --> 00:23:30,940

my path to guide me and lead me, and she

401

00:23:30,940 --> 00:23:35,640

pushed me extremely hard, she taught me

402

00:23:35,640 --> 00:23:38,760

a lot of things a little boy from the country just

403

00:23:38,760 --> 00:23:43,560

didn't know about life, how to behave here,

404

00:23:43,590 --> 00:23:47,380

how to go there, all those sorts of things. And

405

00:23:47,380 --> 00:23:56,920

I remember she said, "Look, you have the

406

00:23:56,920 --> 00:24:02,520

confidence to know the things you do not know

407

00:24:02,560 --> 00:24:07,940

but to learn the things that you don't

408

00:24:07,990 --> 00:24:11,260

know. Those things that you don't know,

409

00:24:11,260 --> 00:24:16,270

be okay with that, but never put yourself in a

410

00:24:16,270 --> 00:24:18,949

situation saying I can learn the things that I do

411

00:24:18,950 --> 00:24:23,070

not know. This is about confidence, so

412

00:24:23,070 --> 00:24:26,070

don't be fearful of this or fearful of that.

413

00:24:26,070 --> 00:24:30,260

A lot of things in life you don't know, fine, but

414

00:24:30,260 --> 00:24:33,410

what keeps you from learning those things

415

00:24:33,410 --> 00:24:35,410

if you want to. You can't believe something is

416

00:24:35,430 --> 00:24:38,310

too hard for you to what, learn or know.

417

00:24:38,340 --> 00:24:41,430

There are books out there, there are people

418

00:24:41,430 --> 00:24:44,170

out there, it is all about how you view

419

00:24:44,170 --> 00:24:50,130

the world." She was an extraordinary

420

00:24:50,130 --> 00:24:55,370

mentor and helped me with a lot of things.

421

00:24:55,370 --> 00:25:01,750

The way I ended up at NASA was I was in

422

00:25:01,820 --> 00:25:06,130

graduate school and the dean of the graduate

423

00:25:06,130 --> 00:25:09,350

school, she called, I got a call one morning

424

00:25:09,350 --> 00:25:12,580

because Mr. Shurney used to talk to the dean

425

00:25:12,580 --> 00:25:17,040

of the other school in Fort Valley that I

426

00:25:17,040 --> 00:25:20,350

went to, they were good friends, and he said

427

00:25:20,350 --> 00:25:23,940

that Marshall Space Flight Center is hiring

428

00:25:23,940 --> 00:25:26,440

and do you have some students down there

429

00:25:26,440 --> 00:25:29,130

that are interested in, that can apply for a

430

00:25:29,130 --> 00:25:32,280

job. He told her and she said immediately,

431

00:25:32,280 --> 00:25:37,460

"Yeah, Lewis is up in graduate school and

432

00:25:37,460 --> 00:25:41,360

he's about to get out." She said call him.

433

00:25:41,360 --> 00:25:44,500

I called Mr. Shurney and Mr. Shurney said fill

434

00:25:44,500 --> 00:25:48,210

out a 171 Form, do this, make sure you address

435

00:25:48,210 --> 00:25:50,720

the things that you've had and such and

436

00:25:50,720 --> 00:25:53,400

such. I did all of that and then all of a sudden

437

00:25:53,400 --> 00:25:57,780

it was later that I got an offer without, like

438

00:25:57,780 --> 00:26:01,020

I said, an interview. I met Mr. Shurney when

439

00:26:01,020 --> 00:26:04,380

I got here and Mr. Shurney was an

440

00:26:04,390 --> 00:26:07,230

amazing man. He actually was the chief

441

00:26:07,270 --> 00:26:10,420

designer of the tires that go on the Lunar

442

00:26:10,420 --> 00:26:12,940

Rover; he actually basically said that the design,

443

00:26:12,940 --> 00:26:16,290

that they needed a design that was

444

00:26:16,290 --> 00:26:22,240

very lightweight, flexible, yet still could go

445

00:26:22,250 --> 00:26:26,190

across the surface. He said a steel band with

446

00:26:26,190 --> 00:26:29,340

aluminum wire mesh would be a solution,

447

00:26:29,340 --> 00:26:31,640

and he was actually the chief designer for

448

00:26:31,640 --> 00:26:35,060

that. He also designed the waste disposal

449

00:26:35,060 --> 00:26:37,820

system that we actually used on Skylab that

450

00:26:37,820 --> 00:26:42,040

kind of determined how we use the toilet in space.

451
00:26:42,040 --> 00:26:47,309
He verified that works with a KC-135 aircraft

452
00:26:47,310 --> 00:26:50,980
where they do zero g and it actually

453
00:26:51,020 --> 00:26:56,050
worked. That same system, the concept

454
00:26:56,050 --> 00:26:58,600
was used on Space Shuttle and it also is

455
00:26:58,600 --> 00:27:00,950
used on the International Space Station today.

456
00:27:00,950 --> 00:27:03,450
I didn't work with Mr. Shurney directly, but

457
00:27:03,450 --> 00:27:06,970
he's a reason I got to the Marshall Space

458
00:27:06,980 --> 00:27:09,960
Flight Center. Once I came to the Marshall

459
00:27:09,960 --> 00:27:14,020
Space Flight Center, I was in the Orbital

460
00:27:14,050 --> 00:27:17,870
Mechanics branch and I worked with a very

461
00:27:17,890 --> 00:27:21,800
brilliant man named Dr. Larry Mullins.

462
00:27:21,800 --> 00:27:26,609
He actually taught me a whole lot about orbital

463
00:27:26,610 --> 00:27:30,220

mechanics and about these things and we

464

00:27:30,220 --> 00:27:34,030

became a great partnership because I know

465

00:27:34,060 --> 00:27:37,270

how to write computer software and we

466

00:27:37,270 --> 00:27:39,590

know how to solve equations and I could

467

00:27:39,590 --> 00:27:42,290

understand all the equations and then I could

468

00:27:42,290 --> 00:27:44,430

turn that into software. Then I ended up teaching

469

00:27:44,430 --> 00:27:46,899

him how to write software and we

470

00:27:46,900 --> 00:27:50,280

did a lot of wonderful things, but he's the

471

00:27:50,280 --> 00:27:56,430

one that I think that, from a technical

472

00:27:56,460 --> 00:28:00,540

perspective, mentoring me and got me where

473

00:28:00,560 --> 00:28:04,970

I'm going. He alleviated all those things

474

00:28:04,970 --> 00:28:07,170

that people say that people wouldn't embrace

475

00:28:07,210 --> 00:28:10,520

you, people wouldn't support you, and

476

00:28:10,580 --> 00:28:13,920

that was completely opposite. Larry wasn't

477

00:28:13,920 --> 00:28:16,940

African American, Mr. Shurney was, but

478

00:28:16,940 --> 00:28:20,820

there have been others that actually have been

479

00:28:20,860 --> 00:28:25,010

a great benefit to me. Mr. Axel Roth was

480

00:28:25,010 --> 00:28:28,160

one of them, Ms. Carolyn Griner was one of

481

00:28:28,160 --> 00:28:30,810

them, Ms. Ann McNair was one of them, a

482

00:28:30,810 --> 00:28:33,510

lot of those people have been actually amazing

483

00:28:33,510 --> 00:28:36,390

and very supportive through my career.

484

00:28:42,950 --> 00:28:46,810

I look at it this way, I didn't really want to

485

00:28:46,810 --> 00:28:51,220

teach high school mathematics, but at the

486

00:28:51,220 --> 00:28:57,200

time, it was a job that I needed, but I'm a

487

00:28:57,230 --> 00:29:01,100

strong believer in you get the things that you

488

00:29:01,100 --> 00:29:05,710

need to. It's not about what you want but what

489

00:29:05,710 --> 00:29:10,520

you need. I look at every situation I'm in

490

00:29:10,520 --> 00:29:15,110

as an opportunity. I'm here for a reason,

491

00:29:15,180 --> 00:29:19,580

what am I to bring and what am I to receive?

492

00:29:19,620 --> 00:29:24,110

There's always those things there. I'm

493

00:29:24,110 --> 00:29:27,000

here for a reason; I'm either here to give

494

00:29:27,000 --> 00:29:30,840

something, I'm here to receive something, or

495

00:29:30,840 --> 00:29:33,570

both. Don't shy away from it, and actually,

496

00:29:33,570 --> 00:29:36,640

I enjoyed it much more than

497

00:29:36,660 --> 00:29:39,960

I thought I ever would.

498

00:29:40,010 --> 00:29:43,389

It's the same thing that works with projects

499

00:29:43,390 --> 00:29:46,080

and things, how you start out things makes

500

00:29:46,080 --> 00:29:48,700

a difference. You don't have to go in and be

501
00:29:48,700 --> 00:29:51,930
a bully or whatever, but you need to go in

502
00:29:51,930 --> 00:29:54,430
being prepared. You need to make sure that

503
00:29:54,430 --> 00:29:57,580
you have a handle on the situation and

504
00:29:57,580 --> 00:30:04,190
then that starts the framework to build

505
00:30:04,200 --> 00:30:08,790
on. We don't have much of that problem here

506
00:30:08,790 --> 00:30:11,390
in the professional world because most

507
00:30:11,390 --> 00:30:14,550
professionals come in there, but I learned get

508
00:30:14,550 --> 00:30:17,090
control of your classroom, get control of it early,

509
00:30:17,090 --> 00:30:18,990
they may think you're being a little

510
00:30:18,990 --> 00:30:21,470
rigid up front, but establish the rules, stick

511
00:30:21,470 --> 00:30:25,230
by them, enforce them, then after a while,

512
00:30:25,280 --> 00:30:28,270
things will go better. I learned that a lot. Then

513
00:30:28,290 --> 00:30:31,430

once you get that kind of level of control

514

00:30:31,450 --> 00:30:34,480

of your classroom, then you can begin to teach,

515

00:30:34,480 --> 00:30:36,970

then learning begins to take place

516

00:30:36,970 --> 00:30:39,660

because that's why you're there, not

517

00:30:39,660 --> 00:30:41,350

to be a disciplinarian but to teach.

518

00:30:41,350 --> 00:30:44,060

But basically, the reason so many people

519

00:30:44,080 --> 00:30:47,290

don't do it is because of what it pays. I taught

520

00:30:47,290 --> 00:30:51,480

part-time as an obligation at Alabama A&M

521

00:30:51,520 --> 00:30:55,190

University for twenty-five years and

522

00:30:55,190 --> 00:30:58,460

people said why did you? I promised Dr.

523

00:30:58,500 --> 00:31:01,080

White, who actually mentored me

524

00:31:01,120 --> 00:31:04,150

throughout, because she had this goal for me

525

00:31:04,180 --> 00:31:08,990

which was get your PhD, go eventually

526

00:31:08,990 --> 00:31:11,140

become a dean at a university, maybe become

527

00:31:11,140 --> 00:31:13,400

president of some college. That was her

528

00:31:13,400 --> 00:31:15,180

goal, that was her drive, she was driving me

529

00:31:15,180 --> 00:31:18,010

down that path. When I got ready to leave

530

00:31:18,110 --> 00:31:22,710

Atlanta University, I had a job there and they

531

00:31:22,730 --> 00:31:26,159

said well and I said, "No, I really don't

532

00:31:26,160 --> 00:31:29,040

want to go back to school right now, I want

533

00:31:29,060 --> 00:31:32,009

to apply some of the stuff I've learned."

534

00:31:32,010 --> 00:31:35,370

They said, "We'll get you enrolled in a PhD

535

00:31:35,390 --> 00:31:38,120

program at Georgia Tech and you can teach

536

00:31:38,120 --> 00:31:41,350

here." I said, "That sounds wonderful, but I

537

00:31:41,360 --> 00:31:44,800

really want to see how this stuff really

538

00:31:44,810 --> 00:31:48,100

works in the real world." I got here, got

539

00:31:48,110 --> 00:31:52,000

excited, but out of obligation to her I said I

540

00:31:52,000 --> 00:31:55,340

promised I would teach, so I went and taught

541

00:31:55,340 --> 00:31:58,290

at Alabama A&M part-time. That itself

542

00:31:58,310 --> 00:32:04,390

too, and some of the people I taught work out

543

00:32:04,420 --> 00:32:09,810

here today, and it was more beneficial

544

00:32:09,850 --> 00:32:14,729

actually me doing that than it actually was

545

00:32:14,730 --> 00:32:18,000

an obligation from me to her. You know,

546

00:32:18,000 --> 00:32:21,210

teaching at the college level is different than

547

00:32:21,210 --> 00:32:24,440

teaching at the high school because you

548

00:32:24,440 --> 00:32:27,270

don't have to worry about things as much with

549

00:32:27,270 --> 00:32:29,270

getting control of your classroom, I

550

00:32:29,270 --> 00:32:31,730

mean, they're paying to be here, fine. But it's

551

00:32:31,750 --> 00:32:34,690

still that connection back to students and

552

00:32:34,690 --> 00:32:41,000

teaching.

553

00:32:41,000 --> 00:32:43,670

I will say this, I've heard it, and this is a true

554

00:32:43,670 --> 00:32:46,550

fact, you never learn anything until you

555

00:32:46,550 --> 00:32:51,470

have to teach it. The best way to learn is to

556

00:32:51,470 --> 00:32:57,200

teach something, and that to me, gave me a

557

00:32:57,200 --> 00:33:01,590

sort of platform and an insight to young people

558

00:33:01,590 --> 00:33:04,860

and to teaching a subject and learning